Program Specification
Program Title:

Faculty(s)/Institution: THEBES Higher Institute of Engineering.
Department: Electronic and Communications Engineering.
2020-2021

A- Basic Information

1- Program type : Single ⬛ Double ☐ Multiple ☐

2- Coordinator: **Dr. Sheirf Samy**
3- Study system: Two Semesters system
4- Last date of program specifications approval: **January 2021**

الرسالة:

قسم هندسه الاتصالات يهدف إلى إعداد مهندس مبتكر يواكب التكنولوجية الحديثة قادر على المنافسة محلياً و إقليميا خلال مناخ علمي و ثقافي و اجتماعي متطور.

الغايات العامة لقسم الاتصالات

تحددت الغايات العامة للقسم على النحو التالي:
1- خريج مبتكر يواكب التيارات المعاصرة في العمارة
2- مكانه متميزة للقسم في منظومة التعليم محليا و إقليميا.
3- اللحاق بالعصر و استخدام أدواته التكنولوجية في العمارة.
4- مجتمع ديمقراطي وبيئة متحضرة.

B- Professional Information
1- Program aims:
1- Demonstrate a basic understanding of the communication and electronic field, and all application in this field.
2- Give the graduates the ability to understand the development of knowledge in this field.
3- Provide the graduates with skills to solve problem that meet in his work. And also give them the ability to improve, performance or functions of the instruments of this field.

2- Academic Standards

External references for standards (benchmarks) The National Academic Reference Standards (NARS 2018) for engineering has been adapted as an external reference for the programme. The benchmarks of the reference are as follows:

A. COMETENCIES OF ENGINEERING GRADUATE:

The Engineering Graduate must be able to:

1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.

2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.

3. Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.

4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.

5. Practice research techniques and methods of investigation as an inherent part of learning.

6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.

7. Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.

8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.

9. Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.

10. Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.

B. COMPETENCIES OF ELECTRICAL ENGINEERING (B-Level):

In addition to the above Competencies (A- level) for All Engineering
Programs the BASIC CIVIL Engineering graduate must be able to:

1- Select, model and analyze electrical power systems applicable to the specific discipline by applying the concepts of generation, transmission and distribution of electrical power systems.

2- Design, model and analyze an electrical/electronic/digital system or component fora specific application; and identify the tools required to optimize this design.

3- Design and implement: elements, modules, sub-systems or systems in electrical/electonic/digital engineering using technological and professional tools.

4- Estimate and measure the performance of an electrical/electronic/digital system an circuit under specific input excitation, and evaluate its suitability for a specific application.

5- Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.

C- COMPETENCIES OF ELECTRICAL and COMMUNICATION ENGINEERING (C- Level):

In addition to the above Competencies (B- level) ELECTRICAL and COMMUNICATION ENGINEERING graduate must be able to:

1- Analyze analog and digital electronic circuits and systems using appropriate mathematical, numerical, and computer-based models and techniques.

2- Design, integrate, and test analog and digital, discrete and integrated, electronic circuits to realize specific functions, using the right equipment, and under specific design constraints

3- Assess and evaluate the characteristics, performance, cost benefit analysis failure of components, systems' reliability and processes to solve engineering problems, often based on limited and possibly contradicting information

4- Understand the key principles of signal processing, control theory, and the main components of analog and digital communication systems. As well as, DSP and embedded systems

5- Illustrate the key performance indicators in communication systems and networks and analyze the performance of analog and digital communication systems, as well as wireless and optical communication systems and communication

6- Use appropriate specialized software packages, write computer programs, and use relevant laboratory equipment for the analysis and design of electronics and communications components and systems

3- Curriculum Structure and Contents

A- Prgoramme duration : **5 years**

B- Programme structure :

A. **The Topics of the Program and Hours distribution according to course categories**

	Compulsory	Elective	Total contact hours	Percentage	NARS standards range
Humanities and social sciences	16	6	22	10.3%	9 % - 12%
Business management	7	--	7		
Mathematics, basic and assistance sciences	61	--	61	21.7%	18%-22%
Engineering culture	11	--	11	4%	4%-6%
Basic engineering sciences	85	--	85	30%	25%- 30%
Applied engineering and design	60	24	84	30%	25%-30%
Project and field training	10	--	10	4%	4%-6%
Total	<u>250</u>	<u>30</u>	<u>280</u>		

Group	Percentage
Public culture Requirements	<u>10.4%</u>
Engineering Institute Requirement	<u>22.5%</u>
General specification requirement	<u>35%</u>
Major specification requirement	<u>32.1%</u>

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6- Program courses & study plans

Table (1)

Preparatory Year

First semester

No.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	BAS011	Mathematics (1)	3	2	-	5	3	40	35	-	75	150
2	BAS021	Physics (1)	3	1	1	5	3	25	25	25	75	150
3	BAS031	Mechanics (1)	2	2	-	4	3	25	25	-	50	100
4	BAS051	Engineering Drawing and Projection (1)	2	3	-	5	3	30	30	-	65	125
5	BAS061	Production Technology	2	-	3	5	3	20	20	20	65	125
6	HUM031	Introduction to Engineering Sciences	2	-	-	2	2	15	10	-	25	50
7	HUM011	English Language (1)	2	-	-	2	2	15	10	-	25	50
		Total				**28**						**750**

8- Second semester

No.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	BAS012	Mathematics (2)	3	2	-	5	3	40	35	-	75	150
2	BAS022	Physics (2)	3	1	1	5	3	25	25	25	75	150
3	BAS032	Mechanics (2)	2	2	-	4	3	25	25	-	50	100
4	BAS052	Engineering Drawing and Projection (2)	1	3	-	4	3	20	30	-	50	100
5	BAS041	Engineering Chemistry	2	-	2	4	3	20	20	20	40	100
6	CEE041	Introduction to Computer and Programming	2	-	2	4	3	20	20	20	40	100
7	HUM012	English Language (2)	2	-	-	2	2	15	10	-	25	50
		Total				**28**						**750**

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Table (2)
First Year

Communications and Electronics Engineering Department

First semester

No.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec.	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CEE121	Electronics (1)	2	2	1	5	3	25	25	25	75	150
2	CEE142	Operating systems	2	1	2	5	3	20	10	20	50	100
3	CEE111	Electric Circuits (1)	2	2	1	5	3	25	25	25	75	150
4	HUM13X	Elective	2	-	-	2	2	15	10	-	25	50
5	HUM 113	Technical English	2	-	-	2	2	15	10	-	25	50
6	BAS113	Mathematics (3)	2	2	-	4	3	25	25	-	50	100
7	BAS123	Modern Physics	2	1	2	5	3	25	25	25	75	150
Total						**28**						**750**

Second semester

No.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CEE122	Electronics (2)	2	1	2	5	3	20	20	20	65	125
2	CEE143	Logic Circuits Design	2	2	2	6	3	25	25	25	75	150
3	CEE112	Electric Circuits (2)	2	2	1	5	3	20	20	20	65	125
4	CEE151	Electromagnetic Field	2	2	-	4	3	25	25	-	50	100
5	HUM13X	Elective	2	-	-	2	2	15	10	-	25	50
6	BAS114	Mathematics (4)	2	1	-	3	3	25	25	-	50	100
7	BAS115	Numerical Analysis	2	1	-	3	3	25	25	-	50	100
Total						**28**						**750**

Table (3)
Second Year

Communication and Electronics Engineering Department

First semester

No.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CEE213	Electronic Measurements (1)	2	1	2	5	3	25	25	25	75	150
2	CEE215	Electronic Circuits (1)	2	2	1	5	3	25	25	25	75	150
3	CEE261	Communication Systems (1)	2	1	1	4	3	20	20	20	65	125
4	CEE282	Electrical Machine and transformers	2	1	1	4	3	20	15	15	50	100
5	CEE244	Computer Architectures	2	2	-	4	3	25	25	-	50	100
6	HUM211	Feasibility studies and operations research	2	1	-	3	2	15	10	-	25	50
7	CVE286	Civil Engineering	2	-	1	3	3	15	15	15	30	75
Total						**28**						**750**

Second semester

No.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CEE223	Electronics (3)	2	2	1	5	3	25	25	25	75	150
2	CEE214	Electronic Measurements (2)	2	1	2	5	3	25	25	25	75	150
3	CEE262	Communication Systems (2)	2	1	1	4	3	20	20	20	65	125
4	CEE216	Electronic Circuits (2)	2	2	2	6	3	25	25	25	75	150
5	CEE291	Field Training (1)	-	-	2	2	-	-	25	25	-	50
6	HUM212	Engineering Economics and Projects Management	2	-	-	2	2	15	10	-	25	50
7	BAS262	Mechanical Engineering	2	1	1	4	3	15	15	15	30	75
Total						**28**						**750**

Table (4)
Third year

Communication and Electronics Engineering Department

First semester

No.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CEE317	Electronic Circuits (3)	2	2	2	6	3	25	25	25	75	150
2	CEE352	Electromagnetic Waves	2	2	-	4	3	30	30	-	65	125
3	CEE371	Digital Signal Processing	2	2	-	4	3	30	30	-	65	125
4	CEE383	Automatic Control	2	2	-	4	3	25	25	-	50	100
5	CEE374	Digital Communication Systems (1)	2	2	2	6	3	25	25	25	75	150
6	HUM332	Technical Report Writing	2	-	-	2	2	25	10	-	25	50
7	HUM34X	Elective	2	-	-	2	2	25	10	-	25	50
Total						**28**						**750**

Second semester

No.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CEE372	Antennas	2	2	1	5	3	25	25	25	75	150
2	CEE318	Electronic Circuits (4)	2	2	2	6	3	25	25	25	75	150
3	CEE345	Microprocessor and Interfacing	2	1	2	5	3	25	25	25	75	150
4	CEE392	Field Training (2)	-	-	2	2	-	-	25	25	-	50
5	HUM321	Human Rights	2	-	-	2	2	15	10	-	25	50
6	CEE3XX	Elective (1)	2	2	-	4	3	25	25	-	50	100
7	CEE3XX	Elective (1)	2	2	-	4	3	25	25	-	50	100
Total						**28**						**750**

Table (5)
Fourth Year

Communication and Electronics Engineering Department

First semester

No.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CEE447	Programmable logic controllers	2	2	-	4	3	25	25	-	50	100
2	CEE453	Microwave Engineering	2	2	2	6	3	25	25	25	75	150
3	CEE464	Satellite Communications	2	2	-	4	3	30	30	-	65	125
4	CEE448	Neural Networks	2	2	-	4	3	30	30	-	65	125
5	HUM413	Engineering Legislations	2	-	-	2	2	15	10	-	25	50
6	CEE4XX	Elective (2)	2	2	-	4	3	25	25	-	50	100
7	CEE4XX	Elective (2)	2	2	-	4	3	25	25	-	50	100
	Total					28						750

Second semester

No.	Course Code	Course Title	Hours				Exam time (Hr)	Examination marks				
			Lec	Tut	Lab	Total		Mid term	Class work	Prac/Oral	Final exam	Total
1	CEE465	Optical Communication Systems	2	2	2	6	3	25	25	25	75	150
2	CEE493	Project	2	-	4	6	-	-	100	100	-	200
3	CEE433	Embedded Systems	2	2	-	4	3	25	25	-	50	100
4	HUM423	Environmental Impact of Projects	2	-	-	2	2	15	10	-	25	50
5	HUM422	Population, Reproductive Health and Family Planning	2	-	-	2	2	15	10	-	25	50
6	CEE4XX	Elective (2)	2	2	-	4	3	25	25	-	50	100
7	CEE4XX	Elective (2)	2	2	-	4	3	25	25	-	50	100
	Total					28						750

Elective

Elective (1): student selects 2 courses (4 contact hours)

No.	Course Code	Course Title	Hours			
			Lec	Tut	Lab	Total
1	HUM133	Study Skills	2	-	-	2
2	HUM134	Scientific Thinking	2	-	-	2
3	HUM135	Presentation and Communication Skills	2	-	-	2
4	HUM136	Professional Marketing Skills	2	-	-	2
		Total	8			8

Elective (2) student selects one course (2 contact hours)

No.	Course Code	Course Title	Hours			
			Lec	Tut	Lab	Total
1	HUM341	Recent Egypt's History	2	-	-	2
2	HUM342	Islamic History	2	-	-	2
		Total	4			4

Elective

Elective (1): Student selects 2 courses (8 contact hours)

No.	Course Code	Course Title	Hours			
			Lec	Tut	Lab	Total
1	CEE346	Computer Programming	2	2	-	4
2	CEE348	Computer Networks	2	2	-	4
3	CEE363	Communication Systems (3)	2	2	-	4
4	CEE373	Information Theory and Coding	2	2	-	4

Elective (2): Student selects 4 courses from one group (16 contact hours)
Group A

No.	Course Code	Course Title	Hours			
			Lec	Tut	Lab	Total
1	CEE426	Power Electronics	2	2	-	4
2	CEE454	Microwave and RF Devices	2	2	-	4
3	CEE466	Communication Networks	2	2	-	4
4	CEE467	Selected Topics in Communications Engineering	2	2	-	4
5	CEE468	Mobile Communication	2	2	-	4
6	CEE475	Digital Communication Systems (2)	2	2	-	4
7	CEE484	Biomedical instrumentations	2	2	-	4

Group B

No.	Course Code	Course Title	Hours			
			Lec	Tut	Lab	Total
1	CEE419	Digital Circuits	2	2	-	4
2	CEE424	Optical Electronics	2	2	-	4
3	CEE425	Selected Topics in Electronics Engineering	2	2	-	4
4	CEE431	Integrated Circuits	2	2	-	4
5	CEE432	Integrated Circuit Systems	2	2	-	4
6	CEE434	Design of VLSI Integrated Circuit Systems	2	2	-	4
7	CEE449	Computer Aided Design	2	2	-	4

7- <u>Course Description:</u>
7.1. <u>Basic and Assistance Sciences Department:</u>

<u>BAS011 Mathematics (1)</u>

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	40	35	-	75	150

Differentiation and integration: Limits and continuity, derivatives and their applications, Indefinite and definite integrals, Integration by substitution, derivatives and integrals of transcendental functions. Geometry and Algebra: Conic sections including parabola, ellipse, circle, and hyperbola, theory of algebraic equations and inequalities, partial fractions, functions and inverse functions.

<u>BAS012 Mathematics (2)</u>

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	2	-	5	40	35	-	75	150

Techniques of integration; by substitution, by parts, and by partial fractions. Geometry and algebra: Linear algebra including determinants and matrices, systems of linear equations and eigenvalues and eigenvectors. Complex numbers, including polar form, De Moivre's theorem and its applications, sequence and series.

<u>BAS021 Physics (1)</u>

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	1	1	5	25	25	25	75	150

Measurements, Dimensions and Units. Physical mechanics, Linear motion. Free fall and gravitational motion. forces, Momentum, energy concept and elastic, inelastic collisions. Circular motion and projectiles. Properties of matter: Mechanical properties of matter, Elastic properties of materials. Hydrostatics and surface tension, Hydrodynamics, Viscosity, with applications. Oscillatory motion, simple harmonic oscillator, Analogy of motions and applications. Electricity and Magnetism: Electrostatics, Electric forces, Electric field, Dipole-moment and maximum electric energy, Gauss law and applications, Electric potential, Capacitors. Electrodynamics, Electric current, electromotive force and resistivity. Direct current electric circuits, Kirchhoff's rules, Magnetic forces, Electromagnetic induction and Ampere's law.

<u>Laboratory:</u> *(Physics Lab)*

No.	Experiment Name
1	Fine measurements of length vernier
2	Micrometer
3	Spherometer
4	The simple pendulum
5	Verification of Hook's law
6	Spiral spring, determination of the force constant
7	Determination of the viscosity of glycerin
8	Verification of Ohm's law parallel and series law of resistors
9	Wheatstone bridge
10	Charging and discharging a capacitor R-C circuits parallel and series law of capacitors
11	Pulling power of an electromagnet

BAS022 Physics (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
3	1	1	5	25	25	25	75	150

Heat: heat energy, temperature, measurements and scales, thermal expansion, heat transfer, heat and thermal work, kinetic theory of gases, first law of thermodynamics, Molar specific heat, Carnot-cycle and entropy, second law of thermodynamics with applications. Waves: types of waves, sinusoidal and standing waves, mechanical waves and sound waves, Doppler effect, electromagnetic oscillations, Maxwell's equations, electromagnetic waves, light, electromagnetic spectrum with applications.

Laboratory:(*Physics Lab*)

No.	Experiment Name
1	Specific heat of a solid by mixture method
2	Newton's low of cooling
3	specific heat of liquid
4	Joule equivalent (joule constant)
5	Thermal conductivity of a bad conductor by lee's method
6	Power of convex lens by general method
7	Power of convex lens by coincident method
8	Power of concave lens
9	Power of convex mirror
10	Speed of sound in air

BAS031 Mechanics (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Concurrent force systems, vector algebra, moments, couples, resultants of general, coplanar, and parallel force systems, frames and machines, trusses. Friction: dry friction, sliding and tipping, wedges friction, belt friction. Kinematics of a particle: rectilinear motion, curvilinear motion (cylindrical and rectangular components), orbital motion, projectile motion, relative motion. Kinetics of a particle: energy method, work, forces, fields, gravitational force, force, potential energy, kinetic energy, work - energy principle, conservation of energy. Linear impulse and momentum impact.

BAS032 Mechanics (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Equilibrium of a rigid body in two dimensions, free body diagrams, center of gravity, center of mass and centroid of a system of particles and rigid bodies. Moment of inertia of an area: parallel-axis theorem, radius of gyration, composite areas, moments of inertia about inclined axes. Planar kinematics of a rigid body: translation motion, rotation motion and general plane motion about a fixed axis, instantaneous center of zero velocity. Kinetics of rigid bodies: energy principle, work, potential energy, kinetic energy, field forces, energy conservation principles, linear impulse - momentum relation, angular impulse - momentum relations, impulsive forces.

BAS041 Engineering Chemistry

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	2	4	20	20	20	40	100

Equations of state, general properties of solutions, introduction to chemical thermos-dynamic and thermos-chemistry, balance in fuel combustion and chemical processes, basic principles in electro chemistry, introduction to corrosion engineering, environmental chemistry, selected topics in process chemical industries (chemistry of cement, petrochemical industries, building materials, dyes and dying industry).

Laboratory:(Chemistry Lab)

No.	Experiment Name
1	Laboratory orientation and safety practices
2	Determination of the normality of an acid (or abase) by titration of Acid Base
3	Acid base titration using the PH meter

4	Factors affecting on reaction rate (effect of concentration)
5	Determination of the solubility product constant (KSP).
6	Dilute hydrochloric acid group and identification of all acidic radicals in it.
7	Concentrated sulphuric acid group and identification of all acidic radicals in it.
8	Miscellaneous group and identification of all Acidic Radicals in it.
9	Identification of basic radicals of inorganic salts.

BAS051 Engineering Drawing and Projection (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	3	-	5	30	30	-	65	125

Drawing technology and skills, drawing equipment, Engineering operations, Geometric construction, Theory of projection, Orthographic projection, Representation of the bodies, Isometric and oblique representation, writing dimensions, predicting missing views, Introduction to engineering sectioning.

BAS052 Engineering Drawing and Projection (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
1	3	-	4	20	30	-	50	100

Sections of solids, intersection of surfaces, development of solids, sectional views, auxiliary projection.
Drawing of fastening means: bolts, nuts, pivodts and welding, drawing of steel sections and connections, Electrical circuts drawing.

BAS061 Production Technology

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	3	5	20	20	20	65	125

Properties of engineering materials and material selection, Casting and joining metals, Forming processes, Basic machining processes, Measurements, Standardization, International measuring systems, Cost analysis and estimation, Maintenance (systems, types, and programming), Organization structure of production.

Workshop: Doing exercises in carpentry, lathe,Casting, Forging, electrical and gas welding drilling shaper, measurement and filing workshops.

BAS113 Mathematics (3)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees

| 2 | 2 | - | 4 | 25 | 25 | - | 50 | 100 |

Calculus: Functions of several variables. Differential equations with some applications. Double, Triple, Linear, and surface integrals, and Green's theorem.

Analytic Geometry: Polar coordinates, Polar coordinate equations of some basic curves ,Intersections of polar curves and plane areas in polar coordinates.

BAS114 Mathematics (4)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	-	3	25	25	-	50	100

Calculus: complex functions, special functions, Laplace equation, Laplace transform and its use in solving differential and integral equations, Dirac function and periodic functions, with some applications to engineering problems. Probability theory. Numerical methods of finding roots of nonlinear equations, Approximation of functions and curves using Lagrange method, the divided-differences method. Numerical differentiation and integration methods.

BAS115 Numerical Analysis

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	-	3	25	25	-	50	100

Theory of linear equations- Solving a system of linear equations using matrices with Gauss method, Gauss-Jordan method and Gauss-Seidel iteration method- Numerical methods of finding roots of nonlinear equations of nth degree including Newton-Raphson' method- Perpendicular projection and realizing the sum of least squares of errors- Approximation of functions and curves using Lagrange's method, the divided-differences method, and the least squares method- Methods of numerical differentiation and integration, Numerical solution of a system of differential equations.

BAS116 Probability and Statistics

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	-	3	25	25	-	50	100

Introduction in statistics, definition and functions of statistics, collection and organization of statistical data. Sets and Probabilities. Tendency and dispersion measures. Random variables of discrete random variables, continuous random variables. Moments, Skewness measures, kurtosis measures. Sampling theory and inferences statistic. Types of hypothesis testing and confidence limits. linear regression and correlation.

BAS123 Modern Physics

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	2	5	25	25	25	75	150

Optical physics: geometrical optics, physical optics, interference, diffraction and polarization of waves, Lasers. Relativistic physics: Michelson, Morely experiment, special theory of relativity, time dilation and length contraction, relativistic mass and energy, with applications. Quantum physics: Planck's theory of quantization of energy of radiation, the photoelectric effect, X-rays and compton's effect. Atomic physics: wave properties of matter and wave function, Principles of quantum mechanics and Schrödinger's equation, atomic structure, quantum theory for free electrons in metals. Nuclear physics: lattice vibrations and thermal properties of solids, superconductivity.

Laboratory:(*Physics Lab*)

No.	Experiment Name
1	Determination of the wavelength of sodium light.
2	Determination of the characteristics of photo-resistors.
3	Determination of the characteristics of photo-diode.
4	The absorption coefficient of glass.
5	Determination of the wavelength of sodium light using Newton's rings.
6	Verification of fourth power law of radiation.
7	Determination of the plateau curve of G.M.counter.
8	The absorption coefficient of load to gamma radiation.

BAS262 Mechanical Engineering:

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	1	4	15	15	15	30	75

Types of fluid, fluid statics, fluid dynamics, energy equation, pipelines. The ideal gas, the first law of thermodynamics, the second law of thermodynamics, carnot cycle, thermal cycles. Refrigeration cycle and air-conditioners. Heat transfer by conduction, forced convection, heat transfer by radiation, heat exchangers. Power generation plants. pumps, gas turbines. Internal combustion engines and diesel engine units. Hydraulic cycles.

Laboratory:(*Hydraulics Lab*)

No.	Experiment Name
1	Flow measurement using ventury meter
2	Flow measurement using orifice meter
3	Flow measurement using nozzle meter
4	Losses in pipes

5	Verification of 1st law of thermodynamics
6	Verification of 2nd law of thermodynamics
7	Measurement of Reynold's number of fluied
8	Pressure measurement and Bourdon gage calibration.

HUM011 English Language (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Basic Verbs (to Be /Must/Might/Can/Do/May/Would...etc), basic nouns (Animal/Table/Chair/ People......etc), list of words with arabic translation related to engineering, writing basic sentences, introducing and holding short basic conversations in English, Past simple tense, present simple tense, future simple tense, irregular verbs (Begin/Become/Bring/Buy/Drive ...etc), List of nouns more advanced, list of words with Arabic translation related to Engineering,
Writing a paragraph and short story, past continuous tense, present continuous tense future continuous tense, list of words with arabic translation related to engineering, writing a curriculum vitae and official letters, holding a presentation in english, identifying proper and common nouns, reading a simple english book and writing a book report about it

HUM012 English Language (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Identifying Concrete and Abstract Nouns, advanced list of words with arabic translation related to engineering, helping verbs (primary auxiliaries) revision of the past continuous tense, revision of the present continuous tense revision of the future continuous tense, presentation in english, reading an intermediate english book and writing a book review, identifying collective, countable and uncountable nouns, helping verbs (modal auxiliaries), finite verb phrases, advanced list of words with arabic translation related to engineering, past perfect tense, present perfect tense, future perfect tense, participles, pronouns, past perfect continuous tense, present perfect continuous tense, future perfect continuous tense, advanced list of words with arabic translation related to engineering, verbals (non finites verbs). Reading an intermediate english book and writing a book report.

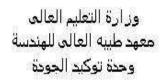## HUM031 Introduction to Engineering Sciences

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Defining engineering disciplines in the institutes**,** introduction to engineering terminologies and industry standards and moral laws for engineers, technology transfer process and methods, optimal time and space of elements of the decision making, information revolution in the twenty first century, upgrading the curriculum of engineering sectors .

HUM113 Technical English

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Introduction, specialized engineering subjects, contents of technical report. How to write specialized technical report? Analysis of technical and engineering reports.

HUM133 Study Skills

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Introduction to learning skills, self-learning, active learning and effective study skills
.

HUM134 Scientific Thinking

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Introduction to Thinking Skills, axial thinking skills, creative thinking and methods of development and critical thinking and strategies.

HUM135 Presentation and Communication Skills

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Course aims to providing the student with the latest knowledge about the concepts, characteristics, and types of managerial and interpersonal communications, as well as the concepts and requirement of good listening and presentation and developing the student's abilities and skills of effective communication, and good listening, as well as how to use the interpersonal and managerial communication methods and the presentation techniques in performance and dealing with others inside and outside the organization. Course Contents: Concept and nature of communication - Communication model - Formal and informal communications - Interpersonal and managerial communications - Body language - Written communications (Reports and memos) - Ten Commandments of effective communication - Good listing - Elements of effective presentation model - Preparation of good presentation -

Carrying out presentations - Discussion and dealing with objections - Evaluating presentation performance.

HUM136 Professional Marketing Skills

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Methods of documentation and presentation of management, technical and engineering data - Careful analysis of the documents, reports and articles ,the best ways to write and display Biography – types of correspondence art ,modern ways to present and discuss information ,information exchange ,management of personal and public interviewing ,management and ethics of professional meetings ,tools and methods of supply and marketing ,measuring return on marketing.

HUM211 Feasibility Studies and Operations Research

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	-	3	15	10	-	25	50

Feasibility studies
Introduction to feasibility studies ,globalization and privatization ,initial feasibility studies ,strategic analysis ,the mechanics of marketing feasibility ,financial and economic feasibility ,generating Projects and Applications.

Operations research
Identify the problem ,decision analysis ,identifying data and targets ,mathematical simplification - use linear programming to solve the problem and achieve goals.

HUM212 Engineering Economics and Projects Management

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Origin of engineering economics, principles of engineering economics, design and manufacturing processes, cost terminologies and cost estimation, accounting, budgeting and balance sheet, profit/loss statement, equivalence, money value of time, applications, simple and compound interest rates, present value, internal rate of return, payback period, evaluation of alternatives for useful life periods, depreciation methods, replacement analysis, determination of the economic life of projects for replacement, engineering economic techniques for evaluating public projects. Project management: Definitions, project life cycle, project stages, relationship among different project parties, execution phase responsibilities, productivity and quality management.

HUM321 Human Rights

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

The course aims to make the student recognizes the rights of the law of human nature and sources and explains the nature of the restrictions and differentiates between individual rights and collective rights and shows the rights of the areas of human educational and intellectual world and determine the duties and responsibilities partisan, professional and shows women and children with special needs.

HUM332 Technical Report Writing

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Essential elements of a technical report: Abstract - Summary - Contents - Objectives - Details of the report including figures, images, video …etc, - Conclusions - Recommendations - References using a standard format and the different electronic sources. Report Classification: Technical (Requirement specification, analysis, design and implementation). Administrative (directed to different operational and management levels). Levels of confidentiality for the different reports. Report Composition: Logical presentation of the report and coordination between its components. Importance of using correct grammar and punctuation. Enhancing communication effectiveness by the use of different media. Report Implementation: Use of the appropriate software packages including any graphics or multimedia packages.

HUM341 Recent Egypt's History

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Egypt under Ottoman rule (1571 - 1798) (conquest - governance and socio-economic conditions) - French invasion of Egypt and its effects (1798-1801) (occupation- governance and control -national resistance - failure of colonial project - Outcomes of occupation) Muhammad Ali's regime (1805-1848) (political conflict - the rule of the Muhammad Ali – the modern state - building foreign policy) - national movement - Orabi revolution - (the successors of Muhammad Ali era - Ismael- national movement and the Orabi revolution). Egypt during the british occupation (1882-1914)) occupation policy - emission of the national movement) - Egypt during the reign of the british protectorate and World war I - authorship the delegation group and the revolution of 1919 - 28 Fberaar1922 announcement

Assurance QUALITY

وزارة التعليم العالى
معهد طيبه العالى للهندسة
وحدة توكيد الجودة

Thebes For Engineering
Quality Assurance Unit

- Constitution of 1923 - evolving of the national case and the treaty of 1936 - Egypt during World war II). The political and social crises of Egypt and the way to revolution - the July revolution and change the political system - British evacuation 1954 - triple aggression in 1956.

HUM 342 Islamic History

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Features of Islamic history since the prophetic mission - Through the era of the Caliphs - Islamic conquest expansions - The Umayyad - Abbasid state and its culture through those times.

HUM413 Engineering Legislations

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

The rights and liabilities governing work in all engineering specializations according to valid laws and regulations. Reviewing and explaining the engineering legislations. Regulations and laws governing engineering union, different syndicates, contractors and the environmental protection.

HUM422 Population, Reproductive Health and Family Planning

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	-	2	15	10	-	25	50

Policy and health services in Egypt - Child and adolescent health - Areas of cooperation with the international organizations in the field of health and population - Family planning and reproductive health - Endemic diseases and how to combat it - Population activities in Egypt - Demographic Indicators.

HUM423 Environmental Impact of Projects

Lec	Tut	Lab	Total Hours	Mid term	Class work	Lab/ Oral	Final exam	Total Grade
2	-	-	2	15	10	-	25	50

The Environment, Human surroundings. Human Influences of projects: Upgrading, development, economic factors, social factors, cultural factors, aesthetic factors, hygienic and psychological factors. Types of projects: Urban projects, infrastructure projects, industrial projects. Environmental impact of projects: Negative impact, positive impact, direct impact, indirect impacts. Assessment of projects: National assessment, international

assessment. Approved rates and criteria for the compatibility of projects, environmental topics.

Textbook: John Glasson, Riki Therivel and Andrew Chadwick, Introduction to environmental impact

assessment, Routledge, 2005.

7.1. Communications and Electronics Engineering Department:

CEE041 Introduction to Computer and Programming

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	2	4	20	20	20	40	100

Computer structure, central processing unit (CPU),memory (types – characteristics),input / output devices, computer interconnections, Microsoft windows, Microsoft office programs (Word – Access – Excel – Power point – Internet explorer) and programming with high level language (C++).

Laboratory: *(Computer Lab)*

No.	Experiment Name
1	Microsoft Word-Examples
2	Microsoft Excel- Examples
3	Microsoft Power Point- Examples
4	Microsoft Access- Examples
5	Programming Language C++
6	Control statements(IF)
7	Control statements(Switch-case)
8	Control statements(For-Loop)
9	Control statements(While-Loop)
10	Control statements(Do-While-Loop)

CEE111   Electric Circuits (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	1	5	25	25	25	75	150

Electrical circuit variables and elements, simple resistive circuits, circuit theorems and analysis of electrical circuits, source transformation network theorems, thevinien theorem,

kirchof's voltage law, kirchof's current law, star-delta transformation, complex power calculations, power factor, series and capacitor and parallel- mutual electro magnetic.

Laboratory: *(Electric Circuits Lab)*

No.	Experiment Name
1	Resistors and resistors network
2	Current and voltage measurements in series and parallel resistors
3	Thevenin's theorem application
4	Electric power measurements
5	Capacitors ,series and parallel connections and time constant
6	Electromagnetic induction and inductor

CEE112 Electric Circuits (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	1	5	20	20	20	65	125

Sinusoidal steady state analysis, phasor diagram representation, application of network theorems on alternating current circuits, circuits with non-linear resistance. Transients in electrical circuits, polyphase circuits, magnetically coupled circuits, mutual Inductance, resonance in electric circuits, electric filters, two-port networks, locus of phasor diagrams at variable frequency, analysis of electric circuits with non-sinsoidal alternating currents, higher, harmonics and fourier series.

Laboratory: *(Electric Circuits Lab)*

No.	Experiment Name
1	Superposition Therem
2	RMS Value of an AC Waveform
3	AC Reactive (Capacitor and Inductive) Circuits.
4	Series CR- And LR- Circuits
5	Concept of Impedance of series LCR Circuits
6	Impedance of series LCR- Circuits Admittance and Parallel Circuits
6	Series and Parallel Resonance
7	Measurement of current, voltage and power in polyphaser network

CEE121   Electronics (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	1	5	25	25	25	75	150

Theory of semiconductor, intrinsic semiconductor, extrinsic semiconductor. Semiconductor P-N junction diode. Forward and reverse diode biasing. Half wave rectification – full wave

rectification Zener diodes – Bipolar junction transistor – The common base (C.B) characteristics – The common Emitter configuration (C.E). Transistor biasing.

Laboratory: *(Electronics Lab)*

No.	Experiment Name
1	Familiarization
2	The semiconductor diode
3	Testing semiconductor diode
4	Half-wave rectification
5	Full wave rectification
6	The zener diode
7	Transistor feminization
8	Testing bipolar transistor
9	The common emitter transistor
10	The field effect transistor

CEE122 Electronics (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	2	5	25	20	20	65	125

Field effect transistor, The junction field effect transistor (JFET). The JFET volt – ampere characteristic. The JFET transfer characteristic. The enhancement MOSFET. The depletion biasing of FET. The FET as switch – CMOS Devices. Basic amplifier stage at low frequencies, small signal (FET & BJT) models, linear analysis of transistor circuits, the common emitter amplifier, the emitter follower amplifier, the common base amplifier, comparison of BJT amplifiers FET amplifier stage, cascaded transistor amplifier. The differential amplifier, the operational amplifier and feedback amplifier.

Laboratory: *(Electronics Lab)*

No.	Experiment Name
1	Junction FET characteristics
2	Thermal stability
3	Small signal amplifiers
4	Amplifier coupling, loading, and feedback
5	DC amplifiers
6	The differential amplifiers
7	Operational amplifiers

CEE142 Operating Systems

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	2	5	20	10	20	50	100

Processor organization and operation, system programs, operating system, memory management, processor management, input / output management, information management, computer languages (High level languages, assembly language, machine language), compiler and programming using visual basic.

Laboratory: *(Computer Lab Visual Basic Programming)*

No.	Experiment Name
1	Defining Toolbox - menu
2	Calculations Program
3	Control Statements(IF)
4	Control Statements(Switch-case)
5	Control Statements(For-Loop)
6	Control Statements(While-Loop)
7	Control Statements(Do-While-Loop)
8	Application Programs
9	Application Programs
10	Application Programs

CEE143 Logic Circuits Design

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	2	6	25	25	25	75	150

Numbering Systems (Binary,octal,hexadecimal,BCD,non-weighted codes), binary addition and subtraction, BCD addition, boolean algebra, karnough-map, logic gates, combinational logic circuits (Decoder/Encoder, Multiplexer/Demultiplexer, Parity generator/ checker, Gray code converter), flip-flops (types and applications),registers,Counters and sequential circuits.

Laboratory: *(Logic Circuit Lab)*

No.	Experiment Name
1	Realization of logic gates using resistors and diodes
2	Realizing of ordinary gates (AND-OR-NOT). using the universal gates (NAND-NOR).
3	Realization of logic Circuits.
4	Realization of full adder circuits using ordinary logic gates.
5	Multiplexer and Demultiplexer.
6	Design a S-R flip-flop using ordinary logic gates (Asynchronous).

CEE151 Electromagnetic Field

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Vector analysis: Divergence of a vector field Cartesian coordinate and curl of a vector. Orthogonal coordinate systems: Divergence, Gradient and curl in Cylindrical and spherical coordinate. Stokes's Theorem, divergence theorem, helmholtz theorem. Static electric fields: Coulombs law, charge densities and electric field intensity. Static electric fields: Moving charges current: Conductors, ohm's law, resistance, semiconductors, conductor under static conditions. Dielectrics and capacitance: Polarization in dielectrics. Boundary conditions: Static magnetic field: BIOT-SAVART law, ampere's circuital law. Vector magnetic potential: Flux density vector, static maxwell equations. Magnetic force and magnetic materials: force between conductors.

CEE181 Electrical Engineering

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	1	4	15	15	15	30	75

Dc circuits, kirchoff's Laws, magnetic circuits, operation theory and construction of DCmachines, operation theory of Dc generators and Dc motors, single phase circuits, 3-phase balanced circuits, cables selection for different loads, operation theory of transformers, operation theory of Ac motors.

Laboratory: *(Machine Lab)*

No.	Experiment Name
1	Current and Voltage Measurement in Series and Parallel Resistors
2	Current and Voltage Measurement in loop (KVL)
3	Electric Power Measurement
4	EMF Generation in Seperetely Excited DC generator
5	Operation of Shunt and Series DC Motor
6	Check up of RMS Values of Current and Voltage using Oscilloscope
7	No load Test and Short Circuit Test of Transformer

CEE213 Electronic Measurements (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	2	5	25	25	25	75	150

Analog Instruments, precautions, data converters, digital Instruments, testing of linear systems, wave analyzers, transducers, noise effects, optical fiber measurements, cathode ray-oscilloscopes application and electronic and communication experiments to support the theoretical aspects of the course material.

Laboratory:*(Electronic Measurements Lab)*

No.	Experiment Name

1	Measuring voltage
2	Measuring current
3	Measuring Resistance characteristics
4	Light Dependent resistor
5	Verifying Ohm's Law
6	Power
7	Determining the sensitivity of your voltmeter
8	Extending voltmeter range
9	Loading effects of the voltmeter
10	Multimeters

CEE214 Electronic Measurements (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	2	5	25	25	25	75	150

Electrical measurements, measurement errors, accuracy, statistical analysis. Static calibration, resolution and precision, dynamic response. Units: systems, dimensions and standards. Moving-coil instruments, moving iron instruments, electro-dynamic instruments, induction-type instruments, current and voltage measurements, measurement of power, measurement of energy and charge, measurement of frequency and power factor, measurement of non-electrical parameters. DC bridges, AC bridges, resistance and capacitance measurement, allocation of cable faults. Strain gauges, temperature transducers, displacement, velocity and acceleration transducers, force and pressure transducers, light transducers, data converters, voltage-to-frequency converters. Digital devices: digital voltmeters and digital frequency meters.

Laboratory:(*Electronic Measurements Lab*)

No.	Experiment Name
1	Linear ramp A/D converter
2	Segmented displays
3	Oscilloscope control operation
4	Lissajour measurement
5	Constructing a main gate and decade counter circuit
6	Signal generator calibration check
7	Performance check of oscilloscope vertical circuit
8	Performance check of oscilloscope sweep speed calibration

CEE215 Electronic Circuits (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	1	5	25	25	25	75	150

Frequency response: Amplifier frequency response, system transfer function, frequency response bipolar transistor, frequency response FET transistor. miller effect capacitance. high frequency response of transistor circuit, multistage frequency effect, square wave testing. wave generators and wave shaping: sinusoidal oscillators, the phase shift oscillator, the wein bridge oscillator, LC oscillator, crystal oscillator, multivibrator components, square wave generation from a sinusoidal, schmitt trigger circuit, square wave and triangle wave generators, pulse generators, the 555 IC timer and voltage time base generators.

Laboratory: *(Electronic Circuits Lab)*

No.	Experiment Name
1	RC Time constant
2	RC circuits
3	RL circuits PART (1)
4	RL circuits PART (2)
5	Series Resonance
6	Parallel Resonance
7	LC Filters PART (1)
8	LC Filters PART (2)
9	Active Filters

CEE216 Electronic Circuits (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	2	6	25	25	25	75	150

Integrated circuit biasing and active loads, bipolar transistor current sources, FET current sources, circuit with active loads. semiconductor devices for digital circuits, digital logic circuit, logic circuit characteristics (logic level, fan out, propagation delay, power dissipation, noise immunity), integrated circuit classification. bipolar digital circuit, emitter coupled logic (EEL), diode transistor logic circuit (DTL), transistor transistor logic circuit (TTL), MOSFET digital circuit, NMOS inverters, NMOS logic circuits, CMOS Inverters and CMOS logic circuits.

Laboratory: (Electronic Circuits Lab)

No.	Experiment Name
1	BJT inverter function using p spice
2	BJT NOR and OR Logic functions
3	BJT NAND and AND Logic functions
4	BJT Boolean` algebra functions
5	CMOS inverter function
6	CMOS NOR and OR Logic functions
7	CMOS NAND and AND Logic functions

| 8 | CMOS Boolean algebra functions |

CEE223 Electronics (3)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	1	5	25	25	25	75	150

Power supply and regulators: AC to DC conversion, rectifiers and capacitor filter, regulated power supply. monolithic regulators, switching regulators. large signal amplitude: harmonic distortion, amplifier classification, efficiency of A class amplitude, class B push pull amplitude, class AB operation. Integration of circuit power amplifier, thermal design consideration, power field effect transistor. Power semiconductor devices: power diodes, thyristors, SCR, TRIAC, DIAC, shochely diode and Unijunction transistor (U.J.T), (PU.J.T).

Laboratory: *(Electronics Lab)*

No.	Experiment Name
1	Unregulated power supplies
2	Voltage regulation
3	IC voltage regulator
4	Complimentary power amplifiers
5	Driven rectangular-wave shaping
6	Rectangular-wave generators
7	Ramp generator
8	The practical Tank circuit
9	LC oscillator
10	Crystal oscillator

CEE244 Computer Architectures

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Design of digital system methodologies, design levels (gate level, register level, processor level), Instruction cycle, addressing techniques, arithmetic operations , control unit design (hardwire and microprogramming) , memory hierarchy , computer input/output operation , computer buses.

CEE261 Communication Systems (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	1	4	20	20	20	65	125

Introduction to communication system, analysis of amplitude modulation, frequency modulation, phase modulation, pulse modulation systems, transmitters and rceivers, detectors, mixers, automatic gain control, automatic frequency control, phase-locked-loop, applications of RF power amplifiers, limiters, harmonic generators and AM modulators, stereo coder and decoder, FM stereo broadcast transmitters and receivers, color TV systems (Pal/SECAM/NTSC), color TV transmitters and receivers, alignment of color TV receivers.

Laboratory:(*Communication Systems Lab*)

No.	Experiment Name
1	The signal sources
2	The tuned circuits
3	The crystal oscillators
4	The amplifiers
5	The familiarization of the Filters
6	AM Modulation (Balanced modulator)
7	The ring modulator, the collector modulator
8	AM Radio Superhetrodyne
9	AM Detection
10	FM Modulation
11	FM Detection

CEE262 Communication Systems (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	1	4	20	20	20	65	125

Sampling process, pulse amplitude modulation, quantization noise, conditions for optimality of scalar quantizes, pulse code modulation, time division multiplexing. digital multiplexers, random processcesses: stationary process, mean, covariance and correlation functions, ergodic processes, transmission of random processcess through linear time invariant filter: power spectral density. Noise: Gaussian process and central limit theorem, white noise, narrow band noise. Noise effect on CW modulation systems: DSB-SC, AM envelope, FM. Baseband Pulse.

Laboratory:(*Communication Systems Lab*)

No.	Experiment Name
1	Harmonic analysis of square wave
2	Harmonic analysis of modulated wave form
3	Super – Hetrodyne Reciver
4	Amplitude modulation with / without carrier
5	Single – Sideband
6	Sample and hold

7	Aliasing and multiplex signaling
8	Pulse Code Modulation
9	Noise in PCM system
10	Delta and Delta – Segma Modulation

CEE282 Electrical Machines and Transformers

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	1	4	20	15	15	50	100

Magnetic circuits, DC machines, transformers, induction motors, fractional horse power motors.

Laboratory: (Electrical Machine Lab)

No.	Experiment Name
1	The no load characteristic of DC Generators
2	Load characteristic of a separately excited generator
3	Load characteristic of shunt generator
4	Load characteristic of series generator
5	Shunt and series DC motor operation
6	Speed control of DC motor
7	No load test for transformer
8	Short circuit test for transformer

CEE291 Field Traning (1):

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
-	-	2	2	-	25	25	-	50

Students should spend 6 weeks in field training, after completing the second year, in any engineering institution or engineering firms. Students should demonstrate the professional and practical skills they acquired during discussion with their assigned tutors.

CEE317 Electronic Circuits (3)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	2	6	25	25	25	75	150

Introduction to frequency selective circuit: Passive filters, LPF, HPF, BPF, and BRF circuit. Active filter circuits. First order low pass and high pass filters, scaling, Op-Amp band pass and Band Reject amplifier, higher order Op-Amp filters, cascading identical filters, butter worth filters, narrow band and band pass and band reject filters, all pass filter, state variable filters, types of active filters.

  Laboratory:(*Electronic Measurements Lab*)

No.	Experiment Name
1	Assigned the bandwidth of LPF, HPF using passive elements
2	Assigned the bandwidth of BPF, BRF using passive elements
3	Assigned and chek the bandwidth gain of LPF, HPF using OP-Amp
4	Assigned and chek the bandwidth gain of BPF, BRF using OP-Amp
5	Assigned the bandwidth for different filters by Butter worth method
6	Assigned the bandwidth for different filters by cheby shave

CEE318 Electronic Circuits (4)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	2	6	25	25	25	75	150

Modulation and demodulation, amplitude modulation, types of amplitude modulation, comparison of various AM systems, block diagram of AM transmitter, transistor AM modulation, square low diode modulation, generation of DSB-SC signal, single side band generation, frequency modulation, phase modulation, AM detection, FM detection, phase difference detector. pulse modulation, pulse amplitude modulation, pulse time modulation, pulse code modulation. Phased Locked Loop (PLL), operating principles, monolithic Phased Locked Loop (PLL) IC's, PLL operation, PLL applications.

Laboratory:*(Electronic Circuits Lab)*

No.	Experiment Name
1	Phase Locked Loop (PLL)
2	Frequency Synthesizing
3	PAM Multi / DE multiplexing
4	PCM Multi / DE multiplexing
5	FDM Multi / DE multiplexing
6	MODEM

CEE345 Microprocessor and Interfacing

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	1	2	5	25	25	25	75	150

Microprocessor structure, instruction types, microprocessor memory, input/output system, transducers, sampling of analog signals, A/D and D/A converters, parallel interfacing, serial interfacing, programmable peripheral interfacing (example 8255).

Laboratory:*(Microprocissor and Interfacing Lab)*

No.	Experiment Name
1	Programming ARDUINO C

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2	IDE Program& component knowledge
3	Applications with LEDs
4	Applications with Sensors
5	Motors, Drive circuit
6	APPLICATIONS WITH MOTORS&RELAYS
7	Applications with display (LCD, 7segment)
8	Applications with buzzers, keypads
9	serial communication
10	Voice syntheses

CEE346 Computer Programming

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Benefits of using Java programming language, how to write and execute a java program, how the program compiles and stores in memory, how to use (If- switch Case – For loop – Do-while), matrices (sort- store-addition and multiplication of two matrices two dimensions), classes, methods, object oriented, construct Database

Laboratory: *(Computer Lab Java Programming language)*

No.	Experiment Name
1	Defining menu of Netbeans
2	Printing and Inputting and calculating Programs
3	Control Statements(IF) (Switch-case)
4	Control Statements(For-Loop)
5	Control Statements(While-Loop) (Do-While-Loop)
6	Matrices
7	Object oriented
8	Classes and methods
9	Functions
10	Create Database

CEE352 Electromagnetic Waves

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	30	30	-	65	125

Time varying fields: Faraday's law, displacement current, transformer and motional EMF's. Maxwell's equations: electromagnetic wave propagation: plane waves in lossless medium, wave propagation in lossy medium. Power and pointing vector: wave propagation, power dissipation. boundary conditions: group velocity & phase velocity. Reflection of waves:

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waves at normal incidence, waves at oblique incidence. Transmission line: transmission line parameters, transmission line equations. transmission line reflections: Input impedance, SWR. Smith chart and applications.

CEE363 Communication Systems (3)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Transmission: line codes, equalizers, filters, probability of errors in baseband, intersymbol interference, nyquist criterion for distortion less baseband transmission, raised cosine spectrum. M-Ary probability of error, regenerative repeaters, eye pattern, power spectrum of pulse amplitude modulation. Signal space analysis, correlation receiver. Passband data transmission, BPSK, QPSK, Pe, spectrum, generation, M-Ary, FSK, No coherent binary FSK. Differential phase shift keying. Comparison of digital modulation schemes using a single carrier. Application: Modems.

CEE371 Digital Signal Processing

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	30	30	-	65	125

Digital filter design: finite impulse response, Infinite impulse response. Adaptive digital filters: concepts, algorithms, applications. Speech coders: speech signal analysis, waveform coders, vocoders, hybrid coders. Image processing: image coding, image enhancement, image compression.

CEE372 Antennas

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	1	5	25	25	25	75	150

Fundamental parameters of antennas: radiation pattern, isotropic, directional and Omni directional patterns, radiation power density, directivity, gain, antenna efficiency. Fundamental parameters of antennas: vector potential for electric and magnetic current sources, electric and magnetic fields for electric and magnetic currents. Far field radiation, duality and reciprocity theorem. Linear wire antennas: infinitesimal dipole, small dipole. Finite length dipole: half-wavelength dipole, linear elements on perfect conductor. Applications: antenna for mobile communication systems. Loop antennas: small circular loop, circular loop with constant current, circular loop with variable current. Antenna arrays: end fire array, phased array. design of antenna arrays: planer arrays, array factor, micro-strip antenna characteristics.

Laboratory: *(Antennas Lab)*

No.	Experiment Name
1	Half-wave dipole antenna
2	Folded dipole antenna
3	Drooping antenna
4	Full-wave loop antenna
5	Yagi antenna
6	Helical antenna
7	Horn antenna

CEE373   Information Theory and Coding

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Introduction: uncertainty, information, entropy and its properties. Source coding: shannon coding, prefix coding, Kraft-Mcmillan inequality, Huffman coding, Lempel Ziv coding. Discrete memoryless channels: transition probability, binary symmetric channel, mutual information and its properties. Channel capacity: definition, binary symmetric channel. Channel coding theorem. Channel capacity theorem. Compression of information. linear block codes: syndrome decoding, minimum distance considerations. Cyclic codes: generator polynomial, parity check polynomial, encoder for cyclic, hamming codes, Bose Chaudhuri-Hocquenghem (BCH) codes, Reed-soloman codes. Convolutional codes: code tree, Trellis and state diagram. Maximum likelihood decoding of convolutional codes.

CEE374 Digital Communication Systems (1)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	2	6	25	25	25	75	150

Sampling, digital modulation transmission, digital system, digital signal, error and noise, synchronization techniques, coding and encoding, pulse coding modulation, amplitude shift keying, phase shift keying, delta modulation, differential delta modulation.

Laboratory: *(communication Lab)*

No.	Experiment Name
1	Introduction to digital signalling
2	Dealing with noise in a digital system
3	Clock regeneration 1 (NRZ data)
4	Amplitude Shift Key (ASK)
5	Clock regeneration 2 (Bi-phase code)
6	Frequency Shift Key (FSK)

7	Phase Shift Key (PSK)
8	Further techniques fopr PSK/DSBSC demodulation
9	Generation of QPSK signals
10	Reception of QPSK signals

CEE383 Automatic Control

Lec	Tut	Lab	Total Hours	Mid term	Class work	Lab/ Oral	Final exam	Total Grade
2	2	-	4	25	25	-	50	100

Introduction to linear control system theory , closed loop control system , feedback control systems , performance of control systems , standard test signals , transient response , response of first and second order systems, the frequency response plots , estimation of transfer functions , stability of linear systems , controllability and observability , non linear control and describing functions , the course must cover preliminaries on intelligent controls.

CEE392 Field Training (2):

Lec	Tut	Prac	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
-	-	2	2	-	25	25	-	50

Students should spend 6 weeks in field training, after completing the Third year, in any engineering institution or engineering firms. They should prepare a technical report implying a full description of the processes they joined for training. Students should demonstrate the professional and practical skills they acquired during discussion of report with their assigned tutors.

CEE419 Digital Circuits

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

CMOS inverter: noise margin, propagation delay, power dissipation, CMOS combinational circuits: static design, pass transistors and transmission gates, dynamic design, CMOS sequential circuits: latches, Flip-flops, counters, finite-state, machines, pipelined structure, non-bistable CMOS circuits: monostable, ring oscillator.

CEE424 Optical Electronics

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Interaction of radiation and atomic systems, theory of laser oscillation: fabry-perot laser, oscillation, frequency, power output, some laser system, electro-optic modulation of laser, OPTO-electronic semiconductor devices, DC and AC characteristics, PIN and avalanche photodiode, applications: OPTO isolator types, parameters and characteristics, circuit applications, solar cells, LCD's.

CEE425 Selected Topics in Electronics

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Selected topics related to recent development in micro- and nano-electronics, Mems and Mems technologies, integrated circuit design, computer aided design techniques and design automation.

CEE426 Power Electronics

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Power diodes – diode rectifier circuits, thyristors, thyristors communication techniques, GTO thyristors, power transistors- controlled rectifier circuits, AC voltage controllers, choppers, inverters, UPS static switches.

CEE431 Integrated Circuits

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

IC Processing, post processing, processing economics, design of basic digital IC building blocks, NMOS inverter: noise margin propagation delay, power dissipation, NMOS and CMOS gate circuits, GaAs digital circuits, IIL, TTL, EEL, gates, BiCMOS digital circuits, Memory cores: ROM, EPROM, EEPROM, Flash ROM, SRAM, DRAM, Memory peripheral Circuitry: Row and column decoders, Array structure: PLA, PAL, PLD.

CEE432 Integrated Circuit Systems

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Defining items, technology roadmap, basic silicon processes, fabrication of passive and active components, process integration and standard technologies, process simulation, layout design rules, layout parasitic, typical examples, layout techniques, interconnect modeling, substrate coupling issues, ESD protection techniques, packaging.

CEE433 Embedded Systems

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

The importance of embedded systems, embedded processor structure, programming of embedded system , I/O and device driver interface to embedded processors with networks, scheduling, communication and synchronization, structure and implementation of microcontroller, the microcontroller basic instruction set, real time operating system and their testing, illustrative examples of microelectromechanical systems as embedded systems.

CEE434 Design of VLSI Integrated Circuit Systems

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Design of VLSI, structural design of VLSI analog and digital circuits, evolution of VLSI, concepts of system design, techniques of IC design, inputting of digital variables and implementation techniques, VLSI testing techniques and its applications.

CEE447 Programmable Logic Controllers

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Introduction to PLC and its advantages in controls , the structure of PLC , types of sensors used with PLC , types of output devices controlled by PLC , symbols used with PLC ladder diagrams , design a PLC ladder diagrams , restrictions imposed on PLC ladder diagrams , solving control problems using PLC , representation and implementation of boolean functions using PLC , programming languages used to program PLC devices , application of PLC in control processes , application of analog PLC in control processes.

CEE448 Neural Networks

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	30	30	-	65	125

Introduction to human neural network, arithmetic model of a neuron, representation of ANN, ANN architecture, knowledge representation, learning processes, single layer perceptrons, multi-layer perceptrons, linear associative networks, learning matrix networks, recurrent associative networks, back propagation networks, dynamic back propagation networks, counter propagation networks, Boltzmann machine, solving engineering problems using ANN.

CEE449 Computer Aided Design

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Introduction to CAD , tools for design analog, digital and mixed circuits, Nodal analysis and matrix map, VLSI circuit design, modeling hardware, hardware description language, programming technologies, digital circuit testing, design for testability, generating output data for manufacturing, design of printed circuit board.

CEE453 Microwave Engineering

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	2	6	25	25	25	75	150

Waveguides TEM (Transverse electromagnetic wave). Transverse magnetic waves (TM), transverse electric waves (TE). Rectangular waveguides: TE and TM waves in rectangular waveguides. Power, Attenuation in rectangular waveguide. Circular Waveguide: Bessel's differential equation and Bessel's functions TE & TM, waves in circular waveguide. Cavity resonators: rectangular cavity quality factor and cavity circular cavity. Microwave network analysis: impedance and admittance matrices, scattering matrix, reciprocal and lossless networks. Impedance transformation and matching: single stub and double stub matching networks. Passive microwave devices: variable short circuit, attenuators, phase shifters, hybrid junctions, power dividers. Directional coupler.

Laboratory:(*Microwave Lab*)

No.	Experiment Name
1	Gun oscillator
2	Variable attenuator
3	Slotted measuring line
4	Complex reflection coefficient
5	Directional coupler
6	Cavity resonator
7	Smith chart for matching

CEE454 Microwave / RF Devices

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Microwave frequencies, microwave devices, microwave systems, electron motion in an electromagnetic field, uniform plane waves and reflection, transmission-line equations and

solutions, microwave coaxial connectors, couplers, dividers, attenuators, circulators, RF / Microwave amplifier Design, RF filters, RF / Microwave semiconductors

CEE464 Satellite Communication

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	30	30	-	65	125

Communication satellite system, orbiting satellites, the satellite channel, link calculation, satellite electronics, frequency division multiple access, time division multiple access and code division multiple access, on board processing, ground and central station.

CEE465 Optical Communication Systems

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	2	6	25	25	25	75	150

Overview of optical fiber communication, optical fiber power launching and coupling, optical reciever operation, digital and analog detectors and preamplifiers, digital transmission systems, point to point links, systems considerations, power and rise time budgets, analog systems, carrier to noise ratio, multichannel transmission techniques, coherent optical fiber communication, WDM multiplexing, optical amplifiers.

Laboratory: *(Optical Fiber Lab)*

No.	Experiment Name
1	V-I characteristics of Photo LED
2	V-I characteristics of Photo Detector
3	Study of 650 nm Fiber Optic Analog and digital link.
4	Study of Characteristics of Fiber Optic Communication Link
5	To obtain Intensity Modulation of the Analog and digital Signal & Demodulation
6	Study of Frequency Modulation (FM) and Pulse Width Modulation
7	Study of Voice Communication through fiber Optic cable using Amplitude Modulation
8	Demonstration of Voice Transmission through optical fiber using FM and Pulse Width Modulation
9	Measurement of Optical Power using optical power meter
10	Study of Characteristics of E-O converter using optical power meter
11	Measurement of Propagation or Attenuation Loss in the optical fiber and Bending Loss
12	Study of Bending Loss

CEE466 Communication Networks

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Introduction to telecommunication, telegraph and telephone, switching: telegraph, telephone, telex, data, signalling, ISDN, broadband, private switching. Management network multiplexing: analog, digital, wavelength division. Data transmission interface equipment: modems, digital data interface equipment, Code: audio, video. Copper lines: open wire, twisted pair cable, coaxial cable. Optical fiber technology: types of optical fibers, cables, applications. Radio relay technology, systems. Mobile radio: service mode technology. Satellites: services, technology, digital subscriber lines.

CEE467 Selected Topics in Communication Engineering

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Selected topics related to current development in communication systems. Radar systems data, Communication and signal processing.

CEE468 Mobile Communication

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Basic concepts of mobile communication: cell site planning: traffic engineering, principles of base station provisioning, cell site configurations. RF propagation characteristics: fading phenomena, free space propagation, two path model, RF coverage for mobile station inside buildings, noise in cellular systems. GSM cellular system: features, multiple access techniques, GSM architecture, TDMA frame structure, types of bursts, mapping of logical channels on physical channels, modulation, frequency hopping, power control, carrier and burst synchronization, hand over processing, authentication encryption, CDMA spread spectrum systems, the performance of DS-SSS, CDMA air links. Types of codes used in CDMA, power control in CDMA, hand-Off process in CDMA.

CEE475 Digital Communication Systems (2)

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Digital communication systems, performance analysis of basic digital communication techniques, power efficiency and spectral efficiency comparisons of digital communication systems, M-array digital modulation techniques, coherent and non-cohrent digital modulation techniques. Applications in mobile and satellite communication systems.

CEE484 Biomedical Instrumentations

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	2	-	4	25	25	-	50	100

Introduction to biomedical instrumentations, models of artificial organs (artificial lung, artificial kidney, heart lung machine), clinical laboratory instruments (blood chemistry instruments, hematology instruments, blood bank instruments, microbiology instruments), radiology instruments (X-ray, gamma camera, computer axial tomography (CAT , scan), magnetic resonance imaging MRI).

CEE493 Project

Lec	Tut	Lab	Total Hours	Mid term	Class work	Prac/ Oral	Final exam	Total Degrees
2	-	4	6	-	100	100	-	200

The students are grouped according to the project title with the supervisors in the first term. In the second term, the student uses the fundamentals, principles and skills he gained during his study to analyze and design an engineering system to perform a specified task either individually or through a group work depending on the supervisor task. The detailed analysis and design must be included in the student report. The data collected and the design performed for the project in the first part is the core of the final practical project. The fundamental principles, Equations of design, analysis, circuits and programs, execution and testing steps and results for the project must be collected in a technical report.

Program Coordinator: Dr. Sheirf Samy