بسم الله الرحمن الرحيم

Mashreq University

Telecommunications Engineering Department
&
Electronics Engineering

Undergraduate Programs Curriculum

منهج قسم هندسة الاتصـــالات
و
قسم هندسة الالكترونيـــــتات

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1 Preamble

Studying for a degree in electronic engineering is not just the pathway to a rewarding career but offers an intellectually demanding and exciting opportunity to break through new boundaries. Many of the most remarkable advancements in the past years have only been possible through the snooping and ingenuity of the electronic engineer.

The department of Electronic Engineering offers programs in the major areas of electronic and communication engineering. These programs are leading to a Bachelor degree in electronic and communication degree. The profession of electronic and communication engineering demands a strong foundation in physical science and mathematics, beside a broad knowledge of engineering techniques, and understanding of the relation between technology and human being. The programs are designed to provide the Requirements of education and depth of training necessary for leadership in the profession. To engage in this profession with competence, five years of undergraduate study is recommended. The curriculum of the departments fully complies with the accreditation of the Sudan Engineering Council.

2 Programs Objectives:

The programs of the department of Electronics/telecommunication Engineering are designed to achieve the following:

1. To supply the candidates with the necessary knowledge to design and implement the planned and needed engineering projects as a part of the development of the society.
2. To improve the education and training methods and techniques used in electronics/ telecommunication engineering.
3. To provide a suitable academic environment for teaching and research areas to help in finding solutions by using the appropriate technologies.

3 Departments programs Admission:

The criteria set for the department admission is the pass in secondary school certificate or its equivalent. The certificate should include the following subjects: Mathematics, Physics, chemistry, additional mathematics, or engineering sciences.

4 Study Period

The period of study of all programs in the department is five years, ten semesters. Each academic year consist of two semesters.

5 Teaching in the Department

Undergraduate programmes offer flexibility, allowing interdisciplinary combinations. The syllabus is continually under development and review, in line with the requirements of various professional bodies that accredit our courses, and the latest technological needs of industry.

The quality of the teaching is achieved by recruiting the most qualified teaching staff together with providing a suitable teaching environment built on an appropriate infra structure for the college.

6 Facilities

Extensive teaching laboratories and networked computer suites are available to all undergraduate students in the department. All electronics, telecommunication, and computer labs are available in the college, which consist of the most efficient equipment needed to satisfy the requirements of the study. Students of the department have the opportunity to improve their skills and capabilities in their interested engineering fields through the scientific societies available in the department and the college. A continuous seminars and presentations are held in the department regularly to achieve these goals.

7 Courses Codes

$C_1C_2C_3C_4C_5C_6$ → EM1101

C_1C_2	Field of study
C_3	Year of study
C_4	Semester (1 or 2)
C_5C_6	The serial number of the course (01, 02, 03,…….)

نوع الساعات	المعيار	المستحق	
عدد ساعات الاتصال	لا تقل عن 4000	4245 الاتصالات	4200 الالكترونيات
نسبة العملي والتدريب والمتابعة للساعات المعتمدة	ما يعادل 35%	%35	
الساعات المعتمدة	180-200	193	
ساعات التدريب	10	10	
مشروع التخرج	6	6	

- نسب مكونات البرنامج:

النوع	المعيار	المستحق
رياضيات وعلوم بحته	%30 - %25	25%
علوم هندسة أساسية	%35 - %25	32%
علوم تطبيقية وتصميم	%35 - %25	32%
علوم انسانية	%15 - %10	11%
المجموع		100%

8 Syllabus Components and Coding

Component		Code
Basic Sciences	Mathematics	EM
	Basic Sciences	PH, CH
	Computer System	CS
Engineering Science	Electrical Eng.	EE
	Mechanical Eng	ME
	General Engineering	GE
Social and Human Sciences	Economics & Admin.	AD
	Studies & Languages	AR, IS, EN
Engineering Design and Applied	Project	PR
	Electronic Eng.	ECE
	Communications Eng.	CE

9 Degree Components and Credit Hours

9.1 Basic Science and Math (25%)

Code	Title	Credit Hours
EM1101	Calculus I حسبان 1	3
EM1102	Linear Algebra جبر خطي	3
PH1103	Physics I الفيزياء 1	3
CH1104	Chemistry كيمياء	3
CS1105	Fundamentals of Computer Science مبادئ الحاسوب	3
EM1201	Calculus II حسبان 2	3
PH1202	Physics II فيزياء2	3
CS1203	Programming Language I لغة برمجه1	2
EM1204	Analytical Geometry الهندسة التحليلية	3
EM1209	Discrete Mathematics رياضيات متقطعة	3
EM2101	Differential Equations معادلات تفاضلية	3
CS 2102	Programming Language II لغة برمجة 2	2
EM2201	Mathematical Methods طرق رياضية	3
EM3101	Probabilities and Statistics احصاء واحتمالات	3
EM3201	Numerical Methods طرق عددية	3
EM3202	Complex Analysis متغيرات مركبة	3
CS3206	Computer Application تطبيقات الحاسوب	2
	Total	48

9.2 Basic Engineering Science (32%)

Code	Title	Credit Hours
EE1205	Fundamentals of Electrical Engineering مبادئ الهندسة الكهربائة	3
ECE2104	Digital Circuits Design I تصميم الدوائر الرقمية-1	3
ECE2105	Principles of Electronic Devices مبادئ الاجهزة الالكترونية	2
EE2106	Electrical Circuits Analysis I تحليل الدوائر الكهربائية -1	3
ME2202	Thermodynamics ديناميكا حرارية	3
ECE2204	Digital Circuits Design I1 تصميم الدوائر الرقمية2	3
ECE2205	Analog Electronic Circuits-I دوائر الالكترونيات التماثلية1	3
EE2206	Electrical Circuits Analysis II تحليل الدوائر الكهربائية2	3
EE3103	Electromagnetic Fields I المجالات الكهرومغناطيسية1	3
ME3104	Engineering Materials هندسة المواد	3
ECE3105	Analog Electronic Circuits-II دوائر الالكترونيات التماثلية2	3
EE3106	Signals and Systems اشارات ونظم	3
ECE3203	Measurements and Instrumentation مقاييس والمتحسسات	3
EE3204	Electromagnetic Fields II المجلات الكهرومغناطيسية2	3
ECE3205	Analogue Electronics Circuits III دوائر الالكترونيات التماثلية3	3
GE3207	Computer Architecture معمارية الحاسوب	2
EE4102	Control Systems I انظمة التحكم 1	3
EE4105	Digital Signal Processing معالجة الاشارة الرقمية	3
EE4106	Power Electronics الكترونيات القدرة	3
EE4202	Control Systems II انظمة التحكم 2	3
GE 5101	Research Methods مناهج البحث	2
GE5104	Environnemental Engineering هندسة البيئة	2
	Total	62

9.3 Applied Science and Design (32%) (Electronics):

Code	Title	Credit Hours
ME2207	Engineering Drawing رسم هندسي	3
ECE3102	Microprocessors & Assembly Language المعالجات الدقيقة ولغة التجميع	3
CE4101	Communication Engineering I هندسة الاتصالات-1	3
ECE4104	Micro Electronics Technology تكنولوجيا الالكترونيات الدقيقة	2
CE4201	Communication Engineering II هندسة الاتصالات-2	3
ECE4203	Interfacing Circuits الربط البيني	3
CE4204	Computer Networks I شبكات الحاسوب1	3
ECE4205	Introduction To VLSI Design مقدمة تصميم التكامل علي نطاق واسع جداً	3
yyy42xx	Elective Course-I كورس اختياري1	3
CE5102	Mobile Communication System انظمة الاتصالات المحموله	3
CE5103	digital Image & Video Processing معالجة الصورة الرقمية والفيديو	3
PR5105	Final Project-I مشروع التخرج 1	3
CS5106	Software Engineering هندسة برمجيات	3
CS5107	Operating System Eng. نظم تشغيل	3
ECE5108	Nano Technology تكنولوجيا النانو	2
ECE5201	Simulation and Modeling نمذجة ومحاكاة	3
ECE5202	Advanced Computer Architecture معمارية حواسيب متقدمة	3
ECE5203	Embedded Systems النظم المدمجة	3
CE5204	Computer Networks II شبكات الحاسوب 2	3
PR5205	Final Project-II مشروع التخرج 2	3
ECE 52xx	Elective Course-II كورس اختياري2	3
	Total	61

9.4 Applied Science and Design (32%): (Telecommunications)

Code	Title	Credit Hours
ME2207	Engineering Drawing رسم هندسي	3
ECE3102	Microprocessors & Assembly Language المعالجات الدقيقة ولغة التجميع	3
CE4101	Communication Engineering I هندسة الاتصالات-1	3
ECE4104	Micro Electronics Technology تكنولوجيا الالكترونيات الدقيقة	2
CE4201	Communication Engineering II هندسة الاتصالات-2	3
ECE4203	Interfacing Circuits الربط البيني	3
CE4204	Computer Networks I شبكات الحاسوب1	3
ECE4205	Introduction To VLSI Design مقدمة تصميم التكامل علي نطاق واسع جداً	3
yyy42xx	Elective Course-I كورس اختياري1	3
CE5102	Mobile Communication Systems انظمة الاتصالات المحمولة	3
CE5103	Digital Image & Video Processing معالجة الصورة الرقمية والفيديو	3
PR5105	Final Project-I مشروع التخرج 1	3
CE5106	Switching and Traffic Theory نظرية التبديل والحركة	2
CE5107	Fiber Optics Communication Systems الالياف ضوئية	3
CE5108	Antennas & Wave Propagation الهوائيات وانتشار الموجات	3
CE5201	Communication Network's Analysis تحليل شبكات الاتصال	3
CE5202	Radar & Microwave Communication اتصالات الرادار والمايكرويف	3
CE52xx	Elective Course-II كورس اختياري2	3
CE5204	Computer Networks II شبكات الحاسوب 2	3
PR5205	Final Project-II مشروع التخرج 2	3
CE5206	Satellite Communication Systems انظمة الاتصالات الفضائية	3
	Total	61

9.5 Social and Human Sciences (11%):

Code	Title	Credit Hours
AR1106	Arabic Language I لغة عربيه1	2
EN1107	English Language I لغة انجليزية 1	2
IS1108	Islamic Studies 1 ثقافة اسلامية 1	2
AR1206	Arabic Language II لغة عربية 2	2
EN1207	English Language II لغة انجليزية 2	2
IS1208	Islamic Studies II ثقافة اسلامية 2	2
EN 2103	English Language III لغة انجليزية 3	2
SD2107	Sudanese Studies دراسات سودانية	2
EN2203	English for Special Purpose (ESP) لغة انجليزية متخصصة	2
AD 4103	Industrial Management أدارة صناعية	2
AD 4206	Engineering Economic اقتصاد هندسي	2
	Total	22

10 Electronic & Telecommunication Engineering Degree Structure

1st Year:

Semester 1

Code	Title	Credit Hours	Lectures Hr/Week	Tutorial Hr/week	Practical Hr/week
EM1101	Calculus I حسبان 1	3	2	2	-
EM1102	Linear Algebra الجبر الخطي	3	2	2	-
PH1103	Physics I فيزياء 1	3	2	-	3
CH1104	Chemistry الكيمياء	3	2	-	3
CS1105	Fundamental of Computer Science مبادئ الحاسوب	3	2	-	3
AR1106	Arabic Language I لغة عربيه 1	2	2	-	-
EN1107	English Language I لغة انجليزية 1	2	2	-	-
IS1108	Islamic Studies I ثقافة اسلامية 1	2	2	-	-
Total		21	16	4	9

Semester 2:

Code	Title	Credit Hours	Lectures Hr/Week	Tutorial Hr/week	Practical Hr/week
EM1201	Calculus II حسبان 2	3	2	2	0
PH1202	Physics II فيزياء 2	3	2	0	3
CS1203	Programming Language I لغة برمجة 1	2	1	0	3
EM1204	Analytical Geometry هندسة تحليلية	3	2	2	0
EE1205	Fundamentals of Electrical Eng. مبادئ الهندسة الكهربائية	3	2	0	3
AR1206	Arabic Language II لغة عربية 2	2	2	0	0
EN1207	English Language II لغة انجليزية 2	2	2	0	0
IS1208	Islamic Studies II ثقافة اسلامية 2	2	2	0	0
EM1209	Discrete Mathematics رياضيات متقطعة	3	2	2	0
Total		23	17	6	9

1st Year C.H= 44

Basic Training (**Practical Duration→ 6 weeks)**					
WS1210	Basic Training التدريب الاساسي	-	-	-	**150**

2nd Year:

Semester 1

Code	Title	Credit Hours	Lectures Hr/Week	Tutorial Hr/week	Practical Hr/week
EM2101	Differential Equations معادلات تفاضلية	3	2	2	0
CS2102	Programming Language II لغة برمجة 2	2	1	0	3
EN2103	English Language III لغة انجليزية 3	2	2	0	0
ECE2104	Digital Circuits Design I تصميم دوائر رقمية 1	3	2	0	3
ECE2105	Principles of Electronic Devices مبادئ الاجهزة الالكترونية	2	2	0	0
EE2106	Electrical Circuits Analysis I تحليل الدوائر الكهربائية 1	3	2	2	2
SD2107	Sudanese Studies درسات سودانية	2	2	0	0
Total		17	13	4	8

Semester 2:

Code	Title	Credit Hours	Lectures Hr/Week	Tutorial Hr/week	Practical Hr/week
EM2201	Mathematical Methods طرق رياضية	3	2	2	0
ME2202	Thermodynamics ديناميكا حرارية	3	2	2	0
EN2203	English for Special Purpose (ESP) لغة انجليزية متخصصة	2	2	0	0
ECE2204	Digital Circuits Design II تصميم دوائر رقمية2	3	2	0	3
ECE2205	Analogue Electronics Circuits I دوائر الالكترونيات التماثلية1	3	2	2	2
EE2206	Electrical Circuit Analysis II تحليل الدوائر الكهربائية2	3	2	2	2
ME2207	Engineering Drawing رسم هندسي	3	2	0	3
Total		20	14	8	10

Total = 38

Advance Training (**Practical Duration→ 6 weeks)**					
WS2208	Advance Training تدريب متقدم	3	-	-	150

3rd Year:

Semester 1:

Code	Title	Credit Hours	Lectures Hr/Week	Tutorial Hr/week	Practical Hr/week
EM3101	Probability and Statistics الاحصاء والاحتمالات	3	2	2	0
ECE3102	Microprocessors & Assembly Language المعالجات الدقيقة ولغة التجميع	3	2	0	3
EE3103	Electromagnetic Fields I المجالات الكهرومغناطيسية1	3	2	2	0
ME3104	Engineering Materials هندسة المواد	3	2	2	2
ECE3105	Analogue Electronics Circuits II دوائر الالكترونيات التماثلية 2	3	2	2	2
EE31106	Signals & Systems اشارات ونظم	3	2	2	2
Total		18	12	10	9

semester 2:

Code	Title	Credit Hours	Lectures Hr/Week	Tutorial Hr/week	Practical Hr/week
EM3201	Numerical Techniques تقنيات عددية	3	2	2	0
EM3202	Complex Variables متغيرات مركبة	3	2	2	0
ECE3203	Measurement & Instrumentation قياسات واجهزة	3	2	0	3
EE3204	Electromagnetic Fields II المجلات الكهرومغناطيسية2	3	2	2	0
ECE3205	Analogue Electronics Circuits III دوائر الالكترونيات التماثلية 3	3	2	2	2
CS3206	Computer Application تطبيقات الحاسوب	2	1	0	3
GE3207	Computer Architecture معمارية الحاسوب	2	2	0	0
Total		**19**	**13**	**8**	**8**

Industrial Training (**Practical Duration→ 8 weeks)**					
WS3208	Industrial Training تدريب صناعي	2	-	-	200

Total = 37

4th Year:

Semester 1:

Code	Title	Credit Hours	Lectures Hr/Week	Tutorial Hr/week	Practical Hr/week
CE4101	Communication Engineering I هندسة الاتصالات-1	3	2	0	3
EE4102	Control Systems I نظم التحكم1	3	2	2	2
AD4103	Industrial Management ادارة صناعية	2	2	0	0
ECE4104	Micro Electronics Technology تكنولوجيا الالكترونيات الدقيقة	2	2	0	0
EE4105	Digital Signal Processing معالجة الاشارة الرقمية	3	2	0	3
EE4106	Power Electronics الكترونيات القدرة	3	2	0	3
Total		16	12	2	11

Semester 2:

Code	Title	Credit Hours	Lectures Hr/Week	Tutorial Hr/week	Practical Hr/week
CE4201	Communication Engineering II هندسة الاتصالات-2	3	2	0	3
EE4202	Control Systems II نظم التحكم2	3	2	2	2
ECE4203	Interfacing Circuits الربط البيني	3	2	0	3
CE4204	Computer Networks I شبكات الحاسوب1	3	2	0	3
ECE4205	Introduction To VLSI Design مقدمة التكامل علي نطاق واسع جداً	3	2	2	0
AD4206	Engineering Economics اقتصاد هندسي	2	2	0	0
yyy42xx	Elective Course-I كورس اختياري1	3	2	2	0
Total		20	14	6	11

yyy42xx:

Electronics Engineering Department:

ECE07 Integrated Circuits الدوائر المتكاملة

ECE07 Microchip Programming برمجة الرقائق الدقيقة

Telecommunication Engineering Department:

CE07 Telephone Systems أنظمة الهاتف

CE07 Information Theory and Coding نظرية المعلومات والتشفير

Total = 35

On Job Training (**Practical Duration→ 4 weeks)**						
WS4208	On Job Training تدريب خارجي	2	-	-	100

5th Year:

Electronics Engineering

Semester 1:

Code	Title	Credit Hours	Lectures Hr/Week	Tutorial Hr/week	Practical Hr/week
GE5101	Research Method مناهج بحث	2	2	0	0
CE5102	Mobile Communication Systems انظمة الاتصالات المحموله	3	2	0	3
CE5103	Digital Image & Video Processing معالجة الصورة الرقمية والفيديو	3	2	0	3
GE5104	Environmental Engineering هندسة البيئة	2	2	0	0
PR5105	Final Project-I مشروع التخرج 1	3	0	0	0
CS5106	Software Engineering هندسة برمجيات	3	2	0	0
CS5107	Operating System Eng. نظم تشغيل	3	2	2	0
ECE5108	Nano Technology تكنولوجيا النانو	2	2	0	0
Total		21	14	2	6

Semester 2:

Code	Title	Credit Hours	Lectures Hr/Week	Tutorial Hr/week	Practical Hr/week
ECE5201	Simulation and Modeling نمذجة ومحاكاة	3	2	0	3
ECE5202	Advanced Computer Architecture معمارية حواسيب متقدمة	3	2	0	3
ECE5203	Embedded Systems النظم المدمجة	3	2	0	3
CE5204	Computer Networks II شبكات الحاسوب 2	3	2	0	3
PR5205	Final Project-II مشروع التخرج 2	3	0	0	0
ECE 52xx	Elective Course-II كورس اختياري2	3	2	2	0
Total		18	10	2	12

ECE 06 PLC

Total = 40

Total (All Sem.) = 193

5th Year:

Telecommunications Engineering

Semester 1:

Code	Title	Credit Hours	Lectures Hr/Week	Tutorial Hr/week	Practical Hr/week
GE5101	Research Methods مناهج بحث	2	2	0	0
CE5102	Mobile Communication Systems انظمة الاتصالات المحمولة	3	2	0	3
CE5103	Digital Image & Video Processing معالجة الصورة الرقمية والفيديو	3	2	0	3
GE5104	Environnemental Engineering هندسة البيئة	2	2	0	0
PR5105	Final Project-I مشروع التخرج 1	3	0	0	0
CE5106	Switching and Traffic Theory نظرية التبديل والحركة	2	2	0	0
CE5107	Fiber Optics Communication Systems الالياف ضوئية	3	2	0	3
CE5108	Antennas & Wave Propagation الهوائيات وانتشار الموجات	3	2	0	3
Total		21	14	0	12

Semester 2:

Code	Title	Credit Hours	Lectures Hr/Week	Tutorial Hr/week	Practical Hr/week
CE5201	Communication Network's Analysis تحليل شبكات الاتصال	3	2	0	3
CE5202	Radar & Microwave Communication اتصالات الرادار والمايكرويف	3	2	2	0
CE52xx	Elective Course-II كورس اختياري2	3	2	2	0
CE5204	Computer Networks II شبكات الحاسوب 2	3	2	0	3
PR5205	Final Project-II مشروع التخرج 2	3	0	0	0
CE5206	Satellite Communication Systems انظمة الاتصالات الفضائية	3	2	0	3
Total		18	10	4	9

03 Ad Hoc Wireless Network الشبكات اللاسليكة المخصصة
03 Information Security أمن وحماية المعلومات

Total = 40

Total (All Sem.) = 193

11 Courses Description

1st Year:

Course Title	EM1101 Calculus I
Level /Semester	1/1
Credit Hours	3
Pre-requisite(s)	**None.**
Objective(s)	After the completion of this course, the student should be able to: - Understand limits, and continuous functions - Plot the graphs of the elementary function. - Find Derivatives. - Integrate by part and substitution. - Apply improper integrals.
Course Contents	Functions: graphs of elementary functions, limits, continuous functions. Derivatives of algebraic, logarithmic, exponential inverse trigonometric. High order derivatives, mean value theorem. Taylor theorem. Indefinite integral, integration by part, and by substitution. Solid volumes, Arc length and coordinates. Unbounded functions. Geometric and physical application of improper integrals.
Teaching Method	• 30 hours for lectures. • 30 hours for tutorial. • 10 office hours for revision
Evaluation	• Class Assignments • Mid-Term Test • Final exam.
Reference(s)	1. Advanced Engineering Mathematical, by alan Jeffrey, 1 edition (June 27, 2001) 2. Engineering Mathematical, by K.A. Stroud , 2007 3. Calculus, by Earl W. Swokowski, 6 edition

Course Title	**EM1102 Linear Algebra**
Level /Semester	1/1
Credit Hours	3
Pre-requisite(s)	**None**
Objective(s)	• To study Vectors and matrices • Solution of Linear equation. • Using Gauss method for linear systems.
Course Contents	Vectors Introduction, Space Vector. Matrices, Algebra of matrices, determinants, matrix and inverse of matrix. Crammer rule and Gauss elimination method for solution of linear systems, and solution of linear equations by inverse matrix. Eigen Value and Eigen Vectors.
Teaching Method	• 30 hours for lectures. • 30 hours for tutorial. • 10 office hours available for revision.
Evaluation	• Class Assignments (20%) • Mid-Term Test (20%) • Final exam. (60%) Or As recommended by the Lecturer.
Reference(s)	1. Advanced Engineering Mathematical, by alan Jeffrey, 1 edition (June 27, 2001) 2. Engineering Mathematical, by K.A. Stroud , 2007 3. Linear Algebra and it's application, 4th ed, by G.strong, 2006

Course Title	**PH1103 Physics I: (Optics)**
Level /Semester	1/1
Credit Hours	3
Pre-requisite(s)	None
Objective(s)	• At the end of this course the student will build a good base for further heat and mechanics theorems and topics. • The course aims to provide the student with the elementary laws of mechanics and heat theorem. • To ensure the basic laws of mechanics and heat practically.
Course Contents	Physics and Measurements ,Physical Quantity, Derived quantities, Dimensional Analysis, Vector and Scalar, Properties of Vectors, Vector addition and subtraction, ,Components of a vector, ,The scalar and vector product, Kinematics Description of Motion, The position and the displacement vector, The average and Instantaneous velocity, The average and Instantaneous acceleration, One-dimensional motion with constant acceleration and its Application, Free Fall, Motion in Uniform Circular Motion, The law of motion, The concept of force, Newton's laws of motion, Newton's first and second law, Newton's third law, Weight and tension, Work and Energy, heat.
Teaching Method	• 30 hours for lectures. • 15 hours for tutorial. • 30 Laboratory hours.
Evaluation	• Mid-Term Test (20%) • Final exam. (50%) • Lab. Practice (30%) Or As recommended by the Instructor
Reference(s)	1. **"Physics for Scientists and Engineers",** 9th Edition , by Raymond A. Serway, 2013

Course Title	**CH1104 Chemistry**
Level /Semester	1/1
Credit Hours	3
Pre-requisite(s)	None
Objective(s)	• The main goal of this course is to clarify the relation between elements and the electronic structure of these elements. • This will improve the student's perception when studying basic and advanced electronic courses. • Microelectronics devices strongly need the chemical properties of some elements especially ceramic and solution because these elements are used in fabrication process of microelectronics devices.
Course Contents	Atomic Law. Quantum mechanics and Bohr hydrogenation. Wave mechanics atomic model. Periodic table, periodic properties of elements and its relation to electronic structure. Chemical and physical bonding, types and properties. Electronic bonding and particles structure. Bonding forces. Crystal structure. Doping effect of some elements. Ideal gas, Boil law. Types of solutions, and common properties. Surfaces tension.
Teaching Method	• This course is lecture based course. At least 30 hours of lectures should be assigned to cover the topics of the course. • Projector slides could be presented especially in the field of atomic structure and other microscopic images. • Practical experiments must be set to cover the main topics.
Evaluation	The theory could be evaluated by: • Assignments (10%) • Mid-term test (15%) • Final Exam. (50%) • The practice (25%) The above percentages are subject to change due to the instructor advice.
Reference(s)	david clark , "General chemistry", 2004

Course Title	**CS1105 Fundamental of Computer Science**
Level /Semester	1/1
Credit Hours	3
Pre-requisite(s)	None
Objective(s)	To provide the students with skills and knowledge necessary for using computers in their future courses. Emphasis will be given to applications and independent work. Also the course helps students to pass ICDL exams.
Course Contents	The course is organized into six modules. History of computing systems, modern computers, introduction to modern computer system. Introduction of how computer work: basic of computer architecture. Introduction to operating system. Introduction to problem solving, algorithm and programming. Introduction to network, internet and World Wide Web. Social aspect of computers and information technology
Teaching Method	This course has two parts, theory and practice. The theory could be taught in 30 contact hours making use of computer slides to assist in describing many topics. 30 hours as minimum of practice should be provided to cover the commands as DOS commands, and GUI. MS-office package should be practiced especially word processing and spreadsheets
Evaluation	• Homework and assignments (15%) • Lab Practice (25%) • Final Exam (60%) The percentages could be changed according to the instructor recommendation. **Computer Laboratory:** Two hours per week for subject CS1105
Reference(s)	1. Glenn Brookshear, computer Science an overview, 11ed ISBN:0132569035 2. Peter Norton's, "Introduction to Computers", McGraw-Hill/Irwin; 6th edition, 2004.

Course Title	**EM1201 Calculus II:**
Level /Semester	1/2
Credit Hours	3
Pre-requisite(s)	Calculus I
Objective(s)	The objectives of this course as follow: - Study integration technique - Understanding partial derivative - Using vector caraculs
Course Contents	The length along a curve if it were straightened out. **Convergent Series**: A series for which partial sums become arbitrarily close to some fixed number. **Exponential Growth**: The increase in a quantity according to an exponential function. **Harmonic Series**: The sum of the reciprocals of the positive integers. The series diverges. A Taylor series expansion of a function around zero. **Power Series**: A sum of powers of a variable. A power series is essentially an infinite polynomial. **Radius of Convergence**: Half the width of the interval inside which a power series converges absolutely. **Surface of Revolution**: A surface generated by rotating a two-dimensional curve about an axis. **Taylor Series**: The power series of a function around a given point.
Teaching Method	• 30 hours for lectures. • 16 hours for tutorial. • 10 office hours available for revision.
Evaluation	• Class Assignments (20%) • Mid-Term Test (20%) • Final exam. (60%) • Or As recommended by the Lecturer.
Reference(s)	1. Advanced Engineering Mathematical, by alan Jeffrey, 1 edition (June 27, 2001) 2. Engineering Mathematical, by K.A. Stroud , 2007 3. Earl W. Swokowski, “Calculus”, 6 edition

Course Title	**PH1203 Physics II**
Level /Semester	1/2
Credit Hours	3
Pre-requisite(s)	Physics I
Objective(s)	• At the end of this course the student will build a good base for further electricity theorems and topics. • The course aims to provide the student with the elementary laws of electricity and charges theorem. • To ensure the basic laws of electricity practically.
Course Contents	Electric force ,coulombs law, Electric force for many charges and resultant force , electric field for a point charge .electric field for many charges and resultant electric field.electic field for continuous distribution, electric flux, electric potential , guess's law and its applications, capacitance, ohms law
Teaching Method	• 30 hours for lectures. Course notes will be delivered. • 15 hours for tutorial. • 30 Laboratory hours. Or, as directed by the instructor
Evaluation	• Mid-Term Test (20%) • Final exam. (50%) • Lab. Practice (30%) Or As recommended by the Instructor.
Reference(s)	1. Physics for Scientist and Engineering, 9th Edition by Raymond A. Serway, 2013 2. David Halliday," Fundamental of physics", 10 edition (August 5, 2013)

Course Title	**CS1203 Programming Language I**
Level /Semester	1/2
Credit Hours	3
Pre-requisite(s)	CS1105
Objective(s)	Because programming languages are at the core of writing software, students should have a thorough understanding of how languages are designed, implemented, and manipulated. This course concerns itself specifically with the implementation and translation of computer languages, leaving an in-depth study of language design to further course. Students will learn the formalisms behind computer languages. C++ language will be taken as a programming language example
Course Contents	Introduction to Computers and Programming. The C Language, Compilers, Numbers Systems. Program Structure, Comments and Printing. Formatting Output, Escape Sequences, Program Debugging. Variables, Constants, Arithmetic Operators and Expressions. Reading Data, Writing to Files, Single Character Data. IF Statements, Logical Operators and Expressions. Switch and IF-ELSE-IF Control Structures, Applications and Review. WHILE and FOR Loops, Applications. Function Prototypes, Definitions, and Call. Address and Pointer Variables, Applications. One Dimensional Arrays, Array I/O. Multidimensional Arrays, Arrays and Functions, Applications and Review. Strings and Pointers. Applications and Review.
Teaching Method	Attendance of 30 contact hours should be a part of the student grade. Slides presentations are used to explain course materials
Evaluation	• Homework (5%) • Midterm Exam (10%) • Practice lab (25%) • Final Exam (60%) **Computer Laboratory:** Two hours per week for subject CS1203
Reference(s)	1. Object oriented programming using C++, Robett Lafore **,2001** 2. H.H. Tan and T.B. D'Orazio, "C Programming for Engineering & Computer Science", McGraw-Hill Science/Engineering/Math; 1st edition (September 17, 1998) 3. B.W. Kernighan and D.M. Ritchie, "The C Programming Language", 2nd edition, Prentice-Hall, 1988. 4. P.J. Plauger, "The Standard C Library", Prentice-Hall, 1992. 5. A.I. Holub, "The C Companion", Prentice-Hall, 1987.

Course Title	**EM1204 Analytical Geometry**
Level /Semester	1/2
Credit Hours	3
Pre-requisite(s)	None
Objective(s)	• To study the Formulas for analytic geometry. • Graphing functions in a coordinate system
Course Contents	Two-dimensional geometry: Transformation of coordinate axes. Pair of straight lines. Circle (parametric form, tangent and normal, pole and polar, orthogonal circle, condition of orthogonality of circles), equation of parabola (its parametric form, tangent and normal). Ellipse (tangent and normal, conjugate diameters), hyperbola and its asymptotes. General equation of second degree and the conditions for representing a pair of straight lines, parabola, an ellipse and a hyperbola, the equation of tangent, condition of tangency of a line, centre and reduction to standard forms. Polar equations of conics. Three dimensional geometry: Plane, straight lines, in three dimensions, shortest distance. Sphere, circle in three dimensions. Cone and cylinder (Elementary concept only)
Teaching Method	• 30 Lecture hours in which rich examples related to the topics are given. • Student contribution is handled especially in solving some problems at the session. • At least 15 tutorial hours will be given including a lot of examples and exercises.
Evaluation	• Class Assignments (20%) • Mid-Term Test (20%) • Final exam. (60%) Or As recommended by the Lecturer.
Reference(s)	1. Calculus with Analytic Geometry , R.A .Silverman , prentice 2. E.W SWOkowski," Calculus with analytic Geometry", by 6th ed

Course Title	**EE1205 Fundamentals of Electrical Engineering**
Level /Semester	1/2
Credit Hours	3
Pre-requisite(s)	None
Objective(s)	On completion of this course, students should be able to: • Explain the relations between charge, current, voltage, energy, power and the properties of ideal circuit elements, including resistors and voltage and current sources, and show understanding of how these differ from real elements. • Perform simple power calculations and find the maximum power available from a source. • Describe the behavior of ideal energy storage elements (inductor, capacitor).
Course Contents	**D.C. Circuits**: Resistive Networks: Ohm's law, Kirchoff's laws/ Source transformations. Power matching. Magnetic Fields and Circuits: Magnetizing force and flux density. MMF, reluctance and design of simple magnetic circuits. Electromagnetic Energy Conversion: Force on a conductor. Faraday's law; motional and transformer e.m.f. The Ideal Transformer: Voltage, current and flux relationships. Referred impedance. Power balance and impedance matching. Design considerations; importance of frequency. Imperfections and introduction to real transformer equivalent circuit
Teaching Method	• 30 contact hours for lectures in slide show. • 20 hours preparing and practising numerical examples for tutorials
Evaluation	• Homework and assignments (15%) • Lab Practice (25%) • Final Exam (60%) The percentages are subject to change according to the instructor recommendation.
Reference(s)	Fundamentals Of Electrical Engineering, By Giorgio Rizzoni, 2009

Course Title	**EM1209 Discrete Mathematic**
Level /Semester	1/2
Credit Hours	3
Pre-requisite(s)	None.
Objective(s)	• To provide a transition from the problem-solving approach of calculus to the entirely rigorous approach of advanced courses. • To set the basics and background needed to study digital topics.
Course Contents	Basic Definitions of Set Theory. Properties of Sets. Proofs, Algebraic Proofs. Number systems concepts. Boolean Algebras. Introduction to Predicates and Quantified Statements. Statements Containing Multiple Quantifiers. Sequences. Mathematical Induction. Logical Form and Logical equivalence Logical Form and Logical equivalence.
Teaching Method	• The instructor should focus on depth of understanding rather than breadth of coverage, and subsequent courses will assume that students have seen induction, Boolean Algebra, and set theory in this course. • 30 hours for lectures. • 20 Tutorial hours.
Evaluation	• Class Assignments (20%) • Mid-Term Test (20%) • Final exam. (60%) Or As recommended by the Lecturer.
Reference(s)	1. Advanced Engineering Mathematical, by alan Jeffrey, 1 edition (June 27, 2001) 2. Engineering Mathematical, by K.A. Stroud , 2007

Course Title	**WS1210 Basic Training**
Level /Semester	1/2
Credit Hours	-
Pre-requisite(s)	**None.**
Objective(s)	To familiarize with 1. The basics of tools and equipment's used in fitting, carpentry, sheet metal, welding and smithy. 2. The production of simple models in the above trades.
Course Contents	**FITTING** Tools &Equipment's – Practice in Filing and Drilling. Making Vee Joints, Square, dovetail joints, Key Making. **CARPENTARY** Tools and equipment's- Planning practice. Making Half Lap, dovetail, Mortise & Tenon joints, a mini model of a single door window frame. **SHEET METAL** Tools and equipment's - Fabrication of a small cabinet, Rectangular Hopper, etc. **WELDING** Tools and equipment's - Arc welding of butt joint, Lap Joint, Tee Fillet. Demonstration of Gas welding, TIG & MIG. **SMITHY** Tools and equipment's –Making simple parts like hexagonal headed bolt, chisel.
Teaching Method	The process of teaching method depends on the trainer in the workshop.
Evaluation	
Reference(s)	1. Gopal, T.V., Kumar, T., and Murali, G., "A first course on workshop practice – Theory, practice and work book", Suma Publications, 2005. 2. Kannaiah,P. & Narayanan,K.C. Manual on Workshop Practice, Scitech Publications, Chennai, 1999. 3. Venkatachalapathy, V.S. First year Engineering Workshop Practice, Ramalinga Publications, Madurai,1999.

Course Title	**EM2101 Differential Equations**
Level /Semester	2/3
Credit Hours	3
Pre-requisite(s)	Calculus I, II
Objective(s)	• To study of differential equations as a wide field in pure, applied mathematics, and engineering. • To study the properties of solutions of a given differential equation. • To show that differential equations are used to model the behavior of complex systems.
Course Contents	Degree and order of ordinary differential equations. Formation of differential equations. Solutions of first order differential equations by various methods. Solutions of general linear equations of second and higher orders with constant coefficients. Solution of homogeneous linear equations. Solution of differential equation of the higher order when the dependent or independent variable is absent. Solution of differential equation by the method based on the factorization of the operators. Frobenius method. *Partial differential equations: Wave equations. Particular solutions with boundary and initial conditions.
Teaching Method	• 30 hours of lectures on differential equations, in which famous differential equations are modeled, especially the wave equations. • At least 16 hours of tutorials on solving differential equations
Evaluation	• Class Assignments (20%) • Mid-Term Test (20%) • Final exam. (60%) Or as recommended by the Lecturer
Reference(s)	1. Advanced Engineering Mathematical, by alan Jeffrey, 1 edition (June 27, 2001) 2. Engineering Mathematical, by K.A. Stroud , 2007 3. Differential equation with BU, Dennis G.Zill, 7th edd.

Course Title	**CS2102 Programming Language II**
Level /Semester	2/3
Credit Hours	3
Pre-requisite(s)	CS1105, CS1203, and Basic mathematics (integration and differentiation).
Objective(s)	The course aims to introduce programmers to the C++ language. Previous programming experience is assumed, To introduce C++ in a structured manner, beginning with the simpler aspects of the language and to use C++ language for scientific computing, aiming to understand what the basic constructs of the programming language.
Course Contents	**C++ Basics :** History of C++, Characteristics of C++, C++ program structure, Variables, Definition global variables, Printing out and Inputting variables (Scanf, Printf, getchar, putchar, getch, getche), Constants, Arithmetic operations , Comparison operators, Logical operators, Order of precedence . **Conditionals:** If statement, If……else statement, If statement with logical operators, the switch statement. **Looping and iteration:** The for statement, the while statement, the do-while statement, Nested loop, Infinite loop, break and continue. **Arrays and strings:** single dimensional arrays, Multi dimensional arrays, Strings. **Functions and Procedures:** Function declarations, definitions, & prototypes, pass-by-value and pass-by-reference parameters, local and global variables, scope, function calls, recursion.
Teaching Method	• 30 contacts hours to explain the course materials. • Slide show is preferable. • Course notes and slide script will be available for students. 30 Lab hours to practice the selected programs
Evaluation	• Homework (5%) • Midterm Exam (10%) • Practice lab (25%) • Final Exam (60%)
Reference(s)	Object oriented programming using C++, Robett Lafore **,2001**

Course Title	**EC2104 Digital Circuit Design I**
Level /Semester	2/3
Credit Hours	3
Pre-requisite(s)	Discrete mathematics.
Objective(s)	This course aims to study combinational logic circuits and their applications as a part of computer and other electronic circuits
Course Contents	Basic notions: Characteristics of digital systems, basic gates AND, OR, NOT, XOR symbols, operation and truth table revision. Combinational logic circuits, simplification techniques, Algebra and Karnaugh map simplifications, parity checker and complement circuits, half and full binary adders, multiplexers and de-multiplexers, coders and decoders.
Teaching Method	• 15 Lectures to cover the topics. • 10 Lab sessions to practice different combinational circuits. • Slide show will be used in lectures. Digital simulators are used especially to check the circuit output.
Evaluation	• Practice 25%. • Midterm 15%, • and Final Exam 60%.
Reference(s)	1. Ramakant A.Gayakward, Op-amps and Linear Integrated Circuits, IV edition, Pearson Education, 2003 / PHI. 2. D.Roy Choudhary, SheilB.Jani, Linear Integrated Circuits, II edition, New Age, 2003. 3. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India, 2008

Course Title	**EC2105 Principles of Electronics Devices**
Level /Semester	2/3
Credit Hours	3
Pre-requisite(s)	PH1103, CH1104
Objective(s)	This course is designed to help the student to learn about origin of electronics starting from the atomic level in solid state theory, components, circuits, and the use of electronics.
Course Contents	Solid state principal, atomic theory. Charge and conduction. Covalent bonding. Intrinsic and extrinsic semiconductors. Holes and energy. PN junction. Formation of depletion layer. Bulk resistance. Forward and reverse biasing. The barrier potential. Controlling width of depletion layer.
Teaching Method	• 15 x 2 hours Lectures. • 7 x 2 hours Tutorials. This course will begin the electronics from scratch level. The solid state and atomic theory lectures will be explained using multimedia projector to display the images of atoms, charges and others in an attractive and clear form. In tutorial hours many examples of electrical quantities will be computed in intrinsic and extrinsic circuits
Evaluation	• Attendance 10%. Assignments 10%. • Midterm 20%, and Final Exam 60%.
Reference(s)	1. Floyd, " Electronic devices", edition 9 2. Sedra Smith, " Microelectronic Circuits",5th edition

Course Title	**EE2106 Electrical Circuits Analysis I**
Level /Semester	2/3
Credit Hours	3
Pre-requisite(s)	EE2102
Objective(s)	• Ability to apply basic laws to resistive circuits. • Ability to perform mesh and nodal analysis. • Ability to apply circuit theorems • Ability to analyze first-order circuits.
Course Contents	Basic circuit laws, Ohm's Law, Nodes, Branches and Loops, Kirchoff's Laws, Series and Parallel Resistor Networks , Voltage and Current Dividers, Wye-Delta Transformations, Circuit Analysis: Linear Equations , Nodal Analysis, Super Nodes, Mesh Analysis, Super Meshes. Circuit Theorems: Linearity, Superposition , Source Transformations , Thevenin and Norton's Theorems, Maximum Power Transfer.
Teaching Method	• Lectures will be aided by slide shows. • Examples and problems will be solved at lectures and tutorial hours. • 30 contact hours and 15 tutorial hours are recommended
Evaluation	• Homework and assignments (15%) • Lab Practice (25%) • Final Exam (60%) The percentages could be changed according to the instructor recommendation
Reference(s)	1. Fundamentals Of Electrical Engineering, By Giorgio Rizzoni, 2009

Course Title	**EM2201 Mathematical Methods**
Level /Semester	2/4
Credit Hours	3
Pre-requisite(s)	None.
Objective(s)	• To study transforms used in many engineering topics.
Course Contents	Fourier Series, Even and odd functions, Convergence, Fourier transforms, Delta-Functions, Parseval's Theorem, Convolution theorem, Laplace transform, Applications of integral transforms: Wave Equation (Fourier Transform), LCR circuit (Laplace Transform), Bessel's Equation for n=0 (Laplace Transform).
Teaching Method	• The instructor should focus on depth of understanding rather than breadth of coverage, and subsequent courses will assume that students have seen induction, Boolean Algebra, and set theory in this course. • 30 hours for lectures. • 20 Tutorial hours.
Evaluation	• Class Assignments (20%) • Mid-Term Test (20%) • Final exam. (60%) Or As recommended by the
Reference(s)	1. Advanced Engineering Mathematical, by alan Jeffrey, 1 edition (June 27, 2001) 2. Engineering Mathematical, by K.A. Stroud , 2007

Course Title	**ES 2202 Thermodynamics**
Level /Semester	2/4
Credit Hours	3
Pre-requisite(s)	Physics I, II
Objective(s)	To teach the student so as: • To be able to identify and describe energy exchange processes (in terms of various forms of energy, heat and work) • To be able to use the First Law of Thermodynamics to estimate the potential for thermo-mechanical energy conversion in some systems. • To be able to apply ideal cycle analysis to simple heat engine cycles to estimate thermal efficiency and work as a function of pressures and temperatures at various points in the cycle.
Course Contents	Thermodynamic principles, kinetic theory, Describes processes that involve changes in temperature, transformation of energy, relationships between heat and work. Work vs. heat transfer. Concept of a thermodynamic system, Thermodynamic state of a system, Changing the state of a system with heat and work. Zeroth Law of Thermodynamics. First Law of Thermodynamics, and Corollaries of the First Law.
Teaching Method	• 30 contact hours are necessary to cover the course content. Detailed lecture notes should be available for the student. • Student's Preparation and participation will be important for learning the material. • Homework problems will be assigned
Evaluation	• Quizzes and home works (20%) • Mid-term Exam (20%) • Final Exam (60%)
Reference(s)	1. Introduction to Thermodynamics and Heat Transfer, YunusCengel, 2nd ed, McGraw-Hill 2. Fundamentals of Thermodynamics, Sonntag, Borgnakke, Van Wylen, Wiley India Pvt. Ltd. 3. Applied Thermodynamics, Onkar Singh, 3rd ed, New Age International 4. Basic Engineering Thermodynamics, Rayner Joel, Longman Publishers 5. Heat Transfer, S P Sukhatme, University Press

Course Title	**EC2204 Digital Circuits Design II**
Level /Semester	2/4
Credit Hours	3
Pre-requisite(s)	**EC2104**
Objective(s)	• To study and Design Sequential Logic circuits. • To link these designs with applicable electronic circuits.
Course Contents	Sequential and combinational circuits comparison. Multi-vibrators circuit operation. RS Flip Flop, T FF, D FF, and JK Flip Flop. Serial and parallel Shift Register. Counters, Asynch and Synch Counters, Decade counters, different Mod Counters.
Teaching Method	• Not less than 30 contact hours to explain the course topics. • Digital simulator slide show will be used to describe the operation of sequential digital devices. • Lab experiments will be set do practice the operation of different digital sequential circuits.
Evaluation	Preferably follow the same assessment of the previous course which includes: • Practice 25%. Midterm 15%, • Final Exam 60%. The instructor can suggest his own assessment which will considered if no big departure from recommended assessment occurs. **Digital II Lab for subject EC3104**
Reference(s)	1. Ramakant A.Gayakward, Op-amps and Linear Integrated Circuits, IV edition, Pearson Education, 2003 / PHI. 2. D.Roy Choudhary, SheilB.Jani, Linear Integrated Circuits, II edition, New Age, 2003. 3. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India, 2008

Course Title	**EC2205 Analogue Electronic Circuits I**
Level /Semester	2/4
Credit Hours	3
Pre-requisite(s)	EC2105
Objective(s)	The goal of this course is to introduce electronic circuit analysis and design techniques with special consideration given to the operation and use of bipolar junction transistors including the analysis and design of important circuits that utilize these devices. In particular, this course will focus on practical analog circuits and more specifically on amplifiers.
Course Contents	Introduction to amplifier circuits, class A, class B, and class C circuits. Common Emitter circuit, analysis and design, circuit gain, alpha and beta calculations, common collector circuit and analysis, common base circuit. FET amplifiers, common source circuit analysis and design.
Teaching Method	• 15 x 2 hours Lectures. • 8 x 3 hours Laboratory. Special concern will be delivered to circuit design and amplification calculations. Different circuit design will be covered practically in the laboratory.
Evaluation	• Attendance 5%. Practice 25%. • Midterm 10%, and Final Exam 60%. The instructor advice in assessment and grading will be considered. **Analog Electronic Lab for subject EC2205**
Reference(s)	1. Electronic devices edition 9 , Floyd 2. Microelectronic Circuits by Sedra Smith,5th edition

Course Title	**EE2206 Electric Circuits Analysis II**
Level /Semester	2/4
Credit Hours	3
Pre-requisite(s)	EE2106
Objective(s)	Electric circuit II is a second course on electric circuits. It is intended both to enhance the knowledge of students with regard to electric circuits and to develop skills in analysis. Although the focus is electric circuits, the theory and skills learned are useful in other areas as well.
Course Contents	Frequency Response, Filters, and Resonance: Frequency response. High-pass and low-pass networks. Half-power frequencies. Frequency response from pole-zero locations and Bode plots. Band pass filters and resonance. Natural frequency and damping ratio. RLC series circuit; series resonance. Quality factor. RLC parallel circuit; parallel resonance. Practical LC parallel circuit. Series-parallel conversions. Locus diagrams. Mutual Inductance and Transformers. Mutual inductance. Coupling coefficient. Analysis of coupled coils. AC Power: Power in time domain. Power in sinusoidal steady state. Average or real power. Reactive power. Summary of AC power in R, L, and C. Exchange of energy between an inductor and a capacitor. Complex power, apparent power, and power triangle. Parallel-connected networks. Power factor improvement. Maximum power transfer.
Teaching Method	• 30 contact hours and 15 tutorial hours are recommended. • Wealthy example will be provided. Examples and problems will be solved at lectures and tutorial hours. Slide show and presentations will be set at the class
Evaluation	• Attendance 5%, Assignments 10%, Laboratory 15%, Midterm 20%, and Final 50%. Electrical Circuits II Lab for subject EE2206
Reference(s)	1. Fundamentals Of Electrical Engineering, By Giorgio Rizzoni, 2009

Course Title	**ES 22207 Engineering Drawing**
Level /Semester	2/4
Credit Hours	3
Pre-requisite(s)	None
Objective(s)	To provide the student with the required skills in dimension determination, descriptive modeling of an object, and drawing skills using standard drawing tools and equipment.
Course Contents	Engineering drawing introduction, types of lines, size of drawing papers, layouts of drawing sheets, graphics instruments, scales, geometrical construction, orthographic projection, sectioning, dimensioning, pictorial drawing, conventions. Descriptive geometry locus of a point, Mange's projection, straight line (particular positions), the plane, auxiliary planes, the positional problems, projection of circle, curved surfaces, intersection of surfaces of revolution, perspective projection.
Teaching Method	• Not less than 10 hours for the theory of descriptive geometry. • 5 hours drawing principles. • 15 hours for computer aided drawing practice. Not less than 15 hours in free hand drawing
Evaluation	As recommended by the instructor
Reference(s)	1. Thomas, E.E., Charls, J.V., and Robert J.F., Engineering Drawing and Graphic Technology, 14th edition, McGraw-Hill, 1993. 2. Colin H., Simmons and Dennis E. Maguire, Manual of Engineering Drawing, 2nd edition, 2004, Elsevier Newnes, Linacre House, Jordan Hill, Oxford OX2 8DP, 200 Wheel Road, Burlington MA 01803

3rd Year:

Course Title	EM 3101 Probability & Statistics
Level /Semester	3/5
Credit Hours	3
Pre-requisite(s)	Calculus-I, II
Objective(s)	• To understand standards of statistics in modern society. • To apply the rules of probability especially in engineering fields.
Course Contents	Measure of central tendency and measure of dispersion. **Correlation & regression:** Correlation between two variables (Pearson-spearman), Contingency tables (nominal variable), Simple linear regression, Time series analysis. **Probability theorems:** Fundamentals of the basic theory of probability, Sample spaces, events, basic axioms, Set theory and a set of axioms for probability, Condition probability. **Random variables:** Random variables (type-expected-variance), Probability density functions (pdf), Continuous distribution (normal distribution), Discrete distribution (binomial distribution-poisson distribution). **Estimation and hypothesis testing:** t-student distribution , f-distribution and Simple analysis of variance.
Teaching Method	• There are a wealth of examples in the text books, so the instructor has to present only some of them. • Tutorial hours must be held to solve different problems
Evaluation	• Homework • Mid-Term test • Final Exam As recommended by the Instructor
Reference(s)	1. Walpole, Myers, Myers & Ye, Probability & Statistics for Engineers and Scientists; Pearson; 9th edition, 2011. 2. Engineering mathematical by K.A stword 2007

Course Title	**ECE3102 Microprocessors and Assembly Language**
Level /Semester	3/5
Credit Hours	3
Pre-requisite(s)	Non
Objective(s)	This course aims to introduce the organization of a microprocessor system and the assembly language for programming the microprocessor. Students will learn the programming techniques, design techniques of memory system and input/output system for a simple microprocessor system. Upon completion, students are equipped with fundamental knowledge to program a microprocessor system for specific application
Course Contents	Basic computer architecture: CPU, input/output, memory systems and buses; Structure of a CPU: ALU, accumulators, registers, stack, control unit and buses; Instruction execution, sequence and data flow, instruction cycle; Concept of address bus, data bus, control bus and bus arbitration; ASCII code; Instruction formats, operands, types and addressing modes; 8086 Assembly language programming, assembler directives and assembler operation
Teaching Method	Suggested lecture/tutorial/laboratory mix: • Lecture Hour: 30 hours • Tutorial Hour: 8 hours • Laboratory Hour: 15 hours
Evaluation	• Pracice 25% • Midterm 15% • Final Exam 60%. For a student to pass the course, at least 50% of the maximum mark must be obtained, and a laboratory attendance of at least 75% recorded
Reference(s)	1. Computer architecture and Organization ,William Stalling. 2. Microprocessor Fundamentals by K.John

Course Title	**EE3103 Electromagnetic Fields I**
Level /Semester	3/5
Credit Hours	3
Pre-requisite(s)	PH1103, PH1203, and basic math courses.
Objective(s)	At the completion of this course Students will be able to: • State Maxwell's equations and explain how they can be related to the force between two particles, • Apply vector analysis to the solution of problems in electromagnetism, • Use vector analysis to apply Maxwell's equation's and solve standard problems, Define the fields commonly used in electromagnetism, and state the laws these field obey
Course Contents	Definition and properties of magnetic field. The force between two charged particles. Interpretation of divergence; the continuity equation. Flux and the divergence theorem. Electrostatic potentials Polarisation **P** and displacement **D** in dielectric media. Surface and volume polarization. Conductors and electric fields in conducting media.
Teaching Method	• Lectures (30 contact hours), handouts, self-study 'drill problems'. • Tutorials and problems classes (15 hours).
Evaluation	• Attendance 10%. • Assignments 10%. • Midterm 20%, and Final Exam 60%
Reference(s)	

Course Title	**ME 3104 Engineering Materials**
Level /Semester	3/5
Credit Hours	3
Pre-requisite(s)	Chemistry (Basic Chemistry concepts, chemical reactions, reaction balancing)
Objective(s)	The aims of the course is to give fundamental knowledge about type of materials, their usage, properties and characteristics, which are important in engineering design. It is also aimed to give a theoretical background about the analysis of behavior of engineering materials by emphasizing important relationships between internal structure and properties. It attempts to present ways of modifying and control the material microstructures and especially mechanical properties (toughness, strength, fatigue and creep resistance) by suitable heat treatment operation
Course Contents	Classification of materials, general criteria of materials selection, atomic bonding and crystalline structure, phase equilibria and transformation in metallic systems, Heat treatment and strengthening methods of materials, mechanical and physical properties, failure of materials in services, electrical, thermal, magnetic, optical properties, engineering properties of ceramics, polymer, and composites
Teaching Method	This is a multi-section course. Lectures are scheduled for the morning or early afternoon 3 hours per week. Presentations slides are prepared to assist in explaining materials and properties
Evaluation	• Student group presentations. (20%) • Mid-term Exam (20%) • Final Exam (60%)
Reference(s)	1. Engineering materials technology, by William Bolton, 1993 2. Material for Engineering, by dohn martin , 2003 3. William D. Callister, Jr. Materials Science and Engineering: An Introduction, 5th , John Wiley and Sons, 2000. 4. William F. Smith, Foundations of Materials Science and Engineering, 3rd Ed., McGraw-Hill, 2004. 5. James F. Shackelford, Introduction to Materials Science for Engineers, 5th Ed., Prentice Hall, 2000. 6. Larry D. Horath, Fundamentals of Material Science, 3rd Ed., Prentice Hall, 2006.

Course Title	**ECE3105 Analogue Electronic Circuits II**
Level /Semester	3/5
Credit Hours	3
Pre-requisite(s)	ECE2205, Knowledge of component level models of bipolar and field effect transistors. Ability to design basic transistor amplifier circuits
Objective(s)	To focus on the design of operational amplifiers, filters.
Course Contents	Feedback in Amplifier & Circuit Design. Loop gain determination Stability analysis. Ideal op-amp, Op-Amps circuits, inverting and non-inverting op-amps, voltage follower and other op-amps, summing op-amp, differential op-amp, differentiation op-amp, comparator op-amp, integrator op-amp. passive filters: high pass filter, low pass filter, band pass filter. Active Filters: Active Low Passive Filter, Active High Pass Filter, Active Band Pass Filter, Band Stop Filter
Teaching Method	Minimum 30 contact hours will be provided. At least 15 hours for tutorials to solve problems of design circuits and calculations. Slide show will be used to explain circuit design and analysis. Practice lab will be set to connect the different op-amps circuits
Evaluation	Will follow the same assessment used in electronic circuit I: • Attendance 5%. Practice 25%. • Midterm 10%, and Final Exam 60%. Instructor recommendations in assessment and grading for this course will taken into account.
Reference(s)	1. Electronic devices edition 9 , Floyd 2. Microelectronic Circuits by Sedra Smith,5th edition

Course Title	**EE3106 Signals & Systems**
Level /Semester	3/5
Credit Hours	3
Pre-requisite(s)	Mathematical Methods and Differential equation.
Objective(s)	This course aims to introduce the basic concepts and mathematical analysis for signals and system representations
Course Contents	Signals and system mathematical definition, the types, characteristics and properties of signals Time domain analysis, and convolution integral for LTI systems, properties and characteristics. Frequency domain representation of signals, aperiodic signals and Fourier transform, Fourier Transform properties, conversion tables, inverse Fourier transform. Frequency domain representation of continuous time systems, definition, properties, inverse Laplace transform. Z transform properties, duality properties, region of convergence, stability. Application: Analog filters, frequency separation, ideal filter, Butterworth filter, cross over frequency, bandwidth, design limitations.
Teaching Method	Suggested lecture/practice: • Lecture Hour: 30 hours • Matlab Practice Hour: 15 hours
Evaluation	• Matlab Practice 25% • Midterm 15% • Final Exam 60%. Subject to change according to the instructor advice
Reference(s)	1. Continuous and Discrete Time Signals and Systems by MrinalMandal, Amir Asif 2. Signals and Systems (2nd Edition) by Alan V. Oppenheim, Alan S. Willsky with S. Hamid 3. Signals and Systems using MATLAB (2nd Edition) by Luis Chaparro 4. Transforms in Signals and Systems by Peter Kraniauskas

Course Title	**EM3201 Numerical Techniques**
Level /Semester	3/6
Credit Hours	3
Pre-requisite(s)	Calculus I, II, Computer programming language.
Objective(s)	• The students completing this course will be able to apply standard numerical solution techniques to the solution of problems. • Using the computer programming to solve problems
Course Contents	Numerical methods for solving linear and nonlinear equations and systems of equations. Interpolation, numerical evaluation of definite integrals, and solution of ordinary differential equations, stability and convergence of methods and error estimates. Introduction to finite difference and finite element methods for solving partial differential equations. Techniques in matrix computation; elimination methods, matrix decomposition.
Teaching Method	This course is not lecture based. The course is an interactive, computer based laboratory course. The computer will lead you through the laboratory (like a set of lab notes) and you will answer problems most of which use the computer. The course consists of two parts: A set of interactive, computer based laboratory exercises, and two or more mini-projects
Evaluation	• Mini projects (25%) • Lab work (25%) • Final exam (50%) As directed by the instructor
Reference(s)	

Course Title	**EM 3202 Complex Variables**
Level /Semester	3/6
Credit Hours	3
Pre-requisite(s)	Calculus I, II
Objective(s)	The aim of the course is to provide the student with a reliable grasp of the results and techniques of the properties of complex analytic functions, with some mathematics majors and joint majors
Course Contents	Complex number system. Geometry of the complex plane,General functions of a complex variable. Limits and continuity of a function of a complex variable and related theorems. Complex differentiation and the Cauchy-Riemann equations. Infinite series. Convergence and uniform convergence. Line integral of a complex function Cauchy integral formula. Liouville's theorem. Taylor's and Laurent's expansions. Singular points. Residue, Cauchy's residue theorem
Teaching Method	• It is a lecture based course, so at least 30 hours should be covered. • Complex Variables course consists of a study of the properties of complex analytic functions, thus complex the properties should be clarified and wealth examples must be given. • 15 hours of tutorial must be set to cover the examples and exercises.
Evaluation	• Class Assignments (20%) • Mid-Term Test (20%) • Final exam. (60%) Or As recommended by the Lecturer.
Reference(s)	1- Complex variables and application 7th ed. By James word Brown/Ruel V.charchiodl 2- Advance Engineering mathematical by alan Jelfey.

Course Title	**EC3203 Measurements & Instrumentation**
Level /Semester	3/6
Credit Hours	3
Pre-requisite(s)	Fundamental of Electrical Engineering, Analog and digital electronics, magnetic fields
Objective(s)	• This course aims to provide the student with the SI, the modern metric system of measurement. • Also to study different measuring instruments, their use and operation
Course Contents	Measurement concept. SI units. Measurement statistics. Errors in measurement, causes and minimization. Accuracy and precision. Measurement of electrical quantities. Transducers types and applications. Measurement instruments. Galvanometer. Moving iron and coil instruments. Digital instruments. CRT theory and operation. Bridges: Wheatstone's, Desauty's, Maxwell's, Anderson, Schering, HAY'S
Teaching Method	15 x 2 hours Lectures, in which multimrdia projector is used in presenting many topics. 10 x 3 Lab hours to practice measurement experiments. Students attendence should be essential and not less than 75% of the total sessions time.
Evaluation	• Practice 25% • Midterm 15% • Final Exam 60%. Any other percentages recommended by the instructor could be taaken
Reference(s)	1. Measurement and Instrumentation: Theory and Application: Alan S Morris and Reza Langari, 2011 2. Instrumentation for Engineering Measurements: James W. Dally, William F. Riley and Kenneth G. McConnell, 1993 3. Measurement and Instrumentation in Engineering: Principles and Basic Laboratory Experiments: Francis S. Tse and Ivan E. Morse, 1989

Course Title	**EE3204 Electromagnetic Fields II**
Level /Semester	3/6
Credit Hours	3
Pre-requisite(s)	EE3105
Objective(s)	This course will complete topic of the previous course aiming to catch the same objectives of magnetic fields I course.
Course Contents	Simple electric dipole Clausius-Mossotti equation. Microscopic models of dielectric media. Ferroelectrics and electrets General properties of solutions to Laplaces's equation General properties of solutions to Laplaces's equation Electrostatic images Surface- and volume-current distributions Magnetic-field intensity **H** Electromagnetic Systems. Steady currents in the presence of magnetic materials. Forces in magnetic fields. Electromagnetic induction for stationary magnetic media. Faraday's law
Teaching Method	The same method followed in magnetic fields I course and concentrating on problem solution and student homework.
Evaluation	• Attendance 5%. • Practice 25%. • Midterm 10%, and Final Exam 60%. The instructor advice will be considered
Reference(s)	

Course Title	**ECE 3205 Analogue Electronic Circuits III**
Level /Semester	3/6
Credit Hours	3
Pre-requisite(s)	EC3105
Objective(s)	To focus on the design of amplifiers, filters, oscillators.
Course Contents	Oscillators: introduction to oscillator. types of oscillators: Feed back Oscillator, Wien-Bridge oscillator, Phase-Shift oscillator Twin-T oscillator, hartley oscillator. relaxation Oscillator.Triangular –Wave , Square – Wave, Saw-tooth oscillator. multivibrator circuits, A/D and D/A converter circuits
Teaching Method	30 contact hours to cover the course topics. At least 15 hours for tutorials or revision to solve problems of design circuits and calculations. Slide show will be used to explain circuit design and analysis. Practice lab will be set to practice passive filters and oscillators
Evaluation	Students' mastery of design skills is assessed primarily through detailed homework which represents 15% of the course grading. • Practice Lab grade represents 25% • Final Exam is 60%. Also instructor recommendations will be wealthy in grading method
Reference(s)	1. Electronic devices edition 9 , Floyd 2. Microelectronic Circuits by Sedra Smith,5th edition

Course Title	**CS 3206 Computer Application**
Level /Semester	3/6
Credit Hours	3
Pre-requisite(s)	Computer Language-I, II
Objective(s)	The objectives of this course is to teach the student the MATLAB program in some Engineering Applications
Course Contents	Introduction , Variables and Matrices , Variables and Matrices, Arrays and Script Files, Arrays and Script Files, Scripts and Functions, Scripts and Functions, Programming, Plotting , Calculus and Differential Equations Symbolic Processing and Simulink
Teaching Method	30 contact hours to cover the course topics. At least 15 hours for tutorials or revision to solve problems of design circuits and calculations. Slide show will be used to explain circuit design and analysis. Practice lab will be set to practice passive filters and oscillators.
Evaluation	• Attendance 5%. • Practice 25%. • Midterm 10%, and Final Exam 60%. The instructor advice will be considered
Reference(s)	- Introduction to MATLAB for Engineers by William J. Palm III, McGraw-Hill, 3rd Edition, 2011.

Course Title	**GE 3207 Computer Architecture**
Level /Semester	3/6
Credit Hours	3
Pre-requisite(s)	**ECE3102**
Objective(s)	The course aims to provide the student with the : Needed knowledge of computer components organisation and architecture. To understand the link between computer structure and instruction set.
Course Contents	Computer View, structure and Functional view, - Instruction set, number of bits used for data representation, addressing techniques, multiply instruction. Buses, types, microprocessor basic units, interfacing units. Input/output Modules, Interrupt Mechanism, and operations. Direct Memory Access DMA, Memory, types, organization, Cache Memory, Virtual Memory organization.
Teaching Method	30 contact hours to cover the course topics. At least 15 hours for tutorials or revision to solve problems of design circuits and calculations. Slide show will be used to explain circuit design and analysis. Practice lab will be set to practice passive filters and oscillators.
Evaluation	• Attendance 5%. • Practice 25%. • Midterm 10%, and Final Exam 60%. The instructor advice will be considered
Reference(s)	1. Introduction to Computer Architecture and Organization by: Harold Lorin 2. Introduction to Computer Architecture by: Harold S. Stone

4th Year:

Course Title	CE4101 Communication Engineering I
Level /Semester	4/7
Credit Hours	3
Pre-requisite(s)	EE3106
Objective(s)	On completion of this module, students should be able to: Understand the fundamental principles underpinning any communication system; Use mathematical analysis to investigate system behavior; Explain how one can model the various blocks in a schematic of a communication system.
Course Contents	Communication systems, Major Components, Historical background, Time and Frequency domain representation, Power measurements. Noise Thermal Noise, Shot Noise, Partition Noise, Excess Noise, Noise Figure. Amplitude Modulation (AM), Principle of AM, Full carrier AM, Modulation Index, Generation and Detection, Double Sideband, Suppressed Carrier (DSB-SC), Single-Sideband AM (SSB AM), Power measurements. Angle Modulation, Frequency Modulation, Phase Modulation, Modulation Indices, Relationships between FM and PM. FM Spectrum, Bessel Function of the first kind, FM Bandwidth, FM Noise, Pre-emphasis and De-emphasis. Transmitters, Basic Components, transmitter requirements, Phase Locked Loop (PLL), Frequency Synthesizers, AM Transmitters, FM Transmitters. Receivers, Receiver Parameters, Intermediate Frequency, Superheterodyne Receiver, AM Receivers, FM Receivers. Introduction to Digital Modulation, Bit rate and Baud rate, Channel Capacity, ASK Modulation, FSK Modulation, PSK Modulation, QPSK, MPSK and QAM
Teaching Method	• Lectures: 15 x 2 hours. • Lab Practice: 10 x 2 hours. Special concern should be taken for student attendance.
Evaluation	• Pracice 25% • Midterm 15% • Final Exam 60%. CE41L1 CommI Lab for subject CE4101
Reference(s)	1. Electronic Communications, Blake 2. Electronic Communication Systems, Wayne Thomasi

Course Title	**EE4102 Control systems I**
Level /Semester	4/7
Credit Hours	3
Pre-requisite(s)	• Linear differential equations with constant coefficients. • Laplace transforms and transfer functions for linear systems. • Elementary matrix manipulations
Objective(s)	To build an introduction to classical and modern control theory. The course emphasizes essential concepts. These concepts are illustrated by using numerous graphics, block diagrams, and simple examples.
Course Contents	Introduction, control system, Open loop, Closed loop Mathematical Modeling representation, Differential equations (t-domain). Laplace transforms (s-domain). Transfer function, block diagram and state variable systems. Control System types and effects of feedback. Time Domain analysis: transient response, steady-state error, Stability of the control systems. Routh-Hurwitz Criterion. Frequency response analysis of linear systems, Poles and zeros, Root-locus Gain and phase margin. Methods of Nyquist and Bode. Trade-off between stability and performance, PID Control. Introduction to Digital Control systems: Discrete-time systems (z-domain). Mappings between t, s, and z domains. MATLAB/Simulink and its Control Toolbox.
Teaching Method	• 30 contact hours for 15 lectures. • Concepts will be illustrated with Matlab examples.
Evaluation	• Design oriented practica examples including extensive use of computer aided simulation & design techniques (25%). • Midterm Exam (15%), and final exam (60%), with mixed evaluation of underlying analytic techniques and design techniques.
Reference(s)	1. "I. J. Nagrath and M. Gopal", "Control Systems Engineering", New Age International (P) Limited, Publishers, 5th edition, 2009 2. "B. C. Kuo", "Automatic Control Systems", John wiley and sons, 8th edition, 2003. 3. "N. K. Sinha", "Control Systems", New Age International (P) Limited Publishers, 3rdEdition, 1998. 4. "NISE", "Control Systems Engineering", John wiley, 6th Edition, 2011. 5. "Katsuhiko Ogata", "Modern Control Engineering", Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

Course Title	**AD4103 Industrial Management**
Level /Semester	4/7
Credit Hours	3
Pre-requisite(s)	None
Objective(s)	• This course aims to provide the student with the basic requirements of engineering organization's management • To develop the skills of the student to solve administratative problems that may encounter during his supervision of engineering projects.
Course Contents	**UNIT I:** HISTORICAL: Definition of Management–Science or Art–Management and Administration– Development of Management Thought–Contribution of Taylor and Fayol– Functions of Management– Types of Business Organization. **UNIT II:** Nature & Purpose – Steps involved in Planning – Objectives – Setting Objectives – Process of Managing by Objectives – Strategies, Policies & Planning Premises- Forecasting – Decision-making. **UNIT III:** Nature and Purpose–Formal and informal organization–Organization Chart–Structure and Process– Departmentation by difference strategies–Line and Staff authority–Benefits and Limitations–De-Centralization and Delegation of Authority–Staffing–Selection Process - Techniques – HRD – Managerial Effectiveness. **UNIT IV:** Scope–HumanFactors–CreativityandInnovation–HarmonizingObjectives–Leadership – TypesofLeadershipMotivation–Hierarchyofneeds–Motivationtheories–Motivational Techniques – Job Enrichment – Communication – Process of Communication – Barriers and Breakdown-Effective Communication – Electronic media in Communication. **UNIT V:** System and process of Controlling– Requirements for effective control–The Budget as Control Technique–Information Technology in Controlling– Use of computers in handling the information–Productivity–Problems and Management– Control of Overall Performance –Direct and Preventive Control– Reporting– The Global Environment– Globalization and Liberalization– International Management and Global theory of Management.
Teaching Method	This course is lecture based course, but group assignments will be delivered regarding management topics.
Evaluation	Lecturers from industry will have at least two seminars in industrial management issues. 30 contact hours will be set to cover 15 Lectures. Homework and management research, 15% Midterm 15% and Final Exam 70%.
Reference(s)	1. Ernest Dale, Management Theory and Practice, International Student edition, McGraw Hill blushing 2. Murphy W.R. and Mc Kay. G., Energy Management Butterworths, London. 3. Chandran. J.S., Organizational Beheviours, Vikas Publishing House Pvt. Ltd., New Delhi, 1994. 4. Industrial engineering and management by O.P Khanna

Course Title	**EC41014 Microelectronic Technology**
Level /Semester	4/7
Credit Hours	3
Pre-requisite(s)	Principle of Electronics.
Objective(s)	This course serves as an introduction to basic processes used in fabricating semiconductor devices and integrated circuits. The objective is to develop the background knowledge necessary to understand the state-of-the-art semiconductor technology related to device fabrication processes
Course Contents	Semiconductor Processing Technology: Crystal Growth, Wafer Preparation, Contamination Control, Wafer Fabrication. Microelectronics Fabrication: Oxidation, Photolithography, Etching, Doping, Deposition techniques, Metallization processes, Wafer Test and Evaluation, Semiconductor Devices, IC Formation, Chip Packaging.
Teaching Method	Since this course will describe the microelectronic devices, slides show is used to explain the fabrication steps in an attractive images. 30 hours for 15 Lecture is needed to cover the topics. Home work will be helpful in student perception.
Evaluation	• Homework 15% • Midterm 25% • Final Exam 60%. Or as recommended by the instructor
Reference(s)	1. Education in Microelectronics Technology, by Ian Szendiuch 2. Microelectronics Technology and devices , by William de Lima

Course Title	**EC4105 Digital Signal Processing**
Level /Semester	4/7
Credit Hours	3
Pre-requisite(s)	Mathematics methods
Objective(s)	On completion of this course, students should be able to: • Understand the fundamental principles of digital signal processing; • Discuss a large number of applications of DSP. • Mathematical theories of DSP for both analysis and design.
Course Contents	**SIGNALS AND SYSTEMS** Introduction to continuous, Discrete and Digital signals, Classification of continuous and Discrete Time signal – Periodic, Even and Odd, Energy and Power, Deterministic and Random, Complex exponential signals, Elementary signals – UNIT step, Ramp, Impulse, Classification of systems : Linear, Time invariant, Causal, Stable, Invertible systems, BIBO Stability criterion. **TRANSFORMATION OF DISCRETE TIME SIGNALS** Spectrum of discrete time signal, Discrete Time Fourier transform and its properties, Discrete Fourier Transform and its properties, Linear and circular convolution, Linear convolution using DFT, Fast Fourier Transform, Z-transform and its properties, Inverse Z-transform using partial fraction and residue methods. **IIR FILTERS** Design of analog filters using Butterworth and Chebyshev approximation, Frequency transformation, Design of digital IIR filters-Impulse Invariant and Bilinear transformation methods, Structures for IIR digital filters. **FIR FILTERS** Design of digital FIR filters – Fourier series, Frequency sampling and windowing methods, Structure for FIR filters, Comparison of IIR and FIR filters
Teaching Method	• Lecture Hour: 30 hours • Tutorial Hour: 15 hours
Evaluation	• Homework 15% • Midterm 25% • Final Exam 60%. Subject to change according to the instructor advice.
Reference(s)	1. Digital Signal Processing - computer based approach by Sanjit K. Mitra, 1997

Course Title	**EE4106 Power Electronics**
Level /Semester	4/7
Credit Hours	3
Pre-requisite(s)	EE2106, EE2206
Objective(s)	Students of this courseware will gain intense knowledge and understanding of the field of Power Electronics, and also the student will learn to design and test these circuits through the software simulation package.
Course Contents	Fundamentals of DC/ DC, AC/DC power conversion. Switch mode power supply fundamentals. basics and operation of power semi-conductor devices. Thyristors and controlled rectifiers .Power converters. SCR operation. Regulation circuits. DC choppers. Design and construct power converters and regulators to meet given objectives through homework, exams and a final project. Understand and analyze the concepts of soft switching of DC/DC converters. Uncontrolled Diode Rectifier Circuits, Phase controlled Converters, DC/AC Inverters.
Teaching Method	• 15 x 2 Hours Lectures. • 12 x 3 Hours Lab practice
Evaluation	• Attendance 5%. Practice 25%. • Midterm 10%, and Final Exam 60%. The instructor advice in assessment and grading will be considered. **Power Electronics Lab for subject EE4106**
Reference(s)	1. Bhimbra. Dr.P.S., Power Electronics Khanna Publishers, 2001 2. Muhammad H. Rashid, Power Electronics – Circuits, Devices & Applications, Prentice Hall of India, New Delhi, 1995

Course Title	**CE4201 Communication Engineering II**
Level /Semester	4/8
Credit Hours	3
Pre-requisite(s)	CE4101
Objective(s)	To identify the functions of various parts in a communication system chain where one has to deal with wireless RF and microwave signals/devices. Appreciate the physical limitations in a practical design.
Course Contents	Concepts & Signals_Spectra, PCM and delta modulation, PAM, ISI, Condition of No ISI, Nyquist Channel, Digital Modulation, Binary (ASK, FSK, PSK, DPSK), M-ary (ASK, FSK, PSK, DPSK, QAM). Synchronization
Teaching Method	- Lectures: 15 x 2 hours. - Lab Practice: 10 x 2 hours. Slide presentations including simulation patterns will be used to express many topics in this course.
Evaluation	This course will follow the same assessment applied for communication I including: - Pracice 25% - Midterm 15% - Final Exam 60%. Comm-II Lab for subject CE4202
Reference(s)	Digital Communication By By John G.Proakis. Fourth Edition

Course Title	**EE4202 Control systems II**
Level /Semester	4/8
Credit Hours	3
Pre-requisite(s)	EE4102
Objective(s)	The objective of this course is to apply knowledge of mathematics and engineering to analyze and design a control system to meet desired specifications. Students should learn to analytically determine a control system's functionality and select appropriate tests to demonstrate system's performance and finally design a control system to meet a set of requirements. Develop an understanding of the elements of classical control theory as applied to the control of aircraft and spacecraft. In particular understand: the concept of feedback and its properties; the concept of stability and stability margins; and the different tools that can be used to analyze the previous properties
Course Contents	Continuous systems: Dynamics System modeling; State-space representation. Multi-input multi-output systems.; Design specifications; relationship between gain and phase margins and closed loop response; Simulation of dynamics systems.; Root-locus analysis and design, Control design using Bode and Nyquist plots; Compensation techniques, Phase lead and phase lag compensators. Discrete systems: Sampled signals, the z-transform and relation between the s and z-planes; Discrete-time transfer functions and the unit pulse response; Frequency response; The zero order hold; Stability analysis; Design by emulation
Teaching Method	• 15 x 2 Hours Lectures. • 12 x 3 Hours Lab practice.
Evaluation	Attendance 5%. Practice 25%. Midterm 10%, and Final Exam 60%. The instructor advice will be considered. **Control II Lab for subject EE4202**
Reference(s)	1. "I. J. Nagrath and M. Gopal", "Control Systems Engineering", New Age International (P) Limited, Publishers, 5th edition, 2009 2. "B. C. Kuo", "Automatic Control Systems", John wiley and sons, 8th edition, 2003. 3. "N. K. Sinha", "Control Systems", New Age International (P) Limited Publishers, 3rdEdition, 1998. 4. "NISE", "Control Systems Engineering", John wiley, 6th Edition, 2011. 5. "Katsuhiko Ogata", "Modern Control Engineering", Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

Course Title	**EC4203 Interfacing Circuits**
Level /Semester	4/8
Credit Hours	3
Pre-requisite(s)	Analog and digital Electronic courses.
Objective(s)	On completion of this module, students should be able to: • Understand interfacing Circuits concept. • Understand interface circuits functions and Services.
Course Contents	Interface circuits concepts; needs for interfacing; sensors types and supports; actuators types ; signal conditions modules ;interface circuits classification; analogue interface models ; basics standard components for analogue interface; digital interface model and basics components, advance mode interface; international standard and specification; interface protocols serial and parallel protocols.
Teaching Method	30 contact hours in 15 lectures as minimum. 20 lab practice hours to set some interfacing experiments. Interfacing simulation slide show will be provided.
Evaluation	• Pracice 25% • Midterm 15% • Final Exam 60%. Further instructor recommendations should be considered.
Reference(s)	1. The Interface Circuits Data Book for Design Engineers, by W.J 2. Practical interface circuits for micros, by Prentice-Hall

Course Title	**CE4205 Computer Networks I**
Level /Semester	4/8
Credit Hours	3
Pre-requisite(s)	Engineering Communication I, II
Objective(s)	To understand various type of computer networks and how they work
Course Contents	Definition, uses and classification of computer networks. Network topologies. Multiple access methods. Layered network structure. OSI and TCP/IP Reference models. Example networks. Data communication services (SMDS, X.25, FR, ISDN, ATM, BISDN). Network standardization. Physical layer, basic definitions related to digital data transmission, RS-232 C interface Functions of data link layer, framing, flow control, error control; HDLC, SLIP and PPP protocols. MAC sublayer. Connectivity and interconnectivity devices, Repeaters, bridges, routers, gateways. Routing Algorithms.
Teaching Method	30 contact hours in 15 lectures as minimum. Student seminars regarding network topics. diagrams and images slide show will be provided
Evaluation	• Seminars 15% • Midterm 20% • Final Exam 65%. Also instructor advice in assessment could be taken.
Reference(s)	1. Computer Networks: A Systems Approach (The Morgan Kaufmann Series in Networking) 5th Edition, 2011

Course Title	**EC4205 Introduction to VLSI Design**
Level /Semester	4/8
Credit Hours	3
Pre-requisite(s)	Microelectronics Technology.
Objective(s)	On completion of this course, students should have a deep understanding of the key aspects and technology drivers in contemporary VLSI design and implementation
Course Contents	Revision: Moore Law, Scales. MOSFET characteristics & models. Modern CMOS alternatives such as BiCMOS, Pseudo nMOS. Design procedure. ASIC and ASIP. Design techniques. Design styles, FPGA, GA, Standard style, and full custom style. Sea of Gate (SOG) design. Optimization of speed and power
Teaching Method	30 contact hours in 15 lectures as minimum. 15 tutorial hours to set some examples. Stick diagrams and images slide show will be provided
Evaluation	• Homework 15% • Midterm 25% • Final Exam 60%. Percentages are Subject to change according to department view.
Reference(s)	1. Introduction to VLSI Systems 1st Edition Edition by carver, 1979 2. Introduction to VLSI Circuits and Systems by John P. Uyemura, 2002

Course Title	**AD4206 Engineering Economics**
Level /Semester	4/8
Credit Hours	2
Pre-requisite(s)	Calculus-I, II
Objective(s)	To improve the students skills in financing topics to have the confidence to take decisions in his organization and analyze different options.
Course Contents	**ENGINEERING ECONOMICS:** Introduction - Economics – Scope and Definition – Importance of Economics in Engineering - Economic optimization- Demand and Revenue Analysis – Law of Demand - Demand Forecasting –Methods of Demand Forecasting - Demand curves – Factors affecting Demand – Demand Elasticity - Production Analysis - simple problems. **SUPPLY, COST AND OUTPUT:** Supply – Supply schedule – Law of Supply – Elasticity of Supply - Cost and Supply Analysis – Types of Costs - Price and output Determination – Price Fixation – Pricing methods - Pricing Policies – Factors governing Pricing Policies – Break-Even analysis – Estimation of Break-Even Point - Usefulness of BEP – Limitations – simple problems
Teaching Method	30 contact hours for 15 lectures. Wealthy examples will be covered. Student homework regarding economics problems will be set.
Evaluation	• Homework and economic research 15% • Midterm 15% • Final Exam 70%. The instructor may change the percentages
Reference(s)	**1.** Chandran. J.S., Organizational Beheviours, Vikas Publishing House Pvt. Ltd., New Delhi, 1994. **2.** Ernest Dale, Management Theory and Practice, International Student edition, McGraw Hill Publishing Co.,

Course Title	**ECE4207 Integrated Circuits**
Level /Semester	4/8
Credit Hours	3
Pre-requisite(s)	Microelectronics technology
Objective(s)	This course aims to provide the student with integrated circuit classifications and families including analog and digital integrated circuits and their design
Course Contents	**Course Content:** Review on the definitions on semiconductors. Basic definitions and classifications of integrated circuits. The basic principles of production techniques of circuit elements and integrated circuits. MOS and bipolar integrated circuit technology. Model parameters of MOS and Bipolar IC design: Design rules, lay-out procedures. IC design and lay-out project
Teaching Method	Power point slide show will be used to describe the topics. Lectures: 15 x 2 hours. Tutorial: 8 x 2 hours
Evaluation	• Homework 15% • Midterm 25% • Final Exam 60%. Students Lecture attendance is essential
Reference(s)	1. **Electronic Devices and Integrated Circuits By B. P. Singh, Rekha Singh, 2006**

Course Title	**ECE4207 Microchip programming**
Level /Semester	4/8
Credit Hours	3
Pre-requisite(s)	Digital Circiut Design-I, II
Objective(s)	- To make students familiar with the basic concepts and terminology of the microchip area. - Demonstrate knowledge and understanding of the microchip technology both for hardware and software supports.
Course Contents	Introduction to microchip. Terms definition, features, characteristics, application area, Microchip programming concepts and rules, Microchip architectures, Instruction set, Interrupt signals and routines, Interface circuits, Analogue and Digital Peripherals programming: Digital I/Os, Timers, ADC and Communication Peripherals, Low power modes of operation. Programming microchip using Integrated Development Environments and using debugging techniques. Know and classify microchips' peripherals; know, understand and explain low-power technology and Interrupt mechanisms. Design and implement a complete microchip system as a project.
Teaching Method	Power point slide show will be used to describe the topics. Lectures: 15 x 2 hours. Tutorial: 8 x 2 hours
Evaluation	• Homework 15% • Midterm 25% • Final Exam 60%. Students Lecture attendance is essential
Reference(s)	1. An Introduction to Programming Microchip by: Nigel Gardner. 2. Embedded C Programming and the Microchip PIC by: Richard Barnett

Course Title	**CE4207 Telephone System**
Level /Semester	4/8
Credit Hours	3
Pre-requisite(s)	Engineering Communication I, II
Objective(s)	This course will introduce telecommunications students to the basic telephone communications system and equipment. At the completion of the course the student will be able to describe local area and long distance telephone networks and the limiting factors of bandwidth and noise
Course Contents	Definitions of the basic telephone system construction. Basic telephone system construction for local area networks and long distance telephone networks. Description of local area telephone calling. Operation of the local loop. The operation of mechanical and electronic telephone sets. Measure signals in the local loop of an electronic telephone set
Teaching Method	• 15 x 2 Classroom Lectures with whiteboard or chalkboard. • 10 x 2 Practical laboratory. Multimedia projector will be used for circuit explanation and simulation
Evaluation	• Practice 25% • Midterm 15% • Final Exam 60%. The instructor advice will be wealthy in progress evaluation
Reference(s)	1. Introduction to Telephones & Telephone Systems by A. Michael Noll, 1991

Course Title	**CE4207 Information System and Coding**
Level /Semester	4/8
Credit Hours	3
Pre-requisite(s)	Probabilities and Statistic, Communication Engineering I,II
Objective(s)	The aim of this course to help students understand and design communication systems using information theory concepts such as source coding and channel coding.
Course Contents	Information Content, Information Measure, Uncertainty, Information Entropy, Joint and Conditional Entropy, Average Mutual Information, Source Coding, Language Models, Entropy of a Memory and Memoryless Sources, Entropy Rate, The Source Coding Problem, Elementary Properties of Codes, Kraft Theorem, McMillan's Theorem, Source Coding Theorem, Data Compression, Compression Algorithms, Shannon-Fano Algorithm, Huffman Algorithm, Lempel Ziv 78 (LZ 78) Algorithm, Lempel Ziv Welsh (LZW) Algorithm, Channel Capacity, Symmetric Channels, Non symmetric Channels, The Noisy Channel Theorem, Channel Coding, Error Correcting Codes, Systematic binary codes, Nearest Neighbour Decoding, Linear Codes, Minimum distance decoding process, Hamming Codes, Convolution codes, Viterbi Decoding
Teaching Method	• 15 x 2 Classroom Lectures with whiteboard or chalkboard. • 10 x 2 Practical laboratory
Evaluation	• Practice 25% • Midterm 15% • Final Exam 60%. The instructor advice will be wealthy in progress evaluation
Reference(s)	1. *Elements of Information Theory*, Second Edition THOMAS M. COVERJOY A. THOMAS, CopyRight2006, Willy 2. *Coding and Information Theory*, RICHARD w. HAMMING Copy Right 1986,Prentic-Hall

5th Year: (Telecommunication)

Course Title	GE 5101Research Methods
Level /Semester	5/9
Credit Hours	2
Pre-requisite(s)	Non
Objective(s)	The course objective is to prepare student for research work, practice and knowledge about research methods, statistical analyses of data within environmental science, a way of thinking and solving problems. Also focus on papers and proposal writing styles.
Course Contents	Communication skills, The Nature of Communication, Barriers to Effective Communication, Informative presentations, Persuasive presentations, Organizing Presentations, Types of Deliveries. Making an effective PowerPoint Slides. Objective of research, Research Motivations, Outcomes of Research. Stages of Research, Research Problem, Meaning of research problem, Sources of research problem, Criteria / Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Literature survey Overview: What is literature survey, Functions of literature survey. Developing a Research Proposal, Format of research proposal, Individual research proposal, Institutional proposal and presentation. Research Design, Actual Investigation, Research Report, Research ethics, Legal issues, copyright, plagiarism General advice about writing technical papers in English, Tips for writing correct English
Teaching Method	• 15 x 2 Classroom Lectures with whiteboard or chalkboard. • 10 x 2 Practical laboratory
Evaluation	Homework and management research 15% Midterm 15% Final Exam 70%. The instructor may change the percentages
Reference(s)	1. Ranjit kumar (2014).Research Methodology: A Step-by-Step Guide for Beginners.4th edition 2. Heidi A, Danille (2007).Digital Writing Research: Technologies Methodologies and Ethical Issues. 3. Stuart Melville, Wayne(2004). Research methodology: an introduction.2nd edition

Course Title	**CE52102 Mobile Communication systems**
Level /Semester	5/9
Credit Hours	3
Pre-requisite(s)	Communication Engineering I, II.
Objective(s)	On completion of this module, students should be able to understand the theory and operation of mobile communication systems.
Course Contents	Introduction to mobile communication systems; basic planning of a cellular system, elements of cellular radio design system; propagation characteristics of mobile radio channels; frequency management, channel allocation and handoff mechanisms; specifications of mobile communication systems in specific examples; wireless networks.
Teaching Method	• Lectures 15 x 2 hours. • Practice 10 x 2 hours. Multimedia projector for slide show circuit simulation will be used. Student small project will be set
Evaluation	• Practice 25% • Midterm 15% • Small projects 10% • Final Exam 50%. The instructor has the right to change the percentages
Reference(s)	1. Kaveh Pahlavan : "Principles of Wireless Network: A Unified Approach", 2001 2. Dharma Prakash Agrawal : "Introduction to wireless and mobile systems", 2010 3. Theodore S. Rappaport : "Wireless Communications Principles and Practice" , 2001

Course Title	**CE5103 Video Engineering & Image Processing**
Level /Semester	5/9
Credit Hours	3
Pre-requisite(s)	DSP, Communication Engineering-I,II.
Objective(s)	On completion of this module, students should be able to: - Understand two dimensional image concept. - Understand Image Coding and compression
Course Contents	Vision Representation Concepts ; vision systems, Elements of image processing system; Image Formation and Models; Digital image types and Structure; Image processing Techniques; Types of Image processing; Digital Image Applications; Video Concepts; Video Signal and Video Digitalization; Video Systems; TV Systems; Color Representation Systems; Multimedia Systems
Teaching Method	- Lectures: 15 x 2 hours. - Lab Practice: 10 x 2 hours. Slide presentations including simulation for image processing will be used to express many topics in this course.
Evaluation	As stated for communication engineering: - Practice 25% - Midterm 15% - Final Exam 60%. Lab for subject CE5103
Reference(s)	1. Digital Image Processing ,by Conzalize 2. Television Engineering and Video Systems, by R. G Gupta

Course Title	**GE 5104 Environmental Engineering**
Level /Semester	5/9
Credit Hours	2
Pre-requisite(s)	CH1104
Objective(s)	Engineering factories and other productions have got which is called unwanted side production. This is categorized in many cases as pollution. Electromagnetic waves and other aspects are assumed to have their effects on environment. The goal of the course is provide the student with these considerations so as to take them into account in designing and implementing engineering projects.
Course Contents	An introduction to environmental resources and their uses. Air and Water resources. Treatment processes. Waste energy. Noise pollution and electromagnetic pollution. Aspects considered in water resources systems. Environmental impact analysis. Environmental planning. International organizations and their impact in environmental planning.
Teaching Method	At least 30 contact hours of lectures concerning the course topics. Student groups will be arranged to make small projects in determination of pollution analysis in some selected topics. Class presentations and seminars will be held to discuss the groups work. An electronic handout will be available.
Evaluation	• Student group presentations. (20%) • Mid-term Exam (20%) • Final Exam (60%)
Reference(s)	1. Environmental engineering by A. Matt Hews, 2003

Course Title	**CE5106 Switching and Traffic Theory**
Level /Semester	5/9
Credit Hours	3
Pre-requisite(s)	Communication Engineering-I, II
Objective(s)	Student should understand the principles of communication networks and services they provide, also understand the use and design of backbone networks
Course Contents	Introduction to communication networks and networks topologies, switching principles, circuit switching, switch design ,crossbar switch, space division switch, time division switch, Telephone network, hierarchy structure, truncking circuits, politics, numbering system, signaling, principles of electronic exchange, introduction to data communications, networks protocols, principles of packet switching, routing concepts and strategies, router design, datagram, virtual circuits approaches, Framerelay and ATM networks, principles of traffic theory.
Teaching Method	30 contacts hours to explain the course materials. Slide show is preferable. Course notes and slide script will be available for students
Evaluation	- Homework 15% - Midterm 15% - Final Exam 70%. Percentages could be directed by the instructor.
Reference(s)	1. Forouzan " data communication and networking", 4th ed, 2012 2. J. Dunlop, "Telecommunication Engineering", Springer; 3rd ed. 1994 edition 3. stalling, " Data & computer communication", 3RD Edition Hardcover – 1991

Course Title	**CE5107 Fiber Optics Communication systems**
Level /Semester	5/9
Credit Hours	3
Pre-requisite(s)	Communication Engineering I,II
Objective(s)	To introduce fiber optics communication systems as a part of modern communication systems and its role in modern global communication networks.
Course Contents	Optical fiber Communications Systems, Basic Element, Historical Developments, Applications. Particle theory, Wave Theory, Electromagnetic Waves, Total Internal Reflection, Quantum View, Photons. Step Index Fiber, The Basic Structure, Numerical Aperture, Attenuation, Transmission Windows, Dispersion. Singlemode (SM) Fibers, Mode Field Diameter, Singlemode Operation, Cutoff Wavelength & V Number, Attenuation and Dispersion in SM Fibers. Fiber Fabrication, Vapor-Phase Oxidation Technology, Drawing, Coating and Fiber Cables. Splicing, Connection Losses, Intrinsic Losses, Extrinsic Losses, Mechanical Splicing, Fusion Splicing, Connectors, Link Consideration, Power Budget, Rise-Time (Bandwidth) Budget, Testing, Troubleshooting and Measurement. Light Sources, LEDs and Lasers, Principle of action, Radiative & Non-Radiative Recombination, Internal Quantum Efficiency, Spontaneous and Stimulated Radiation, Positive Feedback, Population Inversion, Lasing, Input-Output Characteristics, Basic Structures and Types of Laser Diodes. Optical Transmitters, Laser Modulation, Transmitter Modules, Laser Driver, Direct and External Modulation. Photodiodes, The Energy Bands, P-I-N Photodiodes, Avalanche Photodiodes (APDs). Optical Receivers, Noise Sources in a Photodiode, Shot Noise, Thermal Noise, Dark Current Noise, 1/f Noise, Photodiode Sensitivity, Receiver Unit, Optical Receiver Block Diagram
Teaching Method	- 15 x 2 Classroom Lectures. - 10 x 2 Practical laboratories. Multimedia projector will be used for fiber topics explanation and simulation.
Evaluation	- Practice 25% - Midterm 15% - Final Exam 60%. Or as directed by the instructor **Communication Lab for subject CE5106**
Reference(s)	Fiber-Optics Communication Technology, Djafar K. Mynabaev and Lowell L. Scheiner

Course Title	**CE5108Antennas and Wave Propagation**
Level /Semester	5/9
Credit Hours	3
Pre-requisite(s)	Electromagnetic Fields I, II
Objective(s)	• To provide the student with the basic and advanced characteristics of antenna and wave propagation theory and operation. • To clarify the link between antenna and transceivers
Course Contents	Antenna parameters. Small and finite size dipoles. Radiation from a quarter-wave monopole and a half-wave dipole. Influence of earth on antenna radiation pattern and impedance. Loop and Helix antennas. Analysis and synthesis of linear, planar and circular arrays. Aperture antennas. Micro-strip antennas. Receiving antennas theory. Antenna coupling to transmitters and receivers
Teaching Method	- Lectures 15 x 2 hours. - Practice 10 x 2 hours. Multimedia projector for slide show and circuit simulation will be used. Student reports regarding antennas will be assigned and evaluated
Evaluation	- Practice 25% - Midterm 15% - Small projects 10% - Final Exam 50%. Percentages could be changed due to instructor recommendations.
Reference(s)	1. Antenna Theory Analysis And Design by Constantine A. Balanis, 2005

Course Title	**CE5201 Communication Network Analysis**
Level /Semester	5/10
Credit Hours	3
Pre-requisite(s)	Communication I,II, and Networks I,II. - Switching systems - Probability and statistics
Objective(s)	Students understand the principles of networks modeling, and performance measurement for networks trouble shooting, also the principles of planning for both blocked or delayed systems
Course Contents	Review of fundamental concepts in communication networks, Basic Concepts on teletraffic theory and teletraffic engineering, concepts of modeling, Gos, QoS in blocked system, Erlang-B, Stochastic Processes; Poisson process Birth-death Processes Theory , Markov process, Markov chain, delay models, Erlangs-C ,Queuing and Little theorem ,M/M/1 queueing model
Teaching Method	30 contact hours in 15 lectures as minimum. Student seminars regarding network analysis topics. Diagrams and images slide show will be provided.
Evaluation	• Seminars 15% • Midterm 20% • Final Exam 65%. Percentages are subject to change.
Reference(s)	1. George Kesidis, "an introduction to communication networks analysis" 2. J. Dunlop, "Telecommunication Engineering"

Course Title	**CE5202 Radar & Microwave Communication**
Level /Semester	5/10
Credit Hours	3
Pre-requisite(s)	Communication Engineering I, II
Objective(s)	On completion of this module, students should be able to Understand the principles underpinning Radar and microwave communication system.
Course Contents	• Microwave Theory and Techniques Introduction • Effects of Microwaves on Human Body - II • Waveguides - I: Parallel Plane Waveguides • Rectangular Waveguides • Transmission Lines - I: Coaxial Cables, Strip Lines and Microstrip Lines • Transmission Lines - II: Transmission Line Model, Open and Short Circuited Lossless Transmission Lines • Smith Chart and Impedance Matching - I: using Quarter Wave Transformer • Smith Chart and Impedance Matching - II: using Lumped Components • Smith Chart and Impedance Matching - III: using Short and Open Circuited Stubs • ABCD - Parameters • S - Parameters • Power Dividers: Two-way, Three-way and Four-way Equal Power Dividers • Microwave Couplers : Coupled Line Directional Couplers • Microwave Filters : Filters and Low Pass Butterworth Filter • Microwave Diodes: PN Junction , Varactor, Schottky, PIN, Tunnel, and GUNN Diodes • Power Amplifiers, Microwave Tubes • Microwave Systems
Teaching Method	• Lectures: 15 x 2 • Practice : 12 x 3 Specialist lecturers from industry will deliver a small number of (non-assessed) broad-based lectures that will cover aspects of all modules
Evaluation	• Practice 25% • Midterm 15% • Final Exam 60%. The instructor can assign a certain percentage for attendance specially lectures presented by the lecturers from industry
Reference(s)	1. Fundamental of Microwave & Radar Engineering, By K K Sharma, 2011

Course Title	**CE5203 Ad-Hoc Wireless Network**
Level /Semester	5/10
Credit Hours	3
Pre-requisite(s)	• Computer Networks • Wireless Communication
Objective(s)	To provide students with a broad perspective on the fundament and state-of-the-art technologies in wireless ad hoc networks
Course Contents	- Introduction to Ad hoc networks - MAC in Ad hoc network - Routing in Ad hoc network - Clustering in Ad hoc network - Power control in Ad hoc network - QoS of Ad hoc network - Applications of Ad hoc networks
Teaching Method	• Lectures: 15 x 2 • Practice : 12 x 3 Specialist lecturers from industry will deliver a small number of (non-assessed) broad-based lectures that will cover aspects of all modules
Evaluation	• Practice 25% • Midterm 15% • Final Exam 60%. The instructor can assign a certain percentage for attendance specially lectures presented by the lecturers from industry
Reference(s)	1. **R. Ramanathan and J. Redi,** A Brief Overview of Ad Hoc Networks: Challenges and Directions , *IEEE Commun. Mag.* , Vol. 40, No. 5, pp 20-22, May 2002. 2. AD HOC NETWORKS: Technologies and Protocols by Prasant Mohapatra, Srikanth , 2005

Course Title	**CE5203 Information Security**
Level /Semester	5/10
Credit Hours	3
Pre-requisite(s)	
Objective(s)	- To make students familiar with the basic concepts and terminology of the data and information systems. - To give students an understanding of the information security systems. - To acquaint students with security techniques and access control that can be apply and test in practice;
Course Contents	Introduction to data and information systems. Terms definition, features, characteristics, application, security concepts ,needs for security, Security Attacks , an overview of data and computer security and concentrates on (a) technical and (b) continuity management issues. The basic information security objectives such as data integrity, identification, message authentication, authorization, validation and access control are examined. Cryptographic techniques to realize these objectives are introduced. The basic philosophy of key management is Information Security models, information security application areas.
Teaching Method	• Lectures: 15 x 2 • Practice : 12 x 3 Specialist lecturers from industry will deliver a small number of (non-assessed) broad-based lectures that will cover aspects of all modules
Evaluation	• Practice 25% • Midterm 15% • Final Exam 60%. The instructor can assign a certain percentage for attendance specially lectures presented by the lecturers from industry
Reference(s)	1. Information Security by: Marie A. Wright, John S. Kakalik 2. Handbook of Information Security Management by: Harold F. Tipton, Micki Krause

Course Title	**CE5204 Computer Networks II**
Level /Semester	5/10
Credit Hours	3
Pre-requisite(s)	Computer Networks I
Objective(s)	To complete understanding various topics in networks as begun in the first course of networks
Course Contents	The Network Layer: Services provided, congestion control algorithms, traffic shaping, internetworking, firewall, network layer in the Internet and ATM. Transport Layer: Services provided, Quality of Service, elements of transport protocols, TCP congestion control. The Application Layer: Network security, Domain Name System. Performance problems and performance analysis in computer networks. Traffic-arrival models, Poisson distribution, queuing models. Performance calculations in LANs. Statistical multiplexing
Teaching Method	30 contact hours in 15 lectures as minimum. Student seminars regarding network topics. diagrams and images slide show will be provided. • 2 x 2 Lectures from local network companies. • 10 x 2 Practice Hour
Evaluation	• Practice 25% • Midterm 15% • Final Exam 60%. The instructor can assign a certain percentage for attendance specially lectures presented by the lecturers from industry
Reference(s)	1. Computer Networks: A Systems Approach (The Morgan Kaufmann Series in Networking) 5th Edition, 2011

Course Title	**CE 5206 Satellite Communication**
Level /Semester	5/10
Credit Hours	3
Pre-requisite(s)	Communication I,II, and Transmission Medium
Objective(s)	- To introduce the principles of satellite communications. - To introduce satellite function in modern communication network
Course Contents	Overview of Satellite Systems, Orbits and Launching Methods, The Geostationary Orbit, Radio Wave Propagation, Polarization/Antennas, The Space Segment/The Earth Segment, Analog Signals & Error Control Coding, The Space Link, Interference, Satellites in Networks, Direct Broadcast Satellite (DBS) Television, Satellite Mobile and Specialized Services
Teaching Method	• 30 contacts hours to explain the course materials. • Slide show is preferable. • Course notes and slide script will be available for students.
Evaluation	• Homework 15% • Midterm 15% • Final Exam 70%. Percentages could be direced by the instructor
Reference(s)	1. Satellite Communications, Fourth Edition (Professional Engineering) 4th Edition, by Dennis Roddy, 2006

5th Year: (Electronics)

GE5101, CE5102, CE5103, CE4103, GE5104 and CE5203 listed in telecommunication Track.

Course Title	CS5106 Software Engineering
Level /Semester	5/9
Credit Hours	3
Pre-requisite(s)	Programming language, and system analysis and design
Objective(s)	To provide the student with the skills of software system design methodology and life cycle modeling.
Course Contents	Sequential and parallel process, system design methodology: top-down and bottom-up design. Modularity. Information hiding. System specification. System feasibility evaluation. Coding. Documentation. Testing. Production and support. Life cycle models. Language feature. Programming for reliability. Environment and tools for software development. Real time systems
Teaching Method	• This course is theoretical, thus 30 contacts hours will be covered in 15 lectures to explain the course topics. • 15 additional hours are needed to fulfill student homework and seminars. • Multimedia slides are used to describe diagrams and some course notes
Evaluation	• Student group presentations. (20%) • Mid-term Exam (20%) • Final Exam (60%) Could be changed marginally by the instructor
Reference(s)	

Course Title	**CS5107 Operating Systems Engineering**
Level /Semester	5/9
Credit Hours	3
Pre-requisite(s)	Introduction to computer systems, and programming fundamentals
Objective(s)	• Understand the concept of operating systems. • Describe the structure of the operating systems. • Link between hardware and software instructions
Course Contents	Basic concepts of operating systems and system programming. Utility programs. Multi-program system. Subsystems. Process, inter-process communication and synchronization. Memory location, segmentation and paging. Loading and linking libraries. Resource allocating, scheduling, performance evaluation. Files system. Storage devices. I/O systems. Protection, security and privacy
Teaching Method	This course is lectured based. Multimedia projector is used in describing many topics. Students presentations for some assignment will be set. 30 contact hours are needed
Evaluation	• Student group presentations. (20%) • Mid-term Exam (20%) • Final Exam (60%) Percentages are subject to change
Reference(s)	

Course Title	**CE5108 Nano Technology:**
Level /Semester	5/9
Credit Hours	2
Pre-requisite(s)	**EC4104** Micro Electronics technology
Objective(s)	The course is focused on the operational principles and circuit applications of nanoelectronic devices, especially those based on electron tunneling, i.e. tunnel diodes, resonant tunnel diodes, and single electron transistors. Carbon nanotube will also be considered.
Course Contents	• Intro: Nanotechnology & CMOS • Electron tunneling Tunnel diode & RTD • TD & RTD circuits • TF deposition, nucleation, growth • Single electron transistor (SET) • SET circuits • Carbon nanotubes (CNT) • Spintronics • Molecular Electronics
Teaching Method	Assessment will be continuous relying on report writing, presentations and demonstrations of practical work during the development
Evaluation	• Student group presentations. (20%) • Mid-term Exam (20%) • Final Exam (60%) Percentages are subject to change
Reference(s)	Nanotechnology: An Introduction, By Jeremy Ramsden, 2011

.

Course Title	**CS5201 Simulation and Modeling**
Level /Semester	5/10
Credit Hours	3
Pre-requisite(s)	Analog and Digital electronics, Programming languages, and Operating Systems
Objective(s)	To make the student able to create a symbolic or mathematical representation of some phenomenon in order to gain a better understanding of that phenomenon. To decide what factors are relevant to the problem and what factors can be de-emphasized.
Course Contents	Definitions. Types of models, physical modeling, mathematical modeling, Continuous in Time vs. Discrete in Time Models, Verification and validation, Variables and Parameters, Techniques needed in modeling. Poisson theory. Markov chain, Queue theory. Historical overview of computer simulation. Simulation languages. Simulatin examples using matlab.
Teaching Method	• 30 contacts hours will be covered in 15 lectures to explain the course topics. • 15 additional hours are needed to fulfill student homework and seminars. • Multimedia slides are used to describe diagrams and some simulation systems examples.
Evaluation	• Student group presentations. (20%) • Mid-term Exam (20%) • Final Exam (60%) Or as recommended by the instructor
Reference(s)	**1.** Bankds J. Carson. J.S. and Nelson B.L. Discrete Event System Simulation, Prentice Hall of India, New Delhi, 1996. **2.** Gottfried B.S., Elements of Stochastic Process Simulation, Prentice Hall, London, 1984. **3.** R.E. Shanol, Systems Simulation, the art and Science Prentice Hall, 1993

Course Title	**ECE 5202 Advanced Computer Architecture**
Level /Semester	5/10
Credit Hours	3
Pre-requisite(s)	GE 3207: Computer Architecture
Objective(s)	To focus the advanced computer architecture topics and to understand the concepts of parallel processing
Course Contents	Principles of computer design, instruction set design concepts, performance enhancements, new and alternative computer architectures, and the design and implementation of high performance computing systems. It equips you with the skills to undertake performance comparisons, improve the performance of applications, and develop applications to solve computationally intensive problems. Principles of computer design; Instruction set design concepts; Performance enhancements- advanced pipelining, dynamic scheduling, branch prediction, vector processors; Memory hierarchy design- caches and virtual memory; Modern architectures: RISC, Super Scalar, VLIW; Thread-level parallelism; , Multi-core and Multi-CPU systems; Interconnection networks, Clusters and Grid computing.
Teaching Method	The course is theoretical, thus 30 contacts hours will be covered in 15 lectures to explain the course topics. 15 additional hours are needed to fulfill student homework and seminars. Multimedia slides are used to describe diagrams and some course notes.
Evaluation	• Student group presentations. (20%) • Mid-term Exam (20%) • Final Exam (60%) The percentages are subject to change due to the instructor advice
Reference(s)	1. Computer Architecture and Organization by: William stalling

Course Title	**EC5205 Embedded Systems**
Level /Semester	5/10
Credit Hours	3
Pre-requisite(s)	Completion of the previous semesters successfully
Objective(s)	The aim of this module is to enable students at a final year level to design and realize an embedded system. In practice the students will work in teams of 3 to 5. On completion of the course the students will have demonstrated: • Individual and Group ability to decompose a specified task. • Simulate the partitioned problem • Identify processes and data flows continued within the application. • Make technological recommendations for implementing the application. • Implement the recommendations. • Test the system
Course Contents	Introduction to embedded systems. Terms definition, features, characteristics, application, design route. Embedded system structure and standard basics components, layer approach and needs for software supports and services; Fundamentals of control and executive automation. Basics of measurement equipment. Types of sensors, the principles of it's operation. Sensors classifications; actuators types and operation process; system interface and interaction protocols.
Teaching Method	• Student group presentations. (20%) • Mid-term Exam (20%) • Final Exam (60%) The percentages are subject to change due to the instructor advice
Evaluation	Assessment will be continuous relying on report writing, presentations and demonstrations of practical work during the development
Reference(s)	1. Embedded Systems: Architecture, Programming and Design, By Raj Kamal, 2nd ed, 2008 2. Embedded Systems: Hardware, Design and Implementation, By Krzysztof Iniewski

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Course Title	**ECE 5206 PLC**
Level /Semester	5/10
Credit Hours	3
Pre-requisite(s)	Non
Objective(s)	1. Understand the basic of data conversion and data acquisition 2. Understand the fundamental of PLC
Course Contents	• Electromagnetic Control Circuit(ECC) elements and basic applications • Principles of PLC and system component • Interfacing input/output devices and operation • CPU Configuration • Memory concepts, addressing, and data types. • Industrial sensors and actuators, • PLC general Programming languages. • Programming techniques for various types of PLC. • Basic industrial process problems, installation and safety, • Monitoring program execution and diagnostic.
Teaching Method	30 contacts hours will be covered in 15 lectures to explain the course topics. Multimedia slides are used to describe diagrams and some simulation systems examples
Evaluation	• Student group presentations. (20%) • Mid-term Exam (20%) • Final Exam (60%) Or as recommended by the instructor
Reference(s)	1. Petrezeulla, Programmable Controllers, McGraw Hill , 1989. 2. Hughes .T, Programmable Logic Controllers, ISA Press, 1989. 3. G.B.Clayton, Data Converters The Mac Millian Press Ltd., 1982 4. Curtis D. Johnson Process Control Instrumentation Tech 8TH Edition Prentice Hall June 2005

Course Title	**PR5105 Final Project-I** **PR5205Final Project-II**
Level /Semester	5/9 – 5/10
Credit Hours	6
Pre-requisite(s)	All courses.
Objective(s)	1. Enable students to implement the knowledge & skills gathered through various theoretical and laboratory courses 2. Introduce students to conduct independent literature survey for contemporary problems and issues related to implementation of the allotted project. 3. Encourage the students to acquire a comprehensive understanding about design, operation, simulation, data collection and analysis on the important areas of the project
Course Contents	Choose a project that makes usage of the acquired knowledge& skills and in line with current needs of prospective employers. Projects shall incorporate the technological advancements while applying Information Communication Technology (ICT) extensively. ***Suggested Fields:*** Any filed related to telecommunications or electronics engineering
Teaching Method	Weekly meeting with supervisor
Evaluation	- Supervisor :40 mark and committee: 60
Reference(s)	The students should select recent references depend on the project area

Languages & Studies

اسم المقرر	رمز المقرر	عدد ساعات الاتصال		
		نظري	تطبيقات	المعتمدة
الثقافة الاسلامية 1	IS1108	2	-	2

الهدف العام :-

ان يتعرف المتعلم على مفهوم الثقافة الإسلامية ، مصادرها ، خصائصها. ،عناصر الثقافة الاسلامية وآثارها في الفرد والمجتمع، مفهوم العبادة في الإسلام.

مخرجات التعلم (ما يتوقع من المتعلم اكتسابه بعد دراسة المقرر)

ان يطبق المتعلم ثقافته الاسلامية في شؤون حياته

مفردات المقرر (المحتوى – الموضوعات)

- الوحدة الأولى : مقدمات في الثقافة الإسلامية:
  تعريف الثقافة الإسلامية - مصادرها– خصائصها – موقف المسلم من الثقافات الأخرى.
- الوحدة الثانية : العقيدة الإسلامية:
  مفهوم العقيدة الإسلامية – أهميتها – أركان الإسلام الخمسة – أثر هذه العقيدة على الفرد والمجتمع .
  عقيدة أهل السنة والجماعة في السمع والطاعة لولاة الأمر – خطورة الخروج عليهم وعقوبة ذلك – أهمية الجماعة ووجوب لزومها.
- الوحدة الثالثة : العبادة في الإسلام:
  - حقيقة العبادة في الإسلام – خصائصها – أنواعها – حكم ومقاصد أركان الإسلام الخمسة.
  - الغلو – مفهومه –أنواعه – حكمه – و خطره – المنهج النبوي في معالجة الغلو – مصير الغلاة – نماذج من الغلاة (الخوارج).

توصيف المهام والتكاليف:

المهمة	الوصف	الاسبوع
بحث اختبار فصلي اختبار نهائي	موضوع في مفردات المقرر	الرابع السابع نهاية الفصل

استراتيجيات تدريس المقرر

المحاضرة

استراتيجيات (طرق) التقييم

بحث 10%
اختبار فصلي 10%
اختبار نهائي80%

المراجع :-

1 - الثقافة الإسلامية – الشيخ عبدالمجيد بن عزيز الزنداني– إدارة المطلوبات جامعة الخرطوم،
2 - الوسطية والاعتدال وأثرها على حياة المسلمين للشيخ صالح بن عبد العزيز آل الشيخ.
3 - الموافقات للإمام الشاطبي.
4 - مقاصد الشريعة للشيخ الطاهر بن عاشور.

اسم المقرر	رمز المقرر	عدد ساعات الاتصال		
		نظري	تطبيقات	المعتمدة
لغة عربية 1	AR1106	2	-	2

الهدف العام :-

ان يتعرف المتعلم مسائل في اللغة وآدابها لتوظيفها في استعمالاته اللُغوية ، وتدريبه على بعض قواعد النحو الأساسية، وبعض قواعد الضبط الإملائي وتنمية مهارات الطلاب اللغوية من خلال (الاستماع،والكلام،والقراءة،والكتابة)

.

مخرجات التعلم (ما يتوقع من المتعلم اكتسابه بعد دراسة المقرر)

ان يطبق المتعلم مهارات اللغة العربية في شؤون حياته

مفردات المقرر (المحتوى – الموضوعات)

المسائل النحوية:

1. مراجعة لبعض القواعد النحوية التالية:
   - الإعراب والبناء (الأسماء، والأفعال، والحروف) .
   - الجملة الاسمية (المبتدأ والخبر، والأفعال الناسخة، والحروف الناسخة) .
   - الجملة الفعلية (الفاعل ونائبه، وبناء الفعل للمجهول،والأفعال اللازمة والمتعدية، والمفاعيل) .
   - العدد وأحكـامه (صياغته، وإعرابه) .
2. المعاجم العربية (التعريف، والأهمية، والأنواع، وطريقة الاستخدام) .

توصيف المهام والتكاليف:

المهمة	الوصف	الاسبوع
بحث	موضوع في مفردات المقرر	الرابع
اختبار فصلي		السابع
اختبار نهائي		نهاية الفصل

استراتيجيات تدريس المقرر

المحاضرة (الكتروني)

استراتيجيات (طرق) التقييم

الكتروني

المراجع :

1 - النحو الجامعي، محمـــد شريف أبو الفتوح، مكتبة الشباب، مصر، 1974 م.
2 - فن التحرير العربي، محمد صالح الشنطي، دار النفائس، بيروت، 2004 م.
3 - المنجد في اللغة والاعلام – المكتبة الشرقية، بيروت.

اسم المقرر	رمز المقرر	عدد ساعات الاتصال		
		نظري	تطبيقات	المعتمدة
الثقافة الاسلامية 11	IS1208	2	-	2

الهدف العام :-

ان يتعرف المتعلم على العقيدة السليمه ضد انحرافات وشبهات المذاهب الفكرية والاجتماعية المعاصرة للقيام بواجبه الديني في بناء ذاته وأسرته ووطنه المشاركة في النهضة المعاصرة للأمة في مختلف مجالات الحياة.

مخرجات التعلم (ما يتوقع من المتعلم اكتسابه بعد دراسة المقرر)

ان يطبق المتعلم ثقافته الاسلامية في شؤون حياته

مفردات المقرر (المحتوى – الموضوعات)

مسائل و قضايا معاصرة:

أولا: الجهاد: تعريفه – حكمه – أنواعه – الرد على الجماعات الجهادية المعاصرة – بيان ما جنته هذه الجماعات على الأمة الإسلامية من الشرور.

ثانيا: محاسن الإسلام و أبرز مزاياه:

التمام و الكمال – الاتساع والشمول – الصلاحية لكل زمان و مكان – الوسطية والاعتدال– اليسر والسعة ورفع الحرج – العدل – الرحمة – المحبة – الوفاء بالعهود و المواثيق – الأمر بالصلاح والإصلاح والنهي عن الفساد والإفساد – حسن الخلق – الحكمة والبصيرة في الدعوة

توصيف المهام والتكاليف:

المهمة	الوصف	الاسبوع
بحث	موضوع في مفردات المقرر	الرابع
اختبار فصلي		السابع
اختبار نهائي		نهاية الفصل

استراتيجيات تدريس المقرر

المحاضرة

استراتيجيات (طرق) التقييم

بحث 10%
اختبار فصلي 10%
اختبار نهائي80%

المراجع :-

1 - الثقافة الإسلامية – الشيخ عبدالمجيد بن عزيز الزنداني– إدارة المطلوبات، جامعة الخرطوم
2 - الوسطية والاعتدال وأثرها على حياة المسلمين للشيخ صالح بن عبد العزيز آل الشيخ.
3 - الموافقات للإمام الشاطبي.
4 - مقاصد الشريعة للشيخ الطاهر بن عاشور.

اسم المقرر	رمز المقرر	عدد ساعات الاتصال		
		نظري	تطبيقات	المعتمدة
لغة عربية 11	AR1206	2	-	2

الهدف العام :-

ان يتعرف المتعلم مسائل في اللغة وآدابها لتوظيفها في استعمالاته اللُغوية ، وتدريبه على بعض قواعد النحو الأساسية، وبعض قواعد الضبط الإملائي وتنمية مهارات الطلاب اللغوية من خلال (الاستماع،والكلام،والقراءة،والكتابة)

مخرجات التعلم (ما يتوقع من المتعلم اكتسابه بعد دراسة المقرر)

ان يطبق المتعلم مهارات اللغة العربية في شؤون حياته

مفردات المقرر (المحتوى – الموضوعات)

أولاً: التحريـر العـربي:

- ضوابط عـامة حول التحريـر والكتـابة العربيـة .
- كتابة التلخيص (التعريف، والأهمية، والخطوات، والمبادئ، والتطبيق) .
- كتابة التقـرير (التعريف، والأهمية، والأنواع " الإداري، والطبي، والهندسي "، والتطبيق).
- كتابة الرسـالة (التعريف، والمقومات، والأنواع " الأدبية، والرسمية "، والتطبيق) .

ثانياً : التدريبات اللغوية :

- تدريبات على مهارات اللغة (السماع، والحديث، والقراءة، والكتابة) .
- تدريبات على استعمال قواعد اللغة، والمعاجم اللغوية .
- تدريبات على استعمال الهمزات وعلامات الترقيم .
- تدريبات على الأخطاء اللغوية الشائعة، وكيفية معالجتها.

توصيف المهام والتكاليف:

المهمة	الوصف	الاسبوع
بحث	موضوع في مفردات المقرر	الرابع
اختبارفصلي		السابع
اختبار نهائي		نهاية الفصل

استراتيجيات تدريس المقرر

المحاضرة (الكتروني)

استراتيجيات (طرق) التقييم

الكتروني

المراجع :-

1 - محمد عيد ،النحو المصفى، مكتبة الشباب، مصر، 2000 م.
2 - عبد العليم إبراهيم، الإملاء و الترقيم في الكتابة العربية، مكتبة غريب، القاهرة، 1995م.

		عدد ساعات الاتصال		
اسم المقرر	رمز المقرر	نظري	تطبيقات	المعتمدة
الدراسات السودانية	SD2107	2	-	2

الهدف العام :-

ان يتعرف المتعلم على القضايا الاجتماعية والسياسية والاقتصادية للمجتمع السوداني.. وتعميق الإحساس بالسودانية عند الطالب. وتقديم رؤية فكرية عن السودان بوصفه جزء من العالم العربي والأفريقي والإسلامي.

مخرجات التعلم (ما يتوقع من المتعلم اكتسابه بعد دراسة المقرر)

ان يناقش المتعلم في مكونات الثقافة السودانية.

مفردات المقرر (المحتوى – الموضوعات)

يشتمل المقرر علي الآتي:

البلاد وسكانها وعصورها التاريخية وتشمل الجغرافية الطبيعية والبشرية والحضارات السودانية (النوبة – المسيحية – الإسلام) العلاقات الدولية – المهدية والقومية السودانية – السودان والحكم الثنائي – الحركة الوطنية والاستقلال. الآداب والفنون – جمعيات القراءة والمناقشة – المجلات – أشهر الأدباء والفنانين – الفنون التشكيلية – الثقافة الشعبية السودانية والفلكلور السوداني (الأغاني – الأمثال الشعبية – الأحاجي). التعليم الأهلي (فلسفته – مؤسساته – بنيانه).

يستعان ببعض الشخصيات لمناقشة القضايا مع زيارة المعالم الوطنية والمتاحف، كتابة بحوث ومقالات قصيرة بواسطة الطلاب.

توصيف المهام والتكاليف

المهمة	الوصف	الاسبوع
بحث	موضوع في مفردات المقرر	الرابع
اختبار فصلي		السابع
اختبار نهائي		نهاية الفصل

استراتيجيات تدريس المقرر

المحاضرة (الكتروني)

استراتيجيات (طرق) التقييم

الكتروني

المراجع :

1 - بروفيسور محمد عمر بشير ، دراسات سودانية معاصرة،
2 - معتصم محمد الحاج ،دراسات سودانية معاصرة ،
3 - زينب الزبير الطيب، الدراسات السودانية ،جامعة الخرطوم ،2010م
4 - أماني الطويل : مستقبل السودان : واقع التجزئة وفرص الحرب –المركز العربي للأبحاث ودراسة السياسات2011م

عدد ساعات الاتصال				
المعتمدة	تطبيقات	نظري	رمز المقرر	اسم المقرر
2	-	2	EN 1107	English Language I

الهدف العام :-

This course aims to enable students to realize the basic skills of language.

مخرجات التعلم (ما يتوقع من المتعلم اكتسابه بعد دراسة المقرر)

After this course the student may able to read some simplified book or benefit the media the student also can practice speaking English to his /her teacher classmates or other English speakers.

مفردات المقرر (المحتوى – الموضوعات)

1. Family and family tree , vocabulary +exercise
2. Simple present +form and use +exercises
3. Vocabulary concern job and career +speaking (talking about your job and occupation).
4. Application letter writing +Drill
5. Exercise +5-Future simple tense
6. Conditional 0,1,2, and 3
7. Vocabulary of Nationalities , languages, countries and rigors
8. Simple past g) present continues.

متطلبات المقرر

Suitable classroom, microphone, chalk or marker

توصيف المهام والتكاليف

المهمة	الوصف	الاسبوع
تطبيقات ورقة بحثية اختبار نهائي	موضوع في مفردات المقرر	الرابع السابع نهاية الفصل

استراتيجيات تدريس المقرر

- Lecture
- Exercises and drills

استراتيجيات (طرق) التقييم

- Exercises and drills 10%
- Mid-term test 20%
- Final examination 70%

المراجع :-

1. C-E- Eckersley ,J-M-Eckersley,(1985), comprehensive English Grammar , Longman ,Hong Kong .
2. A-J-Thomson , A-V-Martinet, (1982) A practical English Grammar ,third edition ,Oxford University press ,Oxford.
3. Romand Murphy , Ronan Altman ,(1998) , Grammar in use- Reference and practice for intermediate students of English ,Cambridge University press, Cambridge.
4. Michael McCarthy, Felicity O'Dell ,(1998) , English Vocabulary in use, Cambridge university press ,Cambridge.

	عدد ساعات الاتصال			
اسم المقرر	رمز المقرر	نظري	تطبيقات	المعتمدة
English Language II	EN1207	2	-	2

الهدف العام :-

This course aims to enable students to realize the basic skills of language.

مخرجات التعلم (ما يتوقع من المتعلم اكتسابه بعد دراسة المقرر)

After this course the student may able to read some simplified book or benefit the media the student also can practice speaking English to his /her teacher classmates or other English speakers.

مفردات المقرر (المحتوى – الموضوعات)

1. Vocabulary, Word used in grammar.-parts of speech; Noun, verb, adverb .prepositions and yet. For and since +Practices.
2. Present Perfect; Definition and use Just
3. Past Perfect Tense; form and use +past participle form-Reported speech –direct and indirect speech +conditional3.
4. How to use preposition correctly; some tips in preposition in place expression and in time expression +Exercises.

متطلبات المقرر

Suitable classroom, microphone, chalk or marker

توصيف المهام والتكاليف

المهمة	الوصف	الاسبوع
سمنار ورقة بحثية اختبار نهائي	موضوع في مفردات المقرر	الرابع السابع نهاية الفصل

استراتيجيات تدريس المقرر

- Lecture
- Exercises and drills

استراتيجيات (طرق) التقييم

- Exercises and drills 10%
- Mid-term test 20%
- Final examination 70%

المراجع :-

1. C-E- Eckersley ,J-M-Eckersley,(1985), comprehensive English Grammar , Longman ,Hong Kong .
2. A-J-Thomson , A-V-Martinet, (1982) A practical English Grammar ,third edition ,Oxford University press ,Oxford.
3. Romand Murphy , Ronan Altman ,(1998) , Grammar in use- Reference and practice for intermediate students of English ,Cambridge University press, Cambridge.
4. Michael McCarthy ,Felicity O'Dell ,(1998) , English Vocabulary in use, Cambridge university press ,Cambridge.

	عدد ساعات الاتصال			
اسم المقرر	رمز المقرر	نظري	تطبيقات	المعتمدة
English Language III	EN2103	2	-	2

الهدف العام :-

This course aims to enable students to realize the advance skills of language.

مخرجات التعلم (ما يتوقع من المتعلم اكتسابه بعد دراسة المقرر)

After this course the student may able to read some advanced book also can practice speaking English to his /her teacher classmates or other English speakers.

مفردات المقرر (المحتوى – الموضوعات)

- Extensive scientific and technical reading texts that deal with a wide range of topics, e.g. electricity, telecommunication, computer, energy.
- Grammar: The Passive, the Conjunctions, and the Conditional Sentences.
- Word Formation, Parts of Speech.
- Writing: Reports, Instructions, communications

متطلبات المقرر

Suitable classroom, microphone, chalk or marker

توصيف المهام والتكاليف

المهمة	الوصف	الاسبوع
سمنار ورقة بحثية اختبار نهائي	موضوع في مفردات المقرر	الرابع السابع نهاية الفصل

استراتيجيات تدريس المقرر

- Lecture
- Exercises and drills

استراتيجيات (طرق) التقييم

- Exercises and drills 10%
- Mid-term test 20%
- Final examination 70%

المراجع :-

1. C-E- Eckersley ,J-M-Eckersley,(1985), comprehensive English Grammar , Longman ,Hong Kong .
2. A-J-Thomson , A-V-Martinet, (1982) A practical English Grammar ,third edition ,Oxford University press ,Oxford.
3. Romand Murphy , Ronan Altman ,(1998) , Grammar in use- Reference and practice for intermediate students of English ,Cambridge University press, Cambridge.
4. Michael McCarthy ,Felicity O'Dell ,(1998) , English Vocabulary in use, Cambridge university press ,Cambridge.

اسم المقرر	رمز المقرر	عدد ساعات الاتصال		
		نظري	تطبيقات	المعتمدة
اللغة الانجليزية المتخصصة ESP	EN2203	2	-	2

Objectives:

1- **To enable the students to handle simple conversations in Engineering Topics.**
2- **To train the students to comprehend authentic listening material of various kinds such as daily conversations, telephone calls and people talking about locations.**

3 - توصيف المهام والتكاليف

المهمة	الوصف	الاسبوع
سمنار ورقة بحثية اختبار نهائي	موضوع في مفردات المقرر	الرابع السابع نهاية الفصل

مفردات المقرر (المحتوى – الموضوعات)

- دراسة المصطلحات الانجليزية الخاصة بالمجالات الهندسية المختلفة.
- دراسة المصطلحات والإختصارات العالمية القياسية في الهندسة.
- دراسه أساسيات الترجمة الهندسية
- كتابة وترجمة التقارير الفنية المتعلقة بالهندسة .

استراتيجيات تدريس المقرر

- Lecture
- Exercises and drills

استراتيجيات (طرق) التقييم

- Exercises and drills 10%
- Mid-term test 20%
- Final examination 70%

References:

1- Emily Austin Thrush, Laurie Blass and Robert Baldwin, “Interactions Access (Listening/Speaking)”, McGraw-Hill Contemporary, 2002.
2- Judith Tanka, Paul Most, and Lida R. Baker, “Interactions1 (Listening/Speaking)”, McGraw-Hill Contemporary, 2004.
3- William R. Smalzer, "English Language Grammar", Conversational English