Faculty of Engineering

Bachular Degree Contents

2017

الفرقة : اعدادي القسم : العام الفصل الدراسى :الأول

Mechanics(1)				اسم المقرر		BAS-1013		المقرر
2	ساعات معتمده	4	ساعات الاتصال	2	نظري	2	عملي	الساعات
90			تحريري	35	اعمال السنه		عملي/شفوي	درجات المقرر
الوصف Equilibrium of a particle— Equivalent systems of forces and couples - Equilibrium of Rigid body- Center of gravity and centroid.								

Engineering drawing and Projection				اسم المقرر		BAS+PDE1014		كود المقرر
3	ساعات معتمده	5	ساعات الاتصال	2	نظري	3	عملي	الساعات
100			تحريري	50	اعمال السنه		عملي/شفوي	درجات المقرر

Projection

perpendicular Projection to the two levels- Projection of points, straight line, levels, and simple objects- Assistant projection, intersection of levels, perpendicular Projection of engineering objects of many surfaces. -Intersection of rotational surfaces.

Engineering Drawing

Introduction to Engineering Drawing- Instrumental Drawing - Geometric Constructions - Representation by Plane Images - Representation by Stereographic Images – Dimensioning - Intersections of Engineering Solids and Developments

Chemistry				اسم المقرر		BAS-1015		كود المقرر
3	ساعات معتمده	5	ساعات الاتصال	2	نظري	3	عملي	الساعات
80			تحريري	35	اعمال السنه	10	عملي/شفوي	درجات المقرر

Equations of state-chemical thermodynamics - kinetics of chemical reactions - Material and energy balance in fuel combustion and chemical processes - properties of solutions - Dynamic equilibrium in physical and chemical processes - Basic principles in electrochemistry - Introduction to corrosion engineering - Industry and chemistry of cement - Chemical fertilizers - Dyes and dyeing industry.

English				اسم المقرر		BAS1016		كود المقرر
2	ساعات معتمده	4	ساعات الاتصال	1	نظري	3	عملي	الساعات
40			تحريري	10	اعمال السنه		عملي/شفوي	درجات المقرر

Engineering: An Introduction - Civil Engineering – Electrical Engineering – Mechanical Engineering- Computer Engineering - Architectural Engineering – Software Engineering – Chemical Engineering - Industrial Engineering - Petroleum Engineering - Molecular Engineering.

Mathematics (2)				اسم المقرر		BAS-1021		كود المقرر
3	ساعات معتمده	5	ساعات الاتصال	3	نظري	2	عملي	الساعات
100			تحريري	50	اعمال السنه		عملي/شفوي	درجات المقرر

Integral Calculus (Integration)

Integration techniques – Reduction formula – Definite integral and its properties – Improper integral – Applications of integration(area, volume, arc length and surface area) – First order ordinary differential equations(separable, homogeneous, exact, linear and Bernoulli) and their applications– Infinite series.

Analytic Geometry

Two-variable quadratic equations – Conic sections (circle, parabola, ellipse and hyperbola) – Parametric equations of conic sections –Coordinates systems in plane and space – Line and plane in space – Quadratic surfaces (cylinder, sphere, ellipsoid, hyperboloid, cone and paraboloid).

Physics (2)				اسم المقرر		BAS-1022		كود المقرر
4	ساعات معتمده	6	ساعات الاتصال	3	نظري	3	عملي	الساعات
100			تحريري	40	اعمال السنه	10	عملي/شفوي	درجات المقرر

Electricity and Magnetism:

The Charge and matter - The electric field – Coulomb's law- The electric flux Gauss's law - The electric Potential - the capacitors and dielectrics- The magnetic field -Boit- Savart's law- The magnetic flux Gauss's Law – Faraday's Law- Magnetic Induction.

Optics and atomic physics:

Nature of light -Interference - Diffraction - Polarization - Early quantum theory - Special Relativity.

Mechanics (2)				اسم المقرر		BAS-1023		كود المقرر
2	ساعات معتمده	4	ساعات الاتصال	2	نظري	2	عملي	الساعات
70			تحريري	30	اعمال السنه		عملي/شفوي	درجات المقرر

Hydrostatic forces – Frames and Machines – Trusses – Friction – Introduction in dynamics (Projectiles).

Engineering drawing				اسم المقرر		PDE1024		كود المقرر
2	ساعات معتمده	4	ساعات الاتصال	1	نظري	3	عملي	الساعات
70			تحريري	30	اعمال السنه		عملي/شفوي	درجات المقرر

Introduction to Engineering Drawing of complex bodies. Instrumental Drawing-Level 2. Geometric Constructions-Level 2. Representation by Plane Images-Level 2. Representation by Stereographic Images-Level 2. Dimensioning-Level 2. Intersections of Engineering Solids and Developments-Level 2.

Production Engineering				اسم المقرر		PDE1025		كود المقرر
2	ساعات معتمده	4	ساعات الاتصال	1	نظري	3	عملي	الساعات
70			تحريري	30	اعمال السنه		عملي/شفوي	درجات المقرر

Introducing engineering material& Ferrous & Nonferrous & Furnaces for steel & cast iron.Casting processes - Forming processes (forging, rolling, extrusion, drawing & bending), welding - Cutting processes (turning, planning, milling, drilling & grinding)- Measuring tools, quality and safety.

Introduction to Computer Programming				اسم المقرر		CCE-1026		كود المقرر
2	ساعات معتمده	4	ساعات الاتصال	1	نظري	3	عملي	الساعات
70			تحريري	20	اعمال السنه	10	عملي/شفوي	درجات المقرر

Introduction to Computer and Programming Computer hardware components Computer software components - operating systems, compiler, interpreter, editor, application Programming languages - machine language, assembly, high level - Basic concepts of flow chart and algorithm

Network and Internet and Web Programming : ***Experimental 1*** Building a small network

Problem Solving - Fundamentals of VB.net Programming Language & Input/Output- Basic VB.net operators : ***Experimental 2*** Building a small program

Simple application

Control Statements : ***Experimental 3*** Building a small program based on control Statements

Do Loops Statements : ***Experimental 4*** Building a small program based on control Statements - Complex applications

Engineering Entrance				اسم المقرر		BAS1027		كود المقرر
2	ساعات معتمده	2	ساعات الاتصال	2	نظري		عملي	الساعات

درجات المقرر	عملي/شفوي		اعمال السنه		تحريري	50

An introduction to environmental science:

The struggle between man and environment and the effects of this struggle on human-Environmental quality and development - the technological basis of solid waste handling and disposal Economical aspects of environmental abatement Responsibilities of pollution abatement on local, regional and universal levels legislatives concerning environmental protection - Environmental impact assessment (EIA) for development projects.

An introduction to Engineering

Engineering profession International specifications of engineering profession - Engineering specializations - Importance of information technology (IT) Ethics of engineering profession Basic concepts of private business culture.

2 Electrical power & Machines Engineering Program

Basic Information

Program Name	Electrical Power & Machines Engineering
Department	Electrical Engineering
Program Type	Single
No of Semesters	10
No of Contact Hour	280
Lecture	140
Tutorial and Practical	140
Equivalent Credit Hours	161

Attributes of the Graduates

The graduates of the engineering programs should be able to:

1. Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
2. Design a system, component and process to meet the required needs within realistic constraints.
3. Design and conduct experiments as well as analyze and interpret data.
4. Identify, formulate and solve fundamental engineering problems.
5. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
6. Work effectively within multi-disciplinary teams.
7. Communicate effectively.
8. Consider the impacts of engineering solutions on society and environment.
9. Demonstrate knowledge of contemporary engineering issues.
10. Display professional and ethical responsibilities; and contextual understanding.
11. Engage in self- and life- long learning.
12. Design and supervise the construction of systems to generate, transmit, control and use electrical energy.
13. Design and develop heavy equipment, such as generators, motors, transmission lines and distributing systems.

14. Plan and manage engineering activity during the diverse phases of electric power generation, transmission and control
15. Prepare and reviews simple sketches, specifications and data sheets for electric power generation, control and distribution systems
16. Perform design reviews and checks for electric power generation and distribution systems
17. Perform review of supplier documentation for compliance with specifications
18. Develops load lists
19. Develops low voltage power systems

Courses distribution based requirement according the Reference Framework and NARSE for the Electrical Power & Machines Engineering Program

Code	Course Name	Contact Hrs.	Equivalent Credit Hr	Requirements					Academic Year
				University	Faculty	Department			
						Major	Minor		
BAS 1011	Mathematics (1)	5	3					First	Preparatory Year
BAS 1012	Physics (1)	6	4						
BAS 1013	Mechanics (1)	4	2						
PDE+BAS 1014	Engineering drawing and projection	5	3						
BAS 1015	Chemistry	5	3						
BAS 1016	English	4	2						
BAS 1021	Mathematics (2)	5	3					Second	
BAS 1022	Physics(2)	6	4						
BAS 1023	Mechanics(2)	4	2						
PDE 1024	Engineering drawing	4	3						
PDE 1025	Production engineering	4	2						
CAC 1026	Introduction to computer programming	4	2						
BAS1027	Introduction to Engineering Specialties	2	2						
BAS 2111	Engineering Math. (3)	5	3					First	First Year
EE 2112	Electric Circuits (1)	5	3						
EE 2113	Electric Materials	5	3						
STE 2114	Civil Engineering	4	2						
EE 2115	Programming in Electrical Engineering	6	3						
EE 2116	Engineering economy	2	2						
BAS 2121	Engineering Math. (4)	5	3					Second	
EE 2122	Power Electronic Principles	5	3						
EE 2123	Electric Circuits (2)	5	3						
EE 2124	Electrical Measurements	5	3						
MPE 2125	Fluid Mechanic & Thermal Engineering	5	3						
EE 2126	Management & Decision Making	2	2						
BAS -2211	Engineering Math. (5)	5	3						

HAA

EE -2212	Digital Circuits	4	2						
MPE -2213	Thermal & Hydraulic Machines	5	3						
EE – 2214	Power Electronics (1)	5	3						
EE -2215	Computer Applications in Electrical Engineering	4	3						
EE -2216	Engineering Project Management	4	2						
EE – 2217	Summer Training (1)	2	0						
EE – 2221	Power Generation Systems	5	3					Second	
EE – 2222	DC Machines& Transformers	5	3						
EE – 2223	Electrical Lab. (1)	4	2						
EE – 2224	High Voltage	6	4						
EE – 2225	Technical Writing	2	2						
EE – 2226	Electromagnetics	5	3						
EE -2311	Induction & Synchronous Machines	5	3					First	Third Year
ECE -2312	Theory of Communication Sys	4	2						
EE -2313	Power System Transmission	5	3						
CAC -2314	Automatic Control	4	2						
EE -2315	Contracts & Specifications	4	2						
EE -2316	Power Electronics (2)	6	4						
EE -2321	Power System Analysis	5	3					Second	
EE -2322	Special Machines	5	3						
EE -2323	Protective Devices and Switchgear	5	3						
EE -2324	Programmable Logic Controller	5	3						
EE -2325	Elective Course (1)	4	2						
EE -2326	Energy issues & Environment	4	2						
EE -2411	Power System Distribution	5	3					First	Fourth Year
EE -2412	Machines Design& Analysis	5	3						
EE -2413	Power System Protection	5	3						
EE -2414	Elective Course (2)	4	2						
EE -2415	Project 1	6	3						
EE – 2416	Summer Training (2)	2	0						
EE -2421	Power System control	5	3					Second	
EE -2422	Electrical Machine Control	5	3						
EE -2423	Electrical Lab. (2)	4	2						
EE -2424	Electric Energy Utilization	5	3						
EE -2425	Elective Course (3)	4	2						
EE -2426	Project 2	6	2						
No Of Courses		**280**	**161**	**18**	**83**	**96**	**83**		
Percentage				**6.4**	**29.6**	**34.3**	**29.6**		
Min		**250**	**160**	**6.0**	**22.0**	**30**	**20**		
Max		**280**	**180**	**10.**	**30.0**	**35**	**30**		

Program courses and subject area:

PreparatoryYear-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial Practical		Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1011	Mathematics (1)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1012	Physics (1)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1013	Mechanics (1)	2	2	0	**4**	2	3	35	0	90	**125**			3		1		
PDE+BAS 1014	Engineering drawing and projection	2	0	3	**5**	3	3	50	0	100	**150**					5		
BAS 1015	Chemistry	2	0	3	**5**	3	3	35	10	80	**125**			3		2		
BAS 1016	English	1	0	3	**4**	2	2	10	0	40	**50**	4						
Total		13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0

Preparatory Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1021	Mathematics (2)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1022	Physics(2)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1023	Mechanics(2)	2	2	0	**4**	2	2	30	0	70	**100**			3		1		
PDE 1024	Engineering drawing	1	0	3	**4**	2	3	30	0	70	**100**					4		
PDE 1025	Production engineering	1	0	3	**4**	2	2	30		70	**100**				2	2		
CAC 1026	Introduction to computer programming	1	0	3	**4**	2	2	20	10	70	**100**					4		
BAS1027	Introduction to Engineering Specialties	2	0	0	**2**	2	2	0	0	50	**50**	2	0	0	0	0	0	0
Total		13	4	12	29	17	17	200	20	530	750	2	0	12	2	13	0	

Electrical Power & Machines Engineering First Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 2111	Engineering Math. (3)	3	2		5	3	3	40		110	150			5				
EE 2112	Electric Circuits (1)	3	2		5	3	3	20	20	110	150			2		3		
EE 2113	Electric Materials	3	2		5	3	3	20	20	110	150			2		3		
STE 2114	Civil Engineering	2	2		4	2	3	30		70	100				4			
EE 2115	Programming in Electrical Engineering	2	2	2	6	3	3	20	20	110	150		4		2			
EE 2116	Engineering economy	2			2	2	2	10		40	50	2						
Total		15	10	2	27	16	17	140	60	550	750	2	4	9	6	6		

First Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 2121	Engineering Math. (4)	3	2		5	3	3	40		110	150			5				
EE 2122	Power Electronic Principles	3	2		5	3	3	20	20	110	150					3	2	
EE 2123	Electric Circuits (2)	3	2		5	3	3	20	20	110	150			2		3		
EE 2124	Electrical Measurements	2	2	1	5	3	3	20	20	110	150					3	2	
MPE 2125	Fluid Mechanic & Thermal Engineering	3	2		5	3	3	30		70	100				3	2		
EE 2126	Management & Decision Making	2			2	2	2	10		40	50	2						
Total		16	10	1	27	17	17	140	60	550	750	2		7	3	11	4	

Electrical Power & Machines Engineering Second Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS -2211	Engineering Math. (5)	3	2		5	3	3	40		110	**150**			5				
EE -2212	Digital Circuits	2	2		4	2	3	30		70	**100**				2	2		
MPE -2213	Thermal & Hydraulic Machines	3	2		5	3	3	30		70	100			2		3		
EE – 2214	Power Electronics (1)	3	2		5	3	3	40	15	70	**125**					5		
EE -2215	Computer Applications in Electrical Engineering	2		2	4	3	3	30	25	70	**125**		2			2		
EE -2216	Engineering Project Management	2	2		4	2	2	30		70	100	4						
EE – 2217	Summer Training(1)		2		2	0	0		50		**50**							2
Total		15	12	2	**29**	16	17	200	90	460	**750**	4	2	7	2	12		2

Second Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
EE – 2221	Power Generation Systems	3	2		5	3	3	20	20	110	**150**			2			3	
EE – 2222	DC Machines& Transformers	3	2		5	3	3	20	20	110	150					3	2	
EE – 2223	Electrical Lab. (1)			4	4	2	3	50	50		100							4
EE – 2224	High Voltage	3	2	1	6	4	3	20	20	110	**150**					3	3	
EE – 2225	Technical Writing	2			2	2	2	10		40	**50**	2						
EE – 2226	Electromagnetics	3	2		5	3	3	20	20	110	**150**					2	3	
Total		14	8	5	**27**	17	17	140	130	480	**750**	2		2		8	11	4

Electrical Power & Machines Engineering Third Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
EE -2311	Induction & Synchronous Machines	3	2		5	3	3	20	20	110	150					2	3	
ECE-2312	Theory of Communication System	2	2		4	2	3	30		70	100					4		
EE -2313	Power System Transmission	3	2		5	3	3	20	20	110	150					2	3	
CAC -2314	Automatic Control	2	2		4	2	3	30		70	100				2	2		
EE -2315	Contracts & Specifications	2	2		4	2	3	30	10	60	100	4						
EE -2316	Power Electronics (2)	3	2	1	6	4	3	20	20	110	150					4	2	
Total		15	12	1	28	16	18	150	70	530	750	4			2	14	8	

Third Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
EE -2321	Power System Analysis	3	2		5	3	3	30	10	110	150						5	
EE -2322	Special Machines	3	2		5	3	3	30	10	110	150						5	
EE -2323	Protective Devices and Switchgear	3	2		5	3	3	30	10	110	150						5	
EE -2324	Programmable Logic Controller	2	1	2	5	3	3	20	20	60	100				2	3		
EE -2325	Elective Course (1)	2	2		4	2	3	30		70	100						4	
EE -2326	Energy Issues & Environment	2	2		4	2	3	30		70	100	4						
Total		15	11	2	28	16	18	170	50	530	750	4			2	3	19	

Electrical Power & Machines Engineering Fourth Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
EE -2411	Power System Distribution	3	2		**5**	3	3	40	25	110	**175**						5	
EE -2412	Machines Design& Analysis	3	2		**5**	3	3	30	10	110	**150**						5	
EE -2413	Power System Protection	3	2		**5**	3	3	40	25	110	**175**						5	
EE -2414	Elective Course (2)	2	2		**4**	2	3	30		70	**100**					2	2	
EE -2415	Project (1)	2	2	2	**6**	3		25	50		**75**						2	4
EE - 2416	Summer Training (2)		2		2	0	0		50		**50**							2
Total		13	12	2	**27**	14	12	165	160	400	**725**					2	19	6

Fourth Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
EE -2421	Power System control	3	2		**5**	3	3	40	20	90	**150**						5	
EE -2422	Electrical Machine Control	3	2		**5**	3	3	40	20	90	**150**						5	
EE -2423	Electrical Lab. (2)			4	4	2	3	50	50		100						4	
EE -2424	Electric Energy Utilization	3	2		**5**	3	3	40	20	90	**150**						5	
EE -2425	Elective Course (3)	2	2		**4**	2	3	30		70	**100**					4		
EE -2426	Project 2		2	4	**6**	2		25	25	75	**125**						2	4
Total		11	10	8	**29**	15	15	225	135	415	**775**					4	21	4

المتطلبات	عدد المقررات	عدد Teaching Hours الدراسيه	الهدف
Human & Social Science	7	24	تهدف هذه المتطلبات الى امداد الطالب بالمفاهيم المهمة فى التفكير والبحث والاتصال.
Business Administration	2	10	ان يكون الطالب على درايه بطرق سريان العمل والتخطيط داخل المصانع والشركات.
Mathematics & Basic Science	16	52	تهدف هذه المقررات الى الإرتقاء بمهارة الطالب فى بناء الخلفية العلمية الصلبة للعلوم الأساسية.
Engineering Culture	8	13	الارتقاء بخلفية الطالب عن المجالات الهندسية المختلفة.
Basic Engineering Science	26	83	تهدف هذه المقررات الى بناء الخلفية الأساسية فى تخصص الهندسة الكهربية.
Applied Engineering & Design	24	82	تهدف هذه المقررات الى بناء الخلفية الدقيقة فى تخصص الهندسة الكهربية (هندسة القوى والآلات الكهربية) وكيفية تطبيقها Practical.ا
Project &Training	5	16	التأكد من أن الطالب قادراً على تطبيق المهارات والمعارف التي حصل عليها خلال دراسته الجامعية في ظل توفير النصح والإرشاد والتوجيهات من المشرف على المشروع .

Total teaching hours and subject's distribution over the subject areas according the Reference Framework and NARSE of the Electrical Power & Machines Engineering

Semester	Teaching Hours				Equivalent Credit Hours	Wr. Exam Dur.	Marking				Subject Area						
	Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
Preparatory year/ 1st semester	13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0
Preparatory year/ 2nd semester	13	4	12	29	17	17	200	20	530	750	2	0	12	2	13	0	
First year/1st semester	15	10	2	27	16	17	140	60	550	750	2	4	9	2	6		
First year/ 2nd semester	16	10	1	27	17	17	140	60	550	750	2		7	3	11	4	
Second year/1st semester	15	12	2	29	16	17	200	90	460	750	4	2	7	2	12		2
Second year/ 2nd semester	14	8	5	27	17	17	140	130	480	750	2		2		8	11	4
Third year/1st semester	15	12	1	28	16	18	150	70	530	750	4			2	14	8	
Third year/ 2nd semester	15	11	2	28	16	18	170	50	530	750	4			2	3	19	
Fourth year/1st semester	13	12	2	27	14	12	165	160	400	725					2	19	6
Fourth year/ 2nd semester	11	10	8	29	15	15	225	135	415	775					4	21	4
Total of Five Years	140	93	47	280	161	165	1750	795	4955	7500	24	6	52	17	83	82	16
% of Five Years											7.85	2.14	18.6	6	29.6	29.3	5.71
% NARS And Reference framework				250	160						8.00	2.00	18.00	4.00	25.00	25.00	4.00
	maximum			280	180						12.00	4.00	22.00	6.00	30.00	30.00	6.00

Engineering Math. (3)				Course Name		BAS 2111		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical	Teaching Hours
110			Written Exam	40	Term Work		Practical/Oral	Marking

Ordinary Differential Equations (ODE)

Homogeneous higher order ODE – Nonhomogeneous higher order ODE with constant coefficients (undetermined coefficients method and variation of parameters method for finding the particular solution) – Cauchy-Euler ODE (homogeneous and nonhomogeneous) – System of ODE– Laplace transform – Inverse Laplace transform –Applications of Laplace transform – Series solution of ODE.

Functions of Several Variables

Differentiation of integration – Vector calculus –Multiple integrals double and triple) and their applications –Line integral – Green's theorem – Surface integral – Divergence (Gauss) and Stokes' theorems –Mathematical modeling using partial differential equations.

Electric Circuits (1)				Course Name		EE 2112		Code
4	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking

Electric circuit elements-basic laws of electrical circuits-Ohm's law-Kirchhoff current law - Kirchhoff voltage law – methods of electric circuits analysis: Thevenin's theory - Norton theory-conversion of sources-maximum power transfer. Energy storage elements – basic concepts for AC circuits – analysis of AC circuits- analysis of three-phase AC circuits.

Electric Materials				Course Name		EE 2113		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking

Crystal construction of solids-power packs- electrical conductivity of metals- electrical conductivity of semiconductor-electrical properties of metals and semiconductors-insulators and their electrical properties for DC & AC current-the phenomenon of polarization of dielectrics.

Civil Engineering	Course Name	STE 2114	Code

2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		Practical/Oral	Marking
General principles of structure theory-Structural analysis of reactions-Loads- Momentums- shear stress-axial forces-statically determined structures-Types of buildings and applications: concrete arid steel-Types of walls and ceilings- Machine base design principles.								

Programming in Electrical Engineering				Course Name		EE 2115		Code
3	Equivalent Credit Hr	6	Contact Hours	2	Lecture	2	Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking
Introduction to MATLAB environment and engineering applications – MATLAB commands – arrays & vectors-calculations and data processing -MATLAB programming rules text files – functions – input and output – flow control — some known function in MATLAB — data analysis methods – illustrations and control – dynamic simulation – solving equations-statistical analysis.								

Engineering economy				Course Name		EE 2116		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
40			Written Exam	10	Term Work		Practical/Oral	Marking
Introduction to economics - Economic Problem - Possibilities Curve Production - Demand and supply - Supply and demand elasticity - Cost theories - Payback period - Internal rate of return - Net present value of the project - Breakout point - Linear programming and its applications - Introduction to industrial security and occupational safety								

Engineering Math. (4)				Course Name		BAS 2121		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	40	Term Work		Practical/Oral	Marking

Partial Differential Equations (PDE)

Special functions (Gamma, Beta, Bessel and Legendre) – Fourier series – Fourier integral – Fourier transform – Partial differential equations (PDE)– Separation of variables method (heat equation, wave equation and Laplace equation) – Traveling wave solutions to PDE.

Complex Analysis

Complex Numbers – Functions of complex variable – Complex derivative – Analytic functions – Harmonic functions and their applications – Elementary functions – Complex integration – Cauchy theorems and their applications – Taylor and Laurent series – Residue theorem and its applications – Conformal mapping.

Power Electronic Principles				Course Name		EE 2122		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking

الوصف:

Photonic devices - Operations Amplifier – Flip Flops – Mono stable and A stable Multi vibrators – Bi stable Multi vibrators- Flip Flops based counters - Use of counters as pulse circuits - Control methods of pulse circuits by frequency and pulse width - Decoding circuits - Microcontrollers - Microcontroller programming - Use of Microcontroller in triggering circuits - applications of Microcontroller in power electronics.

Introduction to Power Electronics - Power Electronics Switches and Their Applications - Diodes - Applications of Diodes - Transistor – MOSFT and Its Properties - Insulated Gate Bipolar Transistor – Thyristors – New semiconducting materials.

Electric Circuits (2)				Course Name		EE 2123		Code
4	Equivalent Credit Hr	6	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking

Introduction to electrical circuits in switching on/off mode and instantaneous behavior-first order circuit solution – second first order circuit solution – magnetically linked circuits – solving circuits in frequency mode – resonance in electric circuits-two port networks – the use of Fourier analysis for solving electric circuit

Electrical Measurements	Course Name	EE 2124	Code

2	Equivalent Credit Hr	5	Contact Hours	2	Lecture	1	Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking
Basics and concepts of electrical measurements – measurement devices for AC&DC current-power and power factor measurement in single phase and three phase system-measuring frequency – AC bridges – measuring resistance and inductive reluctance-measure the difference in the phase angle – function generator-transfer functions of analog to digital – digital measuring devices-electric watt-hour meters.								

Fluid Mechanic and Thermal Engineering				Course Name		MPE 2125		Code
3	Equivalent Credit Hr	5	Contact Hours	23	Lecture		Practical	Teaching Hours
70			Written Exam	30	Term Work		Practical/Oral	Marking
Properties of fluids-Fluid statics-Fluid kinematics-Fluid flow-Principles of motion Quantity and thrust - Fluid dynamics and its applications-Fluid measurements- Principles of hydrodynamics-First law of thermodynamics and its application to different systems- Second law of thermodynamics and its applications- Thermal power stations-Methods of heat transfer- Thermal insulators- Critical diameter of thermal insulation-Cooling surfaces.								

Projects management				Course Name		EE 2126		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
40			Written Exam	10	Term Work		Practical/Oral	Marking
Principles of Management - Modern Administrative Thought - Management Levels and Types - Management Functions - Organization - Leadership - Motivation - Financial and Moral Incentives - Control - Planning and Decision Making.								

الفصل الدراسي :الاول **القسم : كهرباء** **الفرقة : الثانيه**

Engineering Math. (5)				Course Name		BAS 2211		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	40	Term Work		Practical/Oral	Marking

Numerical Methods

Curve fitting – Interpolation – Numerical integration – Numerical solution of algebraic and transcendental equations – Iterative methods for solving system of linear algebraic equations – Numerical differentiation – Numerical solution of ordinary differential equations – Numerical solution of partial differential equations– Finite difference method.

Applied Probability and Statistics

Introduction to probability – Discrete random variables – Special discrete distributions – Continuous random variables – Special continuous distributions – Multiple random variables – Sampling distribution and estimation theory – Test of hypotheses – Correlation theory – Analysis of time series.

Digital Circuits				Course Name		EE -2212		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
70			Written Exam	30	Term Work		Practical/Oral	Marking
Types of logic circuits– equivalent circuit of logic circuits – reduction rules of logic circuits – logic circuits as integrated circuits – truth tables-aggregation networks – Carnot maps – sequential networks-logical equations – logical circuit applications in automated vending machine design.								

Thermal and Hydraulic Machines				Course Name		MPE -2213		Code
2	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
70			Written Exam	30	Term Work		Practical/Oral	Marking
Types of thermal power stations - Steam power stations - Steam generators - Steam turbines- Condensers and cooling towers - Gas turbines - Compressor and its types - Hydraulic power stations - Hydraulic turbines - Bolton wheels - Francis turbine-Caplan turbine- Types of pumps - Performance of pumps.								

Power Electronics (1)				Course Name		EE – 2214		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
70			Written Exam	40	Term Work	15	Practical/Oral	Marking
Single-phase uncontrolled rectifier circuits – Three-phase uncontrolled rectifier circuits – Single-phase controlled rectifier circuits – Three-phase controlled rectifier circuits – power switches protection –Thyristor firing circuits – Firing pulse amplifiers – Thyristor commutation circuits and techniques – DC choppers – Applications of DC choppers.								

Computer Applications in Electrical Engineering				Course Name		EE -2215		Code
3	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	40	Term Work	15	Practical/Oral	Marking
Applications on programming with Matlab: Solving equations and drawing curves-linear equations-polynomial equations– simulation using different programs - processing in and out files-applications of simulation and modeling methods in electrical power systems - design and handling of graphical user interfaces								

Engineering Project Management				Course Name		EE -2216		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		Practical/Oral	Marking
Basic management functions - Concept and importance of project management - Life cycle of engineering projects - Strategies and types of project planning - Feasibility study - Project resource management - Project implementation - Project evaluation - Practical models for small projects management - Engineering ethics and rules of practicing the engineering profession in Egypt.								

Summer Training (1)				Course Name		EE – 2217		Code
0	Equivalent Credit Hr	2	Contact Hours		Lecture	2	Practical	Teaching Hours
			Written Exam		Term Work	50	Practical/Oral	Marking
Students promoted to the 2nd year are to carry out professional training inside the faculty, or in specialized training centers								

الفرقة : الثانيه **القسم : كهرباء** **الفصل الدراسي :الثاني**

Power Generation Systems				Course Name		EE – 2221		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking
Electrical grids and their components - load factors – operation principles and basic components of: thermal power station, natural gas power stations, hydro and nuclear stations - the economics of electric power stations – total cost and operating cost – tariffs of electric consumption - selection of station type and size of station and units – operation principals of renewable energy systems such as								

wind and solar -

DC Machines and Transformers				Course Name		EE – 2222		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking
Introduction to machinery principles. Power Transformers: Construction and theory of operation, equivalent circuit, determining transformer's constants through practical experiments, electrical performance of the transformer, operation of transformers in parallel. DC. Machinery Fundamentals: Construction and theory of operation - power flow and losses. DC Generators: equivalent circuit, characteristics of DC generators, types of excitation, magnetization curve, armature reaction, parallel operation, types and applications of DC generators. DC motors: equivalent circuit, performance and characteristics, DC motor starting, speed and braking control, efficiency, types and applications of DC motors								

Electrical Lab. (1)				Course Name		EE – 2223		Code
2	Equivalent Credit Hr	4	Contact Hours		Lecture	4	Practical	Teaching Hours
			Written Exam	50	Term Work	50	Practical/Oral	Marking
Experimental tests of DC circuits and their theories- resonance experiments- experiments of AC circuits and theories – experiments of three phase system - experiments of power electronics fundamental and logic circuits - experiments in electrical wiring and lighting circuits								

High Voltage				Course Name		EE – 2224		Code
4	Equivalent Credit Hr	6	Contact Hours	3	Lecture	1	Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking
Introduction to high voltage technology - high voltage generation (DC, AC and impulse) - measurements of high voltages and currents - breakdown of insulators (solid, liquid and gaseous) - high voltage testing of electrical apparatus - applications of insulating materials.								

Technical Writing				Course Name		EE – 2225		Code
2	Equivalent	2	Contact	2	Lecture		Practical	Teaching

	Credit Hr		Hours					Hours
40			Written Exam	10	Term Work		Practical/Oral	Marking
Introduction to technical writing - elements of writing strategy - planning technical reports – writing a technical report: using illustrations, organizing and numbering, writing reference lists and appendices. Formal reports: categories of formal reports, structure of formal reports - Applications in report writing: laboratory report, field report, periodic reports, proposal, theses and dissertations - Ethical considerations and plagiarism - making presentation - writing a suCACssful CV.								

Electromagnetics				Course Name		EE – 2226		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking
Introduction to electromagnetics: Electrostatics: Coulomb's law - Gauss's law - electric potential - boundary conditions - electric dipole Image theorem - Laplace's equation – capacitance – energy and electrostatic force – stationary current field. Magneto-statics: Gauss law for Magnetics - Ampere's law- Biot-Savart's law - vector potential- magnetic boundary conditions - faraday law for induction Inductance- Electromagnetics: Time varying fields- Maxwell's equations - plane wave propagation in space and physical materials - transmission, reflection and relaxation of waves in different mate transmission, reflection and refraction of waves in different materials.								

Induction and Synchronous Machines				Course Name		EE -2311		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking

Basic Concepts of Rotating Electric Machine: Physical concepts of torque production- electromagnetic interaction torque- reluctance torque- constructional features of rotating electrical machine.
Polyphase Synchronous Generators: construction, the speed of rotation- the internal generated voltage- equivalent circuit, measuring the performance parameters of the machine - equations of power and torque in synchronization generator.
Synchronous Motors: Steady state motor operation- effect of excitation on motor starting,
Three phase Induction Motors: Construction- equivalent circuits- power and torque- torque/speed characteristic- motor starting- speed control of the motor
Single-phase Induction Motor: equivalent circuit- motor starting- speed control of the motor

Theory of Communication Systems				Course Name		ECE -2312		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		Practical/Oral	Marking

Introduction to communication systems; signals and systems; power spectral density;
Amplitude modulation (AM) suppressed carrier; amplitude modulation large carrier, single side band amplitude modulation; demodulation techniques for AM signals; narrow-band and wide-band.
Frequency modulation (FM); demodulation of FM signals; phase modulation (PM); AM and FM receivers; Frequency division multiplexing; pulse modulation; noise in analog modulation systems

Power System Transmission				Course Name		EE -2313		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking

Introduction to electric power transmission systems - Transmission line parameters (resistance – induction – capacity)-transmission line models (short, medium and long lines)– performance of transmission lines – high voltage DC systems (HVDC). Components of overhead lines: conductor materials - types and performances of line supports - types and performances of insulators -potential distribution over insulator string Mechanical design of transmission lines- underground cables: construction of cables, insulating materials, classification of cables - measurement of cables capacitance

Automatic Control				Course Name		CAC -2314		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
70			Written Exam	30	Term Work		Practical/Oral	Marking
Open and closed systems - Fund diagram and transfer function - Signal flow diagram - Modeling with case variables - Frequency response analysis - Feeding back - Stability and study - Boar path analysis - Nicost analysis - Methods of designing rear control systems – applications of automatic control in industrial processes								

Contracts and Specifications				Course Name		EE -2315		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
60			Written Exam	30	Term Work	10	Practical/Oral	Marking
Legal aspects of contracting - Conditions of contracting contract - Types of engineering contracts - General responsibilities in engineering contracts - Methods of projects attribution - Formulation of technical specifications - Specifications and specifications - Basic aspects of cost estimation - Inspection and testing of electrical installations								

Power Electronics (2)				Course Name		EE – 2316		Code
4	Equivalent Credit Hr	6	Contact Hours	3	Lecture	1	Practical	Teaching Hours
110			Written Exam	20	Term Work	20	Practical/Oral	Marking
Inverters – Multilevel inverters – Applications of inverters – AC voltage controllers – Cycloconverters – Applications of power electronic convertes (Switch-mode power supply, SMPS – Unintruptable Power Supplies, UPS – High voltage DC transimission, HVDC – Static Switches – Static circit breaker – Solid state relays – Resonant converters - Applications of power electronics in DC machines – power electronics applications in AC machines – power electronics applications in renewable energy systems).								

Power System Analysis				Course Name		EE -2321		Code
3	Equivalent Credit Hr	5	Contact Hours	4	Lecture		Practical	Teaching Hours
110			Written Exam	30	Term Work	10	Practical/Oral	Marking
Electric power system modeling – per unit quantities – symmetrical faults- symmetrical components- unsymmetrical faults- power flow analysis- solving power flow equations - methods to control the power flow- power system stability.								

Special Machines				Course Name		EE -2322		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	30	Term Work	10	Practical/Oral	Marking
Study of the installation and theory of work and applications of some of the following engines: linear motors - magnetic reluctance motors - servo motors - disk motors - stepping motors - general engine - residual magnetism engine - orthogonal field machines - transition impedance motors - brushless motors								

Protective Devices and Switchgears				Course Name		EE -2323		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	30	Term Work	10	Practical/Oral	Marking
Introduction to protective relaying Circuit breakers (oil, air, SF6, Vacuum): construction, theory of operation, and applications. Theories, constructions, and applications of the following relays: Electro-mechanical relays - Solid state relays - Numeric relays. Relays classification: Instantaneous, Definite minimum time and Inverse definite minimum time types. Application of relays: Over current/under voltage relays, Direction relays, Differential relays, and Distance relay.								

Programmable Logic Controller				Course Name		EE -2324		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	2	Practical	Teaching Hours
60			Written Exam	20	Term Work	20	Practical/Oral	Marking

Hardware and software of Microcontroller - Hardware and software of Programmable Automation Controller (PAC) - Hardware and software of Programmable Logic Controller (PLC) - PLC Ladder Diagrams –
Communication between Microcontroller, PLC, PAC and Computer -Simulation of Control Hardware and Software -Applications of PLC in electrical engineering – Applications of automation in industrial processes

Elective Course (1)				Course Name		EE -2325		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		Practical/Oral	Marking

Smart Grids

General considerations for a Smart Grid - Characteristics of Smart Grid - Smart Grid technologies - Smart Grid Elements : electric grid, control elements, communications infrastructure, applications layer - Smart Grid Control Elements: elements required to monitor and control the grid, such as smart meters, sensors, and phasor measurement units - Smart Grid Operations: control and management functions, operations architectures, and information models.

Water Desalinations

Introduction to water resources and Desalination processes- Thermal Technologies: Single and Multi-Stage Flash Technology (construction and performance parameters) - Membrane Technologies: Osmosis and Reverse Osmosis (construction and performance parameters) - Electro dialysis – Solar Desalination Systems - Future desalination Technologies- Desalination problems (scaling, fouling, corrosion), and their mitigation

Electric Vehicles

Introduction to electric vehicles (EV) and hybrid vehicles (HEV) - hybrid vehicle architectures - propulsion system analysis - Fuel cell vehicles - electric motor drive systems for EV/HEVs.
Power Electronic converters for electric and hybrid vehicles - Energy Storage - Energy management and control strategies -

Design of Low and Medium Voltage Networks

Medium voltage networks: an overview – low and medium voltage distribution boards - conductors and cables - indoor and outdoor lighting systems - earthing and safety - Calculation of electrical load in Domestic and industrial buildings – Design of electrical wiring systems in domestic and industrial buildings - Electrical Installation Drawings - Design of networks of special systems (alarm systems - audio - information - telephones - call nurses - surveillance and cameras

Energy issues and Environment				Course Name		EE -2326		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		Practical/Oral	Marking

Importance of Energy, Overview of energy sources, Basic energy problems -Conventional and unconventional reserves and resources - Electric industry overview - Environmental impacts of Electric industry - The evidence for and emerging impacts of climate change - Renewables energy resources: Biofuels - Wind Energy - Solar Energy - Other Renewables: Geothermal and Ocean Energy- Hydro and Nuclear Energy -Nuclear Waste -Domestic and International Energy Policies

الفرقة : الرابعه القسم : كهرباء الفصل الدراسي :الاول

Power System Distribution				Course Name		EE -2411		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	40	Term Work	25	Practical/Oral	Marking
An Overview of Distribution Systems - Sub-transmission lines and Distribution Substations - Primary feeders and Secondary mains – Voltage drop and power loss calculations - Protection of distribution networks (fuses - auto reclosers - over current and under voltage protection devices) - load shedding – voltage regulation - power factor improvement - Performance Indicators for Distribution Companies								

Machines Design and Analysis				Course Name		EE -2412		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	30	Term Work	10	Practical/Oral	Marking
Essentials of rotating electrical machines, the basic two-pole machine, Concepts of primitive machine and its applications in electrical machines, Analysis of electrical machines - Machine properties (start-up, transient and stable operation) - How to apply generalized machine theory, electrical torque, restrictions of the generalized theory of machines. Matrices of DC and AC machines: Impedance matrix, impedance matrix of the synchronous machine, inductance and torque matrices, the flux linkage and the flux density matrices, rotation matrix. Analysis and design of electrical transformers.								

Power System Protection				Course Name		EE -2413		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	40	Term Work	25	Practical/Oral	Marking
Introduction to protective Relaying - Current & potential transformers - Over Current protection, protection of generators and motors, protection of transformers, Transmission Lines protection - bus bar protection - Protection aspects of power system transient phenomena.								

Elective Course (2)				Course Name		EE -2414		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		Practical/Oral	Marking

Power Electronic Applications in Transmission Systems

Introduction to flexible alternating current transmission system (FACTS): configurations, concepts, general system considerations, applications -Static shunt compensators -Static series compensators - Combined compensators -Special purpose FACTS controllers - Modeling of FACTS - Applications of FACTs in electrical power system: steady state, optimization, transients, wide area control, voltage stability.

Energy Storage Technologies

The need for energy storage (grid connected and standalone applications) - Energy storage technologies (electrochemical, mechanical, thermal, Superconducting Magnetic Energy Storage) - Appreciation of balancing the Electric Power system -Battery systems – characteristics of different batteries, behavior at different rates, charging profiles -Supercapacitor modules and packs - Heat engines and thermal storage systems - Superconducting Magnetic Energy Storage - Mechanical systems: pumped hydro storage and practical flywheels

Computer Aided DC machines Design

Review of design, analysis and optimization; Selection of strategies and constraints; Defining material properties; Mathematical model of DC machines - Design of DC machines and their analysis; Development of computer program; Use of finite element method FEM package; Simulation of performance of electrical machine.

Transient Phenomena in Power Systems

Introduction to transients in power systems -Simple switching: DC – Single-phase AC
Switching of three-phase systems - Abnormal switching - Damping methods of transients
Transmission line modeling and traveling waves – Lightning - Computer modeling of transients - Insulation coordination

Project 1				Course Name		EE -2415		Code
2	Equivalent Credit Hr	6	Contact Hours	2	Lecture	2	Practical	Teaching Hours
			Written Exam	25	Term Work	50	Practical/Oral	Marking

The student completes the theoretical and practical analysis for the project started in the first term then realized before being completed after the exams of the second term.

Summer Training (2)				Course Name		EE -2416		Code
0	Equivalent Credit Hr	2	Contact Hours		Lecture	2	Practical	Teaching Hours
			Written Exam		Term Work	50	Practical/Oral	Marking

Students promoted to the 3rd and 4th year are to carry out field training in specialized training sectors. Students trained outside the country should be approved by relevant Department Councils, The student will not be able to obtain his/her B.Sc. Graduation Certificate until Professional and Field Training are both accomplished suCACssfully. The executive regulation of students' training is issued by the University Council based on advices from Scientific Departments, and the Council of Education and Students' Affairs.

الفرقة : الرابعه **القسم : كهرباء** **الفصل الدراسي :الثاني**

Power System Control				Course Name		EE -2421		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
90			Written Exam	40	Term Work	20	Practical/Oral	Marking
Load centers and operating economics – power system classification and methods of operation – power and frequency control – generators and load modeling – voltage and frequency controllers - Basics of using automatic control of generators in isolated and interconnected grids – control of electrical networks voltage by synchronous condensers and capacitors — using FACTs in organizing network's voltage – monitoring and control of electrical power systems – controlling loads by voltage and frequency								

Electrical Machine Control				Course Name		EE -2422		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
90			Written Exam	40	Term Work	20	Practical/Oral	Marking
Speed control of DC motors – Speed control of Induction motors – Speed control of synchronous motors - Speed control of some special machines.								

Electrical Lab. (2)				Course Name		EE -2423		Code
2	Equivalent Credit Hr	4	Contact Hours		Lecture	4	Practical	Teaching Hours
			Written Exam	50	Term Work	50	Practical/Oral	Marking
Open circuit test in machines with rotating field - Synchronous machine test at short circuit, no load and load. Magnetization curve measurement - Synchronization of synchronous machine - Induction machine test at short circuit, no load and load for single phase and 3 phase machines - Measurement of impulse high voltage, Measurement of DC and AC High Voltage, Breakdown Tests of Transformer oil. Experiments in protection systems: Determine characteristics of electrical power system protection devices - overcurrent protection - Grounding								

Electric Energy Utilization				Course Name		EE -2424		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
90			Written Exam	40	Term Work	20	شفوي /Practical	Marking

Illumination and electrical loads: Electrical wiring devices and equipment - lighting systems equipment – cables, conductors, and pipes - electrical loads and sub-circuit calculations - design of electrical panels and emergency loads- Review of laws of illumination, luminous efficacy, lighting sources and their use in domestic, street and industrial lighting,
Electro-planting: Methods, estimation of power and current for depositing metals, Electro-deposition and electroforming, Power supply for electrolysis processes.
Electric Heating and Welding: Methods, types of electric furnaces: Resistance, Arc, Dielectric and Microwave, Types of welding: Arc and resistance, Air conditioning and heating of buildings.
Electric Traction: Traction Principles - Types of systems, services and supply systems, tractive-effort and train resistance, general equation of train motion, speed time curve; energy consumption, elevators, electric cars and trolley buses

Elective Course (3)				Course Name		EE -2425		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي /Practical	Marking

Artificial intelligence applications in electric power systems
Experts systems, Fuzzy logic systems, Artificial Neural Networks, Genetic algorithms, Swarm algorithms,
Optimization techniques, Applications of AI in electrical systems: load flow, economic operation, power system stability, control of electric machines.
Energy Conservation and Management
Introduction- elements of energy conservation and management - techno-economic evaluation of energy conservation options - energy conservation approaches in industries - energy conservation in power generation - energy conservation transmission and distribution -consumers' energy conservation - energy costs and bill analysis - benefits of energy conservation for consumers and suppliers.
Electric Traction
Electric traction systems types - Study and analysis of movement of electric trains - Torque and speed characteristics of AC and DC motors - Speed control of motors- Transients and dynamic behavior of motors- Motion starters - Electric braking methods - Industrial applications of traction.
Electrical Power Systems Planning
Restructured power system - Load forecasting - Reliability and availability - Generation planning - Bulk power transmission planning- Transient and dynamic stability - Production costing analysis

Project 2	Course Name	EE -2426	Code

2	Equivalent Credit Hr	6	Contact Hours		Lecture	4	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي /Practical	Marking
The student completes the practical analysis for the project after the exams of the second term.								

3 Computer Engineering and Automatic Control Systems

Basic Information

Program Name	Computer Engineering and Automatic Control Systems
Department	Computer and Control Systems Engineering
Program Type	Single
No of Semesters	10
No of Contact Hour	280
Lecture	
Tutorial and Practical	
Equivalent Credit Hours	180

Graduate attributes:

The graduates of the engineering programs should be able to:

- Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
- Design a system, component and process to meet the required needs within realistic constraints.
- Design and conduct experiments as well as analyze and interpret data.
- Identify, formulate and solve fundamental engineering problems.
- Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
- Work effectively within multi-disciplinary teams.
- Communicate effectively.
- Consider the impacts of engineering solutions on society and environment.
- Demonstrate knowledge of contemporary engineering issues.
- Display professional and ethical responsibilities; and contextual understanding.
- Engage in self- and life- long learning.
- Analyze a problem, and identify the computing requirements appropriate to its solution.
- Design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.
- Use general computer, systems and software tools professionally.

- Analyze operations, realize requirements and constraints of projects and consequently, achieve an appropriate cost effective design.
- Perform troubleshooting in computer and systems.
- Exhibit competency in English as a second language as suitable for the discipline
- Demonstrate inductive reasoning abilities, figuring general rules and conclusions about seemingly unrelated events
- Demonstrate knowledge of local, national and global contemporary issues in computing and engineering.
- Use modern engineering techniques, skills and tools necessary for computer systems engineering practice.

Courses distribution based requirement according theReference Framework and NARSE of the Computer Engineering and Automatic Control Systems Program

Code	Course Name	Contact Hrs.	Equivalent Credit Hr	Requirements				Semester	Academic Year
				University	Faculty	Department			
						Major	Minor		
BAS 1011	Mathematics (1)	5	3					First	Preparatory Year
BAS 1012	Physics (1)	6	4						
BAS 1013	Mechanics (1)	4	2						
PDE+BAS 1014	Engineering drawing and projection	5	3						
BAS 1015	Chemistry	5	3						
BAS 1016	English	4	2						
BAS 1021	Mathematics (2)	5	3					Second	
BAS 1022	Physics(2)	6	4						
BAS 1023	Mechanics(2)	4	2						
PDE 1024	Engineering drawing	4	3						
PDE 1025	Production engineering	4	2						
CAC 1026	Introduction to computer programming	4	2						
BAS1027	Introduction to Engineering Specialties	2	2						
BAS 3111	Mathematics 3	5	3					First	First Year
CAC 3112	Research and analysis skills	2	2						
EE 3113	Electric circuits	5	3						
CAC 3114	Digital & Logic Circuits 1	5	3						
CAC 3115	Programming language	5	3						
CAC 3116	Classical control systems	5	3						
BAS 3121	Mathematics 4	5	3					Second	
CAC 3122	Computer Ethics and Crimes	2	2						
CAC 3123	Digital & Logic Circuits 2	4	3						
EE 3124	Electric machines	5	3						
CAC 3125	Object oriented programming	4	3						
ECE 3126	Electronic circuits	4	2						
CAC 3127	Electronic experiments in control systems	4	2						
BAS 3211	Mathematics 5	4	2					First	Second Year
CAC 3212	Project Managment	2	2						
CAC 3213	Operating systems	4	3						
CAC 3214	Intro. to Computer Networks	4	2						
CAC 3215	Computer architecture	4	2						
CAC 3216	Modern Control Systems	4	2						

CAC 3217	Measurment and Sensor	5	3						
CAC 3221	Statistical & Prob. App.	5	3					Second	
MPE 3222	Mechanical engineering	4	2						
CAC 3223	Data structure & algorithms	5	3						
CAC 3224	Industrial Control Systems 1	5	3						
CAC 3225	Digital Control Systems	3	2						
CAC 3226	Microprocessors design & architecture	4	3						
CAC– 3227	Technical Writing								
	Summer Training								
CAC– 3227	Technical Writing	2	2						
CAC 3311	Network Design & Prog.	4	2					First	Third Year
CAC 3312	Mobile and Pervasive Computing	5	4						
CAC 3313	DataBase Systems	4	3						
CAC 3314	Artificial intelligence	3	2						
CAC 3315	Industrial Control Systems 2	4	3						
CAC 3316	Elective 1	4	3						
CAC 3321	Computer Vision	5	3					Second	
CAC 3322	Distributed Systems	3	2						
CAC 3323	Machine learning	4	3						
CAC 3324	Elective 2	4	3						
CAC 3325	Nonlinear Control Systems	3	2						
CAC 3326	Microcontrollers	5	3						
CAC 3327	Operation Research	4	2						
CAC 3411	Robotics Modeling & Control	5	4					First	Fourth Year
CAC 3412	Open Source Applications	5	3						
CAC 3413	Software Engineering	3	3						
CAC 3414	Power electronics	5	4						
CAC 3415	Elective 3	5	3						
CAC 3416	Project 1	3	1						
CAC 3421	Compiler design	4	3					Second	
CAC 3422	Real Time Operating Systems	6	4						
CAC 3423	Adaptive Control	4	3						
CAC 3424	Advanced Concepts of Database systems	5	3						
CAC 3425	Elective 4	4	3						
CAC 3426	Project2	5	2						
CAC 3417	Summer Training(2)	2	0						
No Of hours		280	177	18	81	97	84		
Percentage				6.43	28.9	34.6	30		
Min		**250**	**160**	**6**	**22**	**30**	**20**		
Max		**280**	**180**	**10**	**30**	**35**	**30**		

Preparatory Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial Practical		Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1011	Mathematics (1)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1012	Physics (1)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1013	Mechanics (1)	2	2	0	**4**	2	3	35	0	90	**125**			3		1		
PDE+BAS 1014	Engineering drawing and projection	2	0	3	**5**	3	3	50	0	100	**150**					5		
BAS 1015	Chemistry	2	0	3	**5**	3	3	35	10	80	**125**			3		2		
BAS 1016	English	1	0	3	**4**	2	2	10	0	40	**50**	4						
Total		13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0

Preparatory Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1021	Mathematics (2)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1022	Physics(2)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1023	Mechanics(2)	2	2	0	**4**	2	2	30	0	70	**100**			3		1		
PDE 1024	Engineering drawing	1	0	3	**4**	2	3	30	0	70	**100**					4		
PDE 1025	Production engineering	1	0	3	**4**	2	2	30		70	**100**				2	2		
CAC 1026	Introduction to computer programming	1	0	3	**4**	2	2	20	10	70	**100**					4		
BAS1027	Engineering Entrance	2	0	0	**2**	2	2	0	0	50	**50**	2	0	0	0	0	0	0
Total		13	4	12	29	17	17	200	20	530	750	2	0	12	2	13	0	


Computer Engineering and Automatic Control Systems First Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 3111	Mathematics 3	3	2		5	3	3	40		110	150			5				
CAC 3112	Research and analysis skills	2			2	2	2	25		50	75	2						
EE 3113	Electric circuits	3	2		5	3	3	20	15	90	125				2	3		
CAC 3114	Digital & Logic Circuits 1	2		3	5	3	3	20	15	90	125				2	3		
CAC 3115	Programming language	2		3	5	3	3	20	15	90	125		2			3		
CAC 3116	Classical control systems	2		3	5	3	3	20	20	110	150					2	3	
Total		14	4	9	27	18	17	145	65	540	750	2	2	5	4	11	3	

First Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 3121	Mathematics 4	3	2		5	3	3	40		110	150			5				
CAC 3122	Computer Ethics and Crimes	2			2	2	2	15	10	50	75	2						
CAC 3123	Digital & Logic Circuits 2	2		2	4	3	3	15	15	70	100					2	2	
EE 3124	Electric machines	3	2		5	3	3	20	15	90	125				3	2		
CAC 3125	Object oriented programming	2		2	4	3	3	15	15	70	100		2			2		
ECE 3126	Electronic circuits	2	2		4	2	3	15	15	70	100				2	2		
CAC 3127	Electronic experiments in control systems	0		4	4	2		50	50		100					2		2
Total		14	6	8	28	18	17	170	120	460	750	2	2	5	5	10	2	2

Computer Engineering and Automatic Control Systems Second Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 3211	Mathematics 5	2	2		4	3	3	30		70	100			5				
CAC 3212	Project Managment	2			2	2	2	25		50	75	2						
CAC 3213	Operating systems	2		2	4	3	3	20	15	90	125					2	2	
CAC 3214	Intro. to Computer Networks	2		3	5	3	3	20	15	90	125					3	2	
CAC 3215	**Computer Arcitecture**	**2**		**3**	**4**	**3**	**3**	**15**	**15**	**70**	**100**					**2**	**3**	
CAC 3216	Modern Control Systems	2	2	1	4	2	3	10	15	90	125			2		2		
CAC 3217	Measurment and Sensor	2		3	2	2		10	15	75	100							2
Total		12	6	8	27	18	17	130	125	495	750	2	0	7	0	9	7	4

Second Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
CAC 3221	Statistical & Prob. App.	3	2		5	3	3	20	15	90	125			5				
MPE 3222	Mechanical engineering	2	3		5	2	3	20	10	70	100				2	2		
CAC 3223	Data structure & algorithms	2		3	5	3	3	25	15	110	150					2	3	
CAC 3224	Industrial Control Systems 1	2		3	5	3	3	25	15	90	125					2	3	
CAC 3225	Digital Control Systems	2	2		4	2	3	20	10	90	125					2	1	
CAC 3226	Microprocessors design & architecture	3	1		4	3	3	20	15	90	125					2	2	
CAC 3227	Summer Training(1)		2		2	0	0		50		50							2
Total		16	6	6	28	18	20	130	80	540	750	2		5	2	10	9	

Computer Engineering and Automatic Control Systems Third Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
CAC 3311	Network Design & Prog.	2	2		4	2	3	15	15	70	100						4	
CAC 3312	Mobile and Pervasive Computing	3		2	5	4	3	20	15	90	125						4	1
CAC 3313	DataBase Systems	3	1		4	3	3	15	15	70	100		2	2				
CAC 3314	Artificial intelligence	2	1		3	2	3	20	15	90	125					2	1	
CAC 3315	Industrial Control Systems 2	2		2	4	3	3	15	15	70	100					1	3	
CAC 3316	Elective 1	2		2	4	3	3	15	15	70	100					2	2	
CAC 3317	Engineering Project Management	2	2		4	2	2	30		70	100	4						
Total		16	6	6	28	19	20	130	90	530	750	4	2	2		5	14	1

Third Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
CAC 3321	Computer Vision	2		3	5	3	3	20	15	90	125		2				3	
CAC 3322	Distributed Systems	2	1		3	2	3	15	15	70	100						3	
CAC 3323	Machine learning	2		2	4	3	3	15	15	70	100					2	2	
CAC 3324	Elective 2	2		2	4	3	3	20	15	90	125					2	2	
CAC 3325	Nonlinear Control Systems	2	1		3	2	3	15	15	70	100			3				
CAC 3326	Microcontrollers	2		3	5	3	3	15	15	70	100					1	4	
CAC 3327	Operation Research	**2**	**2**	0	**4**	2	2	30		70	**100**	**4**						
Total		14	4	10	28	18	20	130	90	530	750	4	2	3		5	14	

Computer Engineering and Automatic Control Systems Fourth Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
CAC 3411	Robotics Modeling & Control	3		2	5	4	3	20	15	90	125						5	
CAC 3412	Open Source Applications	2		3	5	3	3	20	15	90	125				1		4	
CAC 3413	Software Engineering	2		1	3	3	3	20	10	70	100					1	2	
CAC 3414	Power electronics	3		2	5	4	3	20	15	90	125				2	3		
CAC 3415	Elective 3	2		3	5	3	3	20	15	90	125						5	
CAC 3416	Project 1			3	3	1		50	50		100							3
CAC 3217	Summer Training(2)		2		2	0	0		50		**50**							2
Total		12	2	14	28	18	15	150	170	430	750				3	4	16	5

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
CAC 3421	Compiler design	3	1		4	3	3	15	10	100	125						4	
CAC 3422	Real Time Operating Systems	3		3	6	4	3	20	20	110	150					2	4	
CAC 3423	Adaptive Control	3	1		4	3	3	15	15	70	100						4	
CAC 3424	Advanced Concepts of Database systems	3	2		5	3	3	20	10	70	100					1	4	
CAC 3425	Elective 4	2		2	4	3	3	20	10	70	100					2	2	
CAC 3426	Project 2			5	5	2		75	100		175							5
	Total	14	4	10	28	18	15	165	165	420	750	0	0	0		5	18	5

Total teaching hours and subject's distribution over the subject areas according the Reference Framework and NARSE

Semester		Teaching Hours				Equivalent Credit Hours	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
Preparatory year/ 1st semester		13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0
Preparatory year/ 2ndsemester		13	4	12	29	17	17	200	20	530	750	2	0	12	2	13	0	
First year/1st semester		14	4	9	27	18	17	145	65	540	750	2	2	5	4	11	3	
First year/ 2nd semester		14	6	8	28	18	17	170	120	460	750	2	2	5	5	10	2	2
Second year/1st semester		13	6	8	27	16	17	135	110	505	750	2	0	7	0	9	7	2
Second year/ 2nd semester		16	6	6	28	18	20	130	80	540	750	2		5	2	10	9	
Third year/1st semester		16	6	6	28	19	20	130	90	530	750	4	2	2		5	14	1
Third year/ 2nd semester		14	4	10	28	18	20	130	90	530	750	4	2	3		5	14	
Fourth year/1st semester		12	2	14	28	18	15	150	130	470	750				3	4	16	5
Fourth year/ 2nd semester		14	4	10	28	18	15	165	165	420	750	0	0	0		5	18	5
Total of Five Years		143	85	47	280	177	175	1575	890	5035	**7500**	22	8	54	16	82	83	15
% of Five Years												**7.85**	**2.86**	**19.28**	**5.71**	**29.28**	**29.64**	**5.35**
% NARS And Reference framework	**minimum**				250	160						8.00	2.00	18.00	4.00	20.00	25.00	4.00
	maximum				280	180						12.00	4.00	22.00	6.00	30.00	30.00	6.00

المتطلبات	عدد المقررات	عدد Teaching Hours الدراسيه	الهدف
Human & Social Science	8	22	تهدف هذه المتطلبات الى امداد الطالب بالمفاهيم المهمة فى التفكير والبحث والاتصال.
Business Administration	4	8	ان يكون الطالب على درايه بطرق سريان العمل والتخطيط داخل المصانع والشركات.
Mathematics & Basic Science	14	54	تهدف هذه المقررات الى الإرتقاء بمهارة الطالب فى بناء الخلفية العلمية الصلبة للعلوم الأساسية.
Engineering Culture	8	16	الارتقاء بخلفية الطالب عن المجالات الهندسية المختلفة.
Basic Engineering Science	38	82	تهدف هذه المقررات الى بناء الخلفية الأساسية فى تخصص الهندسة الكهربية.
Applied Engineering & Design	28	85	تهدف هذه المقررات الى بناء الخلفية الدقيقة فى تخصص الهندسة الكهربية (هندسة القوى والآلات الكهربية) وكيفية تطبيقها ا.
Project &Training	6	15	التاكد من ان الطالب قادرا على تطبيق المهارات والمعارف التي حصل عليها خلال دراسته الجامعية في ظل توفير النصح والإرشاد والتوجيهات من المشرف على المشروع .

Computer Engineering and Automatic Control Systems First Year-First Semester:

Code	BAS 3111		Course Name		Mathematics 3			
Teaching Hours	Practical	0	Lectures	3	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	0	Year Work	40	Written Exam	110	Total	150
Method of solution of first order ODEs & Rules of partial differentiations -second order ODEs & application of partial differentiations - ODE with variable coefficients & Double integral and its applications - Basics of Laplace transform & Triple integrals and its applications - Inverse Laplace transform & Line and surface integrals - Application of Laplace transform to solve ODEs, Theorems of vector fields integrals.								

Code	CAC 3112		Course Name		Research and analysis skills			
Teaching Hours	Practical		Lectures	2	Total Hours	2	Equivalent Credit Hour	2
Marking	Practical Exam		Year Work	25	Written Exam	50	Total	75
The concept of systems and information - systems strategy and information - the general framework of feasibility studies Practical experiments: a feasibility study for projects graduated from the department - Marketing study of the project - Conducting a marketing study for projects in the department and showing the extent of marketing feasibility - Technical and economic study of commercial profitability - Preparation of the specifications and specifications of the project - The work of a preliminary model of the specifications required in the project in terms of technical and marketing - Tenders and analysis of capital structure.								

Code	EE 3113		Course Name		Electric circuits			
Teaching Hours	Practical		Lectures	4	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125
Network Theorems (Superposition, Thevenin, Norton, Practical Sources, Maximum Power Transfer) – AC Circuits Analysis Methods - Energy Storage Elements - RLC circuits - unit step and step response - sinusoidal analysis - Phasor transform - Impedance and Admittance, steady state analysis - power analysis.								

Code	CAC 3114		Course Name		Digital & Logic Circuits 1			
Teaching Hours	Practical	3	Lectures	2	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125
Numeric Systems - Converting between binary, decimal, octal and hexadecimal numbers - Boolean algebra - Logic gates –simplification of logic functions – k -map - Using the kit and test the output on simple circuits. - Boolean function reduction - Combinational circuits – Experimental: Implement of digital clock using counters– use of HDL in design.								

Code	CAC 3115		Course Name		Programming Language			
Teaching Hours	Practical	3	Lectures	2	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125
Introduction to Structure Programming - Data Types - Entering some data of different types on visual studio - File Handling - Functions and Pointers - Implement simple calculator using functions - Data Structure & Procedure - Memory Handling - Reading and writing from memory- Implementation via Recent Programming Language.								

Code	CAC 3116		Course Name		Classical Control System			
Teaching Hours	Practical	3	Lectures	2	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	20	Year Work	20	Written Exam	110	Total	150
Introduction to control systems - Open and closed loop control systems - Transfer function - Block diagram - Signal flow graph - Modeling of systems – Time response analysis - Routh stability analysis – Root locus analysis - Design simple closed loop and open loop system - Draw simple block diagram for a system on MATLAB – Time response on MATLAB – Root locus using MATLAB.								

Computer Engineering and Automatic Control Systems First Year-Second Semester:

Code	BAS 3121		Course Name		Mathematics 4			
Teaching Hours	Practical		Lectures	3	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam		Year Work	40	Written Exam	110	Total	150
Gamma, Beta. Bessel and Legendre functions. Fourier series and Fourier Integral Boundary value problem (heat, wave and Laplace equations). complex numbers - Functions of a complex variable - Elementary functions - Conformal mapping - Complex integration - Power series - Residue theorm.								
Code	CAC 3122		Course Name		Computer Ethics and Crimes			
Teaching Hours	Practical		Lectures	2	Total Hours	2	Equivalent Credit Hour	2
Marking	Practical Exam	10	Year Work	15	Written Exam	50	Total	75
Rights and privileges Owner rights – Crime in computer systems Experimental: learning more about spam and fraud - Computer viruses – Security in computer systems- Experimental: downloading and installing anti viruses on the pc - Studying some computer's crime-Experimental: learning about Crimes that primarily target computer networks or devices such as: computer viruses, Denial-of-service attacks, malware.								
Code	CAC 3123		Course Name		Digital & Logic Circuits 2			
Teaching Hours	Practical	2	Lectures	2	Total Hours	4	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	15	Written Exam	70	Total	100

Introduction to Registers and study different types of sequential circuits – Counter design - design a counter with a specific sequences - Different Memory Implementations – Design a complete digital design - design a digital system that multiplies tow binary numbers by repeated addition method -Processor Logic gates - be familiar with register, shift register, counter, adder, comparator, and control logic – Controller logic design – Asynchronous sequential components design the sequential circuit for a specific state diagram- Implementation via a recent hardware description language.

Code	EE 3124		**Course Name**		Electric Machine			
Teaching Hours	**Practical**		**Lectures**	3	**Total Hours**	5	**Equivalent Credit Hour**	3
Marking	**Practical Exam**	15	**Year Work**	20	**Written Exam**	90	**Total**	125
DC motors - Induction motors - synchronous motors - synchronous generators - asynchronous motors - transformers - special purpose motors - losses in motors and transformers.								

Code	CAC 3125		**Course Name**		Object Oriented Programming			
Teaching Hours	**Practical**	2	**Lectures**	2	**Total Hours**	4	**Equivalent Credit Hour**	3
Marking	**Practical Exam**	15	**Year Work**	15	**Written Exam**	70	**Total**	100
Advanced programming via object oriented Experimental: calculating the smallest between two numbers using a function procedure. Different object oriented properties - aCACssing databases using the ADO data control. Study inheritance, overloading, overriding - reading a random aCACss data file using OOP- Writing Classes and Creating objects - Code reusability - Implementing different course topics recent object oriented languages.								

Code	ECE 3126		**Course Name**		Electronic circuits			
Teaching Hours	**Practical**		**Lectures**	2	**Total Hours**	4	**Equivalent Credit Hour**	3
Marking	**Practical Exam**	15	**Year Work**	15	**Written Exam**	70	**Total**	100
P and N junctions -Diodes - Zener diodes – Diodes applications - Bipolar Junction Transistor (BJT) – BJT biasing – BJT as a switch - Field Effect Transistor (FET) – FET biasing - MOSFET - MOSFET biasing - MOSFET as a switch								

Code	CAC 3127		**Course Name**		Electronic experiments in control Systems			
Teaching Hours	**Practical**	4	**Lectures**	0	**Total Hours**	4	**Equivalent Credit Hour**	2
Marking	**Practical Exam**	50	**Year Work**	50	**Written Exam**		**Total**	100
Knowing various electronic components - how to use various lab equipment - Voltage and Current measurement - Linear and nonlinear resistive circuits - Oscilloscopes and functions generators - Capacitors and Inductors - First and second order circuits - Transistor Biasing - Transistor as an amplifier - Transistor as a switch - MOSFET as a switch - H-Bridge circuit - DC motor speed and direction control - Operational amplifier circuits - electromechanical relays - overloads - contactors - AC motors control circuits.								

Computer Engineering and Automatic Control Systems Second Year-First Semester:

Code	BAS 3211		Course Name		Mathematics 5			
Teaching Hours	Practical		Lectures	3	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam		Year Work	40	Written Exam	110	Total	150

Curve fitting – Interpolation – Numerical Solution of Algebraic Equations – Direct Methods for Solving Linear System of Equations – Iterative Methods for Solving Linear Systems – Numerical Solution of Ordinary Differential Equations – Numerical Solution of Partial Differential Equations – Mathematical statistics – Probability theorem – Random Variables and Probability Distribution – Some particular Probability Distribution – Estimation Theory and sampling distribution –Non parametric tests (tests of hypotheses).

Code	CAC 3212		Course Name		Project Managment			
Teaching Hours	Practical		Lectures	2	Total Hours	2	Equivalent Credit Hour	2
Marking	Practical Exam		Year Work	25	Written Exam	50	Total	75

Introduction to Project Management – Managing SuCACssful Projects- Principles - Project Themes - Business Case, Organization, Quality, Plans, Risk, Change, Progress - Project Processes: Starting up, Directing, and Initiating a Project – Managing Stage Boundary, Controlling a Stage, Managing Product Delivery, Closing a Project – The Project Environment – Project Reports – Roles and Responsibilities.

Code	CAC 3213		Course Name		Operating systems			
Teaching Hours	Practical	2	Lectures	2	Total Hours	4	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125

Introduction to operating system Functions, attributes, goals. Operating System History, and design issues. File systems –study of different data aCACss method. System resources management. Managing and scheduling tasks (CPU scheduling). Memory hierarchy, Memory types, Different memory implementations, memory management techniques, and secondary storage management. Cache memory implementation - Implement simple cache memory using vb.net. Sequential execution, System selection consideration - Study of recent Operating Systems - Dealing with recent OS and comparing it with newer versions Process Management and Process synchronization. Deadlock detection Methods studying process termination and resource termination

Deadlock Prevention and system Recovery Experimental: get familiar with deadlock prevention methods such as: mutual exclusion, hold and wait, no preemption, circular wait.Introduction to computer security – Network and distributed operating systems - working on a different type of network operating system like Linux - Different Virtual Memory implementation Process management and control Secondary storage management.

Code	CAC 3214		Course Name		Introduction to computer networks			
Teaching Hours	Practical	3	Lectures	2	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125

Introduction To Computer Networks - NIC and TP cable installing - Introduction to Data Communication - PCs on a

Network. Network Components (HW- SW) - Network Architecture. Computer Network Classification and types. Network Layered Model for communication and different communication protocols. Network Design techniques and modeling – 7 Layers Model (ISO-OSI) - PCs on the Internet - Application Layer protocol - Wireless Networks and Mobile Systems - Transmission Layer Protocol - Network layer Protocol - Study Different Routing Algorithms. Digital integrated network system - interference between Bluetooth and 802.11b. Practical Study and Exercises - Configure ICS and Trace the Operations of DHCP and NAT.

Code	CAC 3215		Course Name		Computer Architecture			
Teaching Hours	Practical	3	Lectures	2	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125

Computer Organization and design - designing an arithmetic and logic unit - Computer Components and data transfers via buses, different types of computer busses - get familiar with the different types of busses- Microprocessor design and programming-Microprocessor-classes and families- designing a microprocessor - Hardwired control unit, design and implementations- designing a control unit - Micro-programmed control unit- implementation via modern description language (VHDL) - Memory Organization – Central Processing Unit- Pipeline and Vector Processing- Computer Arithmetic- Input / Output Organization

Code	CAC3216		Course Name		Modern Control Systems			
Teaching Hours	Practical		Lectures	2	Total Hours	4	Equivalent Credit Hour	2
Marking	Practical Exam	15	Year Work	10	Written Exam	75	Total	100

Introduction - state space representation of transfer function - solving the time-invariant state equation - controllability - observability - duality.

Code	CAC 3217		Course Name		Measurements & Sensors			
Teaching Hours	Practical	3	Lectures	2	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125

Introduction to Measurements and its fundamentals - Random Errors Analysis - Amplification in Instrumentation - Operational Amplifiers and its applications- Data Acquisition Boards Components - Digital to Analog Converters - Analog to Digital Converters - Analog and Digital meters (voltmeters, ammeters, Ohmmeters) - Analog and Digital Oscilloscopes- Introduction to transducers and actuators - Different Types of Sensors - Lab Topics (Design of virtual measurements using Labview, Design of different sensor circuits test boards and PCB, Analog and Digital Measurement Devices, Single-phased A.C. Circuits Measurements, Wheatstone Bridge, Oscilloscope, Data Acquisition Systems, Industrial Control Applications)

Code	CAC 3217		Course Name		Summer training (1)			
Teaching Hours	Practical	2	Lectures	0	Total Hours	2	Equivalent Credit	0

							Hour	
Marking	Practical Exam	50	Year Work		Written Exam		Total	50
Students promoted to the 2nd year are to carry out professional training inside the faculty, or in specialized training centers								

Computer Engineering and Automatic Control Systems Second Year-Second Semester:

Code	CAC3221		Course Name		Statistical & Probabilistic App			
Teaching Hours	Practical		Lectures	3	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125
Introduction to Advanced Probability and Random Processes – Conditional Probability, Bayes Rule – Bayesian and Gaussian Probability Distribution – Introduction to Random Processes, Markov Chains, Auto Correlation, Stationarity, Erogdicity, Spectral density, Stochastic Processes – Time Series Models AR, MA, ARMA, ARIMA, Regression models –Hypothesis tests and confidence intervals – Goodness of fit tests (Ljung-Box test, R2), ANOVA and Xi-square Applications.								

Code	MPE3222		Course Name		Mechanical Engineering			
Teaching Hours	Practical		Lectures	2	Total Hours	4	Equivalent Credit Hour	4
Marking	Practical Exam	20	Year Work	10	Written Exam	70	Total	100
1st and 2ndlaws of thermodynamics – energy conversion – power cycles – principles of fluid mechanics – prime movers (gasoline, diesel engines and jet engines)- pumps & turbines principles of heat transfer- steam plants – refrigeration and air conditioning.								

Code	CAC3223		Course Name		Data Structure & Algorithms			
Teaching Hours	Practical	3	Lectures	2	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125
Introduction to data structures. Experimental: Using of .net environment - Different Data representations. Experimental: Simple program as an example of using Variables. Study the structure, properties, and implementation issues of different data structures (Array – Stack – queue,..). Experimental : Advanced program as an example of using Different ADT - Data Structure Storing , ordering and sorting algorithms. Experimental : Advanced program as an example of implementing the different alg. - Study Different search algorithms - Evaluation and analysis of studied algorithms using a recent programming language								
Code	CAC3224		Course Name		Industrial Control Systems 1			
Teaching Hours	Practical	3	Lectures	2	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125
PID Design and Tuning: Zigler-Nicholas, PID Optimization, Modification of PID control schemes - Zero placement - Digital PID - Pimplementation (electrical, mechanical, pneumatic, electronic). Introduction to process control system - important terms - process characteristics types of processes - feedback controllers - cascade control - selective control -								

block diagrams and stability - feedforward control - dead-time compensation - multivariable process control - applications: open tank modeling, level control, modeling of tanks with pump, thermal processes, position control of hydraulic cylinders or similar practical applications**.**

Code	CAC 3225		**Course Name**		Digital Control systems			
Teaching Hours	**Practical**		**Lectures**	2	**Total Hours**	3	**Equivalent Credit Hour**	2
Marking	**Practical Exam**	10	**Year Work**	20	**Written Exam**	70	**Total**	100
Introduction to Discrete Time control systems- Z-transform and transfer function for digital systems- Design of Discrete Time Control by conventional methods (mapping, stability analysis, root locus) - frequency response - State space for Discrete time system - Pole Placement and Observer Design Applications								

Code	CAC 3226		**Course Name**		Microprocessors design & architecture			
Teaching Hours	**Practical**		**Lectures**	3	**Total Hours**	4	**Equivalent Credit Hour**	3
Marking	**Practical Exam**	15	**Year Work**	20	**Written Exam**	90	**Total**	125
Intro, Organization, Syllabus - Embedded System Overview, Characteristics, Challenges, Requirements - From Requirements to a Modular Maintainable Implementation o SYSTEMatic Engineering - Embedded System Specification, Models of Computation (MoC) - FSM + StateCharts / Process Models - Modular Design in C o Layered Architecture - Embedded Systems Architecture - Generic + Blackfin Architecture - Embedded Processing - Synchronization (e.g. Interrupts) - Operation Modes - Power Management - Communication Systems - Common parallel and serial bus systems - Topology, Arbitration, Synchronization - Memory Hierarchy for Performance Improvement - Caches, Scratch Pad, DMA - Embedded Systems in a Loop - Sensors - Analog to Digital Conversion - Control Algorithm - Digital to Analog Conversion - Actuators - Embedded Computation Optimizations.								

Computer Engineering and Automatic Control Systems Third Year-First Semester:

Code	CAC 3311		Course Name		Network Design & Prog.			
Teaching Hours	Practical		Lectures	2	Total Hours	4	Equivalent Credit Hour	2
Marking	Practical Exam	15	Year Work	15	Written Exam	70	Total	100

Introduction to computer networks, topologies and switching techniques.Protocol Stacks and Layering - Java Overview (Streams) - Java Overview (Threading) - Internet Addressing - Socket Programming - Send mails using SMTP protocol - Security - Security Intro, Cryptography, and SSL. History of World Wide Web (from the first website till modern technologies)-How does the web work?- Front-End vs. Back-End (comparison, frameworks and libraries alternatives, etc…) - Web development project phases - Introduction to HTML and HTML5 - Introduction to CSS and CSS3 - Introduction to JavaScript - Using one of the most common libraries such as jQuery - Using one of the most common frameworks such as Bootstrap, and AngularJS.

Code	CAC 3312		Course Name		Mobile and Pervasive Computing			
Teaching Hours	Practical	2	Lectures	3	Total Hours	5	Equivalent Credit Hour	4
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125

Ubiquitous data aCACss. Exploiting virtual machines. Resource-driven dynamic adaptation. Sensing and actuation: smart sensors and actuators, smart appliances. Mobile hardware technologies. Information aCACss devices. Smart identification: smart cards, smart labels, smart tokens. Home networking. Entertainment systems. Pervasive computing platforms and software: Java cards, iOS, Android, Windows-based platforms. Client middleware: smart card programming, messaging components. Security and privacy in mobile and pervasive systems. Mobile internet. Web services: service discovery, location and context awareness. Backend server infrastructure: Gateways, application servers, Internet portals, device management, synchronization. Mobile and ubiquitous services: home services, travel and business services, consumer services. Design methodologies and infrastructure. End-to-end application considerations.

Code	CAC 3313		Course Name		Data Base Systems			
Teaching Hours	Practical		Lectures	3	Total Hours	4	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	15	Written Exam	70	Total	100

Introduction to database Concepts -Data Structure handling and File Systems - Database Management systems operation and Components - Experimental: operate with different types of DBMS - Data Modeling ANSI/SPARC – Client Server - Experimental: implement client server database model - Relational Databases (indexing- keys – sorting)- Experimental: implement relationships between a numbers of database -Structured Query Languages (SQL) - Experimental: creating a new database - Schema Design and normalization - Experimental: normalize the database -.E/R Model and database Programming - Experimental: designing a number of E/R models.Practical implementation using recent DBMS- Experimental: implement a database using MYSQL DBMS.

Code	CAC 3314		Course Name		Artificial intelligence			
Teaching Hours	Practical		Lectures	2	Total Hours	3	Equivalent Credit Hour	2
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125

Goals - features of intelligence - AI search - level of intelligence - AI problems - -intelligent agent - knowledge classification - search techniques - types of search algorithms - blind search - depth first search breath first search - - iterative deepening - finding best solution -heuristic functions - probability in AI - Bays rule - dependence - Bays network- D separation - artificial neural network - ANN applications - simple neuron model - activation functions - building logic gates - learning rules - multi-layer feed-forward network - backpropagation approach.

Code	CAC 3315		**Course Name**		Industrial Control System 2			
Teaching Hours	**Practical**		**Lectures**	2	**Total Hours**	3	**Equivalent Credit Hour**	2
Marking	**Practical Exam**	15	**Year Work**	20	**Written Exam**	90	**Total**	125
Introduction to PLC: interface and communication - Analog and Digital Devices (Input and Output Devices) - PLC structure and Operation - PLC programming Methods - HMI programming Methods - Automated Systems - SCADA System Design - Automated System Communication (Fieldbus) - DCS Systems - CNC machines and Programming - Applications.								

Code	CAC 3316		**Course Name**		Elective 1			
Teaching Hours	**Practical**	2	**Lectures**	2	**Total Hours**	4	**Equivalent Credit Hour**	3
Marking	**Practical Exam**	15	**Year Work**	15	**Written Exam**	70	**Total**	100

Computer engineering Field	**Control system field**
FPGA Implementation Based on VHDL	FPGA Implementation Based on VHDL
Web development	Intelligent Transportation Systems
Multimedia	Frequency response analysis

FPGA Implementation Based on VHDL *

Introduction of VLSI - FPGA programming technologies - FPGA architecture - FPGA programming using VHDL or Verilog - (combinational circuits- regular sequential circuit - finite state machine - finite state machine with data path)- Applications.

Web development

Revision on web development course (1) by building a project using HTML, CSS, JavaScript (by using one of the most common frameworks/libraries)- Building a virtual web server, and configuring it (such as XAMPP)-PHP and SQL alternatives (comparison, advantages, and disadvantages-Introduction to PHP - Introduction to Database using SQL - Using one of the most common frameworks such as Laravel - Building, testing, and deploying a project (such as a To-Do list or a blog).

Multimedia

Introduction to Multimedia - Elements of multimedia systems - Recording and transmission of audio - Photography and quality of photographs - Record and tone of video signals - Digital methods of dealing with audio, video and video - Data compression methods - Data compression applications for voice, Requirements for multimedia systems - Examples of multimedia archiving systems and the Egyptian National Archives

Intelligent Transportation Systems

Introduction to Intelligent Transportation Systems ITS - Advanced Traveler Information - System ATIS - Advanced Traveler Management System ATMS - Advanced Public Transport System - ITS and the Environment -Applications.
Frequency response analysis Introduction - Bode diagram - stability analysis - polar plot - Nyquist criteria - compensator design using frequency response - applications.

Code	CAC 3316		**Course Name**		Computer Architecture			
Teaching Hours	**Practical**	2	**Lectures**	2	**Total Hours**	4	**Equivalent Credit Hour**	3
Marking	**Practical Exam**	15	**Year Work**	15	**Written Exam**	70	**Total**	100
Computer Organization and design - designing an arithmetic and logic unit - Computer Components and data transfers via buses, different types of computer busses - get familiar with the different types of busses- Microprocessor design and programming-Microprocessor-classes and families- designing a microprocessor - Hardwired control unit, design and implementations- designing a control unit - Micro-programmed control unit- implementation via modern description language (VHDL) - Memory Organization – Central Processing Unit- Pipeline and Vector Processing- Computer Arithmetic- Input / Output Organization								

Code	CAC 3317		**Course Name**		Engineering project Management			
Teaching Hours	**Practical**		**Lectures**	2	**Total Hours**	4	**Equivalent Credit Hour**	2
Marking	**Practical Exam**	15	**Year Work**	15	**Written Exam**	70	**Total**	100
Basic management functions - Concept and importance of project management - Life cycle of engineering projects - Strategies and types of project planning - Feasibility study - Project resource management - Project implementation - Project evaluation - Practical models for small projects management - Engineering ethics and rules of practicing the engineering profession in Egypt.								

Computer Engineering and Automatic Control Systems Third Year-Second Semester:

Code	CAC 3321		Course Name		Computer Vision			
Teaching Hours	Practical	3	Lectures	2	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125
Image formation -Image processing - Feature detection and matching -Image Segmentation - Feature-based alignment - 3D reconstruction - Image Recognition - Image formation.								

Code	CAC 3322		Course Name		Distributed Systems			
Teaching Hours	Practical		Lectures	2	Total Hours	3	Equivalent Credit Hour	2
Marking	Practical Exam	15	Year Work	15	Written Exam	70	Total	100
Ch/s and evolution of DS - foundational concepts of distributed systems. H/W and S/W concepts of DS- Architectures-overlay networks - Type of communications in DS and processes communication.Experimental: Implementation of TCP chat application and UDP chat Application - Thread and multiple Task-synchronization, mutual exclusion - Experimental: Designing Multi-Threaded Application - Parallel programming and scheduling- Distributed File systems- Distributed Information systems - Experimental: Design distributed database system								

Code	CAC 3323		Course Name		Machine learning			
Teaching Hours	Practical	2	Lectures	2	Total Hours	4	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	15	Written Exam	70	Total	100
Introduction - learning theory - supervised learning - unsupervised learning - reinforcement learning - applications of supervised learning - linear regression - gradient descent - stochastic gradient descent - underfitting and overfitting - parametric and nonparametric algorithms - locally weighted regression - parabolistic interpolation of linear regression - motivations of logistic regression - logistic regression perceptron and Newton's method - intelligent modeling - fuzzy logic modeling and control systems using Matlab.								

Code	CAC 3315		Course Name		Elective 2			
Teaching Hours	Practical	2	Lectures	2	Total Hours	4	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125

Computer science engineering	Control system field
Geographic Information Systems	Electronics 2
Computer System Security	control system design in state space
Advanced FPGA applications	Advanced FPGA applications

Geographic Information Systems

Introduction to Geographic Information Systems (GIS) - GIS data types, structures and topology - GIS data input and editing - Coordinate systems and projections - GIS data management - GIS data output - GIS data analysis - Analytical modelling in GIS - Data quality issues.

Computer System Security

Computer security systems and networks - Information security concepts - Risk types - Protection procedures - Insurance policy - Advanced algorithms in analogue and telematics encryption - Personal verification methods - Practical applications for securing information in different systems - - threat models – Security architecture – User authentication- Buffer overflow attacks and defenses (Experimental) – Privilege separation (Experimental) – Footprinting and Reconnaissance – Software fault isolation –Mobile phone security – Symbolic execution (Experimental) – Hacking Webserver and Hacking Web Applications – Browser security (Experimental) – Network security & protocols – SSL and HTTPS – "Side-channel" attacks – Cryptography introduction – SQL injection introduction.

Advanced FPGA applications*

serial communication - serial peripheral interface - PS2 keyboard - PS2 mouse - memory - VGA controller.

Electronics 2

BJT AC analysis - MOSFET AC analysis - BJT and FET frequency responses - power amplifiers (class A - class B - power amplifiers distortion - class C and D) - Linear digital ICs: (555 Timer- comparators - phase locked loop) - feedback and oscillator circuits.

control system design in state space

Pole-placement - state observers - design of state observers - design of servo systems.

Code	CAC 3325		**Course Name**		Nonlinear Control Systems			
Teaching Hours	**Practical**		**Lectures**	2	**Total Hours**	3	**Equivalent Credit Hour**	2
Marking	**Practical Exam**	15	**Year Work**	15	**Written Exam**	70	**Total**	100
Introduction to Nonlinear Systems - Analysis of Nonlinear Systems: Linearization, Describing functions - phase plane - stability of Nonlinear Systems: Lyapunov stability (1st, 2nd) methods – Popov and circle criteria - Chaos Theory.								

Code	CAC 3326		**Course Name**		Microcontrollers			
Teaching Hours	**Practical**	3	**Lectures**	2	**Total Hours**	5	**Equivalent Credit Hour**	3
Marking	**Practical Exam**	15	**Year Work**	15	**Written Exam**	70	**Total**	100
Introduction to MicroController - Types of MicroController - PIC, AVR Architectures and differences - Microcontroller Programming of Application Projects - Advanced Programming Application (LCD, Keybad, Analog, serial, CCP, EPROM and Flash Memory, SPI, I2C, and CAN protocols).								

Code	CAC 3327		Course Name		Operation Research			
Teaching Hours	Practical		Lectures	2	Total Hours	4	Equivalent Credit Hour	2
Marking	Practical Exam		Year Work	30	Written Exam	70	Total	100
Operations Research is composed of the following areas: (1) Linear programming, (2) Nonlinear programming, (3) Dynamic programming, (4) Stochastic modeling and simulation, (5) Network programming, (6) Computer simulation, (7) Queuing, (8) Time-series analysis, and (9) Applications in engineering, science, economics, and management								

Computer Engineering and Automatic Control Systems Fourth Year-First Semester:

Code	CAC3411		Course Name		Robotics Modeling & Control			
Teaching Hours	Practical	2	Lectures	3	Total Hours	5	Equivalent Credit Hour	4
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125
Robot Configuration Space and degree of freedom - Classification of Robotic Manipulators - Robotic Systems - kinematic arrangements of manipulators - Representing positions - representing rotations - rotational transformations - rigid motions - homogeneous transformations - forward kinematics - kinematic chains - Denavit-Hartenberg representation - inverse kinematics - the general inverse kinematics problem - kinematic decoupling - inverse position - inverse orientation.								

Code	CAC3412		Course Name		Open Source Applications			
Teaching Hours	Practical	3	Lectures	2	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125
Classifying Linux Distributions – Start with Command Line (Experimental) – Files and Folders Manipulation – Linux Software Management (rpm,deb) (Experimental) – Process Contexts and Permissions Handling – Linux users & group management & Permissions (Experimental) –Introduction to Shell and Shell Scripting – Shell and Terminal (Experimental) – Memory Management – Simple Partitioning and LVM (Experimental) – Inter-process Communication –Networking.								

Code	CAC3413		Course Name		Software Engineering			
Teaching Hours	Practical	1	Lectures	2	Total Hours	3	Equivalent Credit Hour	3
Marking	Practical Exam	10	Year Work	20	Written Exam	70	Total	100
Concepts of software systems design , examples and languages - Software - Experimental : Simple programs on software – Software Systems Life Cycle - Design of Software Systems –Software Systems Architecture – Software								

Development Methodologies – Applications.

Code	CAC3414		Course Name		Power electronics			
Teaching Hours	Practical	3	Lectures	2	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125
Introduction to power electronics - using diodes as electronic switch with RLC - transistor as a switch - thyristors - Triac - Diac - DC/DC converters using PWM (step up - step down - step up/down)- AC/DC converters (half wave - full wave) - DC/AC converters.								

Code	CAC 3315		Course Name		Elective 3			
Teaching Hours	Practical	3	Lectures	2	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	20	Written Exam	90	Total	125

Computer science engineering	Control system field
Computer Game Architecture and Virtual Reality	Optimal & Robust Control
Internet of things	Robotics 2
	Fuzzy and predictive control systems

Computer Game Architecture and Virtual Reality

Game Theory Motivation and Background – Software architecture for computer games – 2D and 3D rendering – Event driven programming – Game engines – Introduction to Virtual Reality – Virtual Reality (Input Devices – Output Devices) – Computing Architectures for Virtual Reality (OpenGL Introduction – 2D drawing – Shading) – Modelling OpenGL 3D drawing – Animation – Lights.

Optimal & Robust Control

Introduction to Optimal and Robust Control - Principles of Optimal Control Euler, Lagrange, Riccati Equation - Dynamic Programming, Terminal Constraints - Robust Control, Structured Singular Value, Stability Performance, Loop Shaping, H-infinity, state space for robustness analysis. Real and Complex uncertainty - Kalman Filter, LQ, LQR, LQG - Applications.

Robotics 2

Forward kinematics- The DenavitHartenberconvention- velocity kinematics and Jacobian analysis - inverse kinematics - singularities.

Fuzzy and predictive control systems

Introduction in fuzzy logic and reasoning - fuzzy control - linear fuzzy PID - nonlinear fuzzy PID - self organizing fuzzy controller. **Introduction to Predictive Control Theory - Digital State Space Theory - Standard Formulation of Predictive Control - Unconstrained Predictive Control and Predictive Control with Constraints - Set Point Tracking - Applications and Case Studies**.

Internet of things

Introduction to IoT – IoT hardware platforms and operating systems – Wireless communication technologies for IoT – IP-connected smart objects and networks – Embedded web services and web of things – Tracking industrial networks – Other relevant standardization bodies and protocol.

Code	CAC 3416		Course Name		Project 1			
Teaching Hours	Practical	3	Lectures		Total Hours		Equivalent Credit Hour	1
Marking	Practical Exam	50	Year Work	50	Written Exam		Total	100
Survey - Data processing and analysis - Main professional and practical part - Conclusions and recommendations - Writing the project document								

Code	CAC 3417		Course Name		Summer training (2)			
Teaching Hours	Practical	2	Lectures	0	Total Hours	2	Equivalent Credit Hour	0
Marking	Practical Exam	50	Year Work		Written Exam		Total	50
Students promoted to the 2nd year are to carry out professional training inside the faculty, or in specialized training centers								

Computer Engineering and Automatic Control Systems Fourth Year-Second Semester:

Code	CAC3421		Course Name		Compiler Design			
Teaching Hours	Practical		Lectures	3	Total Hours	4	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	10	Written Exam	100	Total	125
The theory and practice of compilation - the lexical and syntax analysis, syntax-directed translation - parsing and code generation and optimization phases of compilation, - design a compiler for a concise programming language. In class projects, we will focus on the design and implementation of the following four stages of compilation for a subset of a modern imperative programming language: lexical analysis, parsing, code generation and code optimization.								

Code	CAC3422		Course Name		Real Time Operating Systems			
Teaching Hours	Practical	3	Lectures	3	Total Hours	6	Equivalent Credit Hour	4

Marking	Practical Exam	20	Year Work	20	Written Exam	110	Total	150
Introduction to concepts, techniques, and standards related to design of real-time (RT) systems. Motivation - Specification of RT systems - RT kernel architectures - Overview of POSIX 1003.1b interface for RT operating systems (RTOS) - Introduction to I/O using the BSP and debugging (Experimental) - Implementation of a simple RT application by means of interfaces (Experimental) - Introduction to RT task scheduling - Scheduling of independent, static-priority RT tasks running in 1-CPU environment - Scheduling of dependent, dynamic-priority RT tasks running in 1-CPU environment - Thread synchronization and scheduling for a personal fitness device (Experimental) - Advanced scheduling approaches: scheduling in n-CPU/distributed/network environment, scheduling for fault-tolerance, scheduling for architecture overload - Introduction to Timestool and Cheddar tools for design of RT applications based on RTOS. (Experimental).								

Code	CAC3423		Course Name		Adaptive Control			
Teaching Hours	Practical	1	Lectures	3	Total Hours	4	Equivalent Credit Hour	3
Marking	Practical Exam	15	Year Work	15	Written Exam	70	Total	100
Introduction to Predictive Control Theory - Digital State Space Theory - Standard Formulation of Predictive Control - Unconstrained Predictive Control and Predictive Control with Constraints - Set Point Tracking - Applications and Case Studies.								

Code	CAC3424		Course Name		Advanced Concepts of Database systems			
Teaching Hours	Practical		Lectures	3	Total Hours	5	Equivalent Credit Hour	3
Marking	Practical Exam	10	Year Work	20	Written Exam	70	Total	100
Transaction Def.- Concurrency – Deadlock Management – Security – Integrity – Distributed Database Data processing cycle - Data warehouse design and ETL tools - Data pre-processing - Data mining techniques - Classification and clustering methodologies - Regression approaches - Introduction to big data - Characterizing of big data and dimensions of scalability - Hadoop and MapReduce - Big data storage and analytics - Big data analytics machine learning algorithms - Machine Learning, streams and database on Spark - Linked big data - Graph computing and Analytics - Graphical Models and Bayesian Networks - Big data visualization								

Code	CAC 3315		Course Name		Elective 4			
Teaching Hours	Practical	2	Lectures	2	Total Hours	4	Equivalent Credit Hour	3
Marking	Practical Exam	10	Year Work	20	Written Exam	70	Total	100

Computer science engineering	Control system field
Wireless Networking Mobile Computing	Nanotechnology
Satellite image processing and remote sensing	CAD-CAM Simulation
Advanced Topics in Computer Engineering	Photovoltaic systems
	Electric motors control systems

Satellite image processing and remote sensing

Introduction to remote sensing - Methods of obtaining satellite images and remote sensing - Methods of analysis of satellite images and remote sensing - Different frequencies and methods of image analysis Representation of images in the computer - Methods of operation of images - Improving remote sensing images - Registering sites - Getting reports

Wireless Networking Mobile Computing

Overview of fundamental challenges in wireless networking and potential techniques • Wide area wireless networks: Mobile IP • Wireless local area networks (WLAN): MAC design principles, 802.11 (WiFi) • Wireless person area networks (WPAN): 802.15.4 (ZigBee), bluetooth • Mobile ad hoc and sensor networks • Mobile computing and applications

Advanced Topics in Computer Engineering

Nanotechnology

Introduction to NanoTechnology, fundamentals of nanoelectronics and mesoscopic physics - Transistors fundamentals, Transistor electrostatics -Ballistic MOSFETs, Transmission theory of the MOSFET- Applications.

CAD-CAM Simulation

Introduction to Manufacturing Processes - Principles of Computer Aided Design - Design of Mechanical Parts in 2D and 3D - Production Processes using CAD/CAM and CNC - Design of Electrical / Electronic Systems using CAD - Creating PCB circuits - Electronics in 3D – Applications

Photovoltaic systems

Introduction to photovoltaic systems - photovoltaic cell - IV characteristic curve - maximum power point tracking methods - methods of storing electrical energy - battery charging circuits - DC/AC converters - grid connected PV systems - battery backup systems - stand-alone PV systems.

Electric motors control systems

Introduction - torque speed curve - basic structure and modeling of electric machines - Variable-speed Control of Induction Machine - Modeling of Power Converters - Reference Frame Transformation - Design of Regulators for Electric Machines (current regulators - speed regulators - position regulator - detection of phase angles) - Vector control of electric machines - Position/Speed Senseless Control of AC Machines.

Code	CAC 3426		**Course Name**		Project 2			
Teaching Hours	**Practical**	5	**Lectures**		**Total Hours**	5	**Equivalent Credit Hour**	2
Marking	**Practical Exam**	100	**Year Work**	75	**Written Exam**		**Total**	175
Survey - Data processing and analysis - Main professional and practical part - Conclusions and recommendations - Writing the project document								

4 Mechanical Power Engineering Program

Basic Information:

Program Name	**Mechanical Power Engineering**
Department	**Mechanical Power Engineering**
Program Type	**Single**
No of Semesters	**10**
No of Contact Hour	**280**
Lecture	**162**
Tutorial and Practical	**118**
Equivalent Credit Hours	**175**

The graduates of the mechanical power engineering program should be able to:

1. Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
2. Design a system; component and process to meet the required needs within realistic constraints.
3. Design and conduct experiments as well as analyze and interPDEt data.
4. Identify, formulate and solve fundamental engineering problems.
5. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
6. Work effectively within multi-disciplinary teams.
7. Communicate effectively.
8. Consider the impacts of engineering solutions on society & environment.
9. Demonstrate knowledge of contemporary engineering issues.
10. Display professional and ethical responsibilities; and contextual understanding
11. Engage in self- and life- long learning.
12. Evaluate the sustainability and environmental issues related to mechanical power systems.
13. Use energy efficiently.
14. Apply industrial safety.
15. Apply and integrate knowledge, understanding and skills of different subjects and available computer software to solve real problems in industries and power stations.
16. Lead or supervise a group of engineers, technicians and work force.
17. Carry out PDEliminary designs of fluid transmission and power systems, investigate their performance and solve their essential operational problems.
18. Design, operate and maintain internal combustion and steam engines.


Courses distribution based requirement according the Reference Framework and NARS

Code	Course Name	Contact Hrs.	Equivalent Credit Hr	Requirements				Semester	Academic Year
				University	Faculty	Department			
						Major	Minor		
BAS 1011	Mathematics (1)	5	3		3			First	PDEparatory Year
BAS 1012	Physics (1)	6	4		4				
BAS 1013	Mechanics (1)	4	2		2				
PDE+BAS 1014	Engineering drawing and projection	5	3		3				
BAS 1015	Chemistry	5	3		3				
BAS 1016	English	4	2	2					
BAS 1021	Mathematics (2)	5	3		3			Second	
BAS 1022	Physics(2)	6	4		4				
BAS 1023	Mechanics(2)	4	2		2				
PDE 1024	Engineering drawing	4	2		2				
PDE 1025	Production engineering	4	2		2				
CAC 1026	Introduction to computer programming	4	2	2					
BAS1027	Introduction to Engineering Specialties	1	1	1					
BAS 4111	Mathematics 3	6	4		4			First	First Year
BAS 4112	Applied mechanics	5	3		3				
STE 4113	Civil engineering	5	3				3		
MPE4114	Thermodynamics 1	6	4			4			
MPE 4115	Mechanical power engine drawing*	4	2			2			
MPE 4116	Engineering Economy	2	2	2					
PDE 4121	Material strength & stresses analysis	6	4				4	Second	
PDE 4122	Production and material engineering	5	3				3		
MPE 4123	Fluid mechanics 1	6	4			4			
MPE 4124	Mechanical power engine drawing*	4	2			2			
MPE 4125	Computer applications in mechanical power engineering 1	4	2		2				
MPE 4126	Technical reports in mechanical power engineering	2	2	2					
BAS 4211	Mathematics 4	6	4		4			First	Second Year
MPE 4212	Thermodynamics 2	6	4			4			
MPE 4213	Measurements and measuring devices	6	4				4		

EE 4214	Electrical engineering	4	2				2		
PDE 4215	Theory of machine 1	4	2				2		
MPE 4216	Introduction to Environmental Science	2	2		2				
MPE 4217	Summer training	2							
BAS 4221	Numerical methods and statistics	5	3		3			Second	
MPE 4222	Fluid mechanics 2	6	4			4			
MPE 4223	Heat transfer 1	6	4			4			
ECE 4224	Electronic engineering	3	2				2		
PDE 4225	Theory of machine 2	4	2				2		
MPE 4226	Computer applications in mechanical power	4	2		2				
MPE 4311	Energy conversion	6	4			4		First	Third Year
MPE 4312	Heat and Mass transfer	6	4			4			
MPE 4313	Theory of combustion	5	3			3			
MPE 4314	Steam Technology	5	3				3		
MPE 4315	Elective course 1	2	2				2		
MPE 4316	Computer applications in mechanical power engineering 3	4	2		2				
MPE 4321	Gas dynamics	6	4			4		Second	
MPE 4322	Combustion engines	6	4			4			
MPE 4323	Power & Electrical machines	4	2				2		
MPE 4324	Design of machines	5	3				3		
MPE 4325	Elective course 2	2	2				3		
MPE 4326	project management	3	3		3				
MPE 4411	Hydraulic machines	6	4			4		First	Fourth Year
PDE 4412	Operation research	5	3				3		
MPE 4413	Refrigeration and air conditioning	6	4			4			
MPE 4414	Design of mechanical power engines	6	4				4		
MPE 4415	Elective course 3	2	2				2		
MPE 4416	Project*	2	1			1			
MPE 4417	Summer training	2							
MPE 4421	Turbo machines	6	4			4		Second	
MPE 4422	Power plants	6	4			2			
MPE 4423	Automatic control of energy systems	4	2				2		
MPE 4424	Elective course 4	2	2				2		
MPE 4425	Contracts and Specifications	3	3		3				
MPE 4426	Project*	6	3			3			
Total	**61**	**276**	**175**	**21**	**82**	**99**	**74**		
Percentage		**100**		**7.61**	**29.71**	**35.87**	**26.81**		
Min		**250**	**160**	**6**	**22**	**30**	**20**		
Max		**280**	**180**	**10**	**30**	**35**	**30**		

Program courses and subject area:

Preparatory Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial Practical		Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1011	Mathematics (1)	3	2	0	**5**	3	3	50	0	100	**150**			5				
BAS 1012	Physics (1)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1013	Mechanics (1)	2	2	0	**4**	2	3	35	0	90	**125**			3		1		
PDE+BAS 1014	Engineering drawing and projection	2	0	3	**5**	3	3	50	0	100	**150**					5		
BAS 1015	Chemistry	2	0	3	**5**	3	3	35	10	80	**125**			3		2		
BAS 1016	English	1	0	3	**4**	2	2	10	0	40	**50**	4						
Total		13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0

Preparatory Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1021	Mathematics (2)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1022	Physics(2)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1023	Mechanics(2)	2	2	0	**4**	2	2	30	0	70	**100**			3		1		
PDE 1024	Engineering drawing	1	0	3	**4**	2	3	30	0	70	**100**					4		
PDE 1025	Production engineering	1	0	3	**4**	2	2	30		70	**100**				2	2		
CAC 1026	Introduction to computer programming	1	0	3	**4**	2	2	20	10	70	**100**					4		
BAS1027	Engineering Entrance	1	0	0	**1**	1	2	0	0	50	**50**	1	0	0	0	0	0	0
Total		12	4	12	28	16	17	200	20	530	750	1	0	12	2	13	0	

First Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 4111	Mathematics 3	4	2		6	4	3	40		110	150			6				
BAS 4112	Applied mechanics	3	2		5	3	2	30		70	100			3		2		
STE 4113	Civil engineering	3	2		5	3	3	30		70	100				4		1	
MPE 4114	Thermodynamics 1	4	2		6	4	3	60	20	120	200					4	2	
MPE 4115	Mechanical power engine drawing*	1		3	4	2	3	40	10	75	125					1	3	
MPE 4116	Engineering Economy	2			2	2	3	25		50	75	1	1					
Total		17	8	3	28	18	17	225	30	495	750	1	1	9	4	7	6	0

First Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
PDE 4121	Material strength & stresses analysis	4	2		6	4	3	60		90	150			2		4		
PDE 4122	Production and material engineering	3	2		5	3	3	40		60	100	2			3			
MPE 4123	Fluid mechanics 1	4	2		6	4	3	60	20	120	200			2		2	2	
MPE 4124	Mechanical power engine drawing*	1		3	4	2	3	40	10	75	125					1	3	
MPE 4125	Computer applications in mechanical power engineering 1	2		2	4	2	3	30	10	60	100	3					1	
MPE 4126	Technical reports in mechanical power engineering	2			2	2	2	25		50	75	2						
Total		16	6	5	27	17	17	255	40	455	750	7	0	4	3	7	6	0

Second Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 4211	Mathematics 4	4	2		6	4	3	40		110	150			6				
MPE 4212	Thermodynamics 2	4	2		6	4	3	40	10	100	150					3	3	
MPE 4213	Measurements and measuring devices	3		3	6	4	3	40	20	90	150					2	4	
EE 4214	Electrical engineering	2	2		4	4	3	30		70	100				2	2		
PDE 4215	Theory of machine 1	2	2		4	4	3	30		70	100					1	3	
MPE 4216	Introduction to Environmental Science	2			2	2	2	25		50	75	2						
MPE 4217	Summer training (1)		2		2				50		50							2
Total		17	10	3	30	18	17	205	80	490	775	2	0	6	2	8	10	2

Second Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 4221	Numerical methods and statistics	3	2		5	3	3	40		110	150			5				
MPE 4222	Fluid mechanics 2	4	2		6	4	3	40	10	100	150					3	3	
MPE 4223	Heat transfer 1	4	2		6	4	3	40	10	100	150			2		2	2	
ECE 4224	Electronic engineering	2	1		3	2	2	25		50	75				1	2		
PDE 4225	Theory of machine 2	2	2		4	2	3	30		70	100					1	3	
MPE 4226	Computer applications in mechanical power engineering 2	2		2	4	2	3	30	10	60	100	2					2	
Total		17	9	2	28	17	17	205	30	490	725	2	0	7	1	8	10	0

Third Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
MPE 4311	Energy conversion	4	2		6	4	3	40	10	100	150	1			2		3	
MPE 4312	Heat and Mass transfer	4	2		6	4	3	40	10	100	150					3	3	
MPE 4313	Theory of combustion	3	2		5	3	3	40	10	100	150	1				2	2	
MPE 4314	Steam Technology	3	2		5	3	3	40	10	75	125					3	2	
MPE 4315	Elective course 1	2			2	2	3	30	10	60	100						2	
MPE 4316	Computer applications in mechanical power engineering 3	2		2	4	2	3	30	10	60	100					1	2	1
Total		18	8	2	28	18	18	220	60	495	775	2	0	0	2	9	14	1

Third Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
MPE 4321	Gas dynamics	4	2		6	4	3	40	10	100	150					4	2	
MPE 4322	Combustion engines	4	2		6	4	3	40	10	100	150					2	4	
EE 4323	Power & Electrical machines	2	2		4	2	3	30		70	100				2		2	
PDE 4324	Design of machines	3	2		5	3	3	40		85	125		1			2	2	
MPE 4325	Elective course 2	2			2	2	3	30	10	60	100						2	
MPE 4326	project management	3			3	3	2	40		60	100		3					
Total		18	8	0	26	18	17	220	30	475	725	0	4	0	2	8	12	0

Fourth Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
MPE 4411	Hydraulic machines	4	2		6	4	3	40	10	100	150					2	4	
PDE 4412	Operation research	3	2		5	3	2	30		70	100		2	3				
MPE4413	Refrigeration and air conditioning	4	2		6	4	3	40	10	100	150					2	4	
MPE 4414	Design of mechanical power engines	4	2		6	4	3	40	10	100	150					2	2	2
MPE 4415	Elective course 3	2			2	2	3	30	10	60	100						2	
MPE 4416	Project*			2	2	1		40	10		50							2
MPE 4417	Summer training (2)		2		2				50		50							2
Total		17	10	2	29	18	14	220	100	430	750		2	3		6	12	6

Fourth Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
MPE 4421	Turbo machines	4	2		6	4	3	40	10	100	150					1	5	
MPE 4422	Power plants	4	2		6	4	3	40	10	100	150					2	4	
MPE 4423	Automatic control of energy systems	2	2		4	2	3	40		60	100					2	2	
MPE 4424	Elective course 4	2			2	2	3	30	10	60	100						2	
MPE 4425	Contracts and Specifications	3			3	3	2	40		60	100	3	0					
MPE 4426	Project*	2		4	6	3		40	10	مناقشة 100	150							6

Total	17	6	4	27	18	14	230	40	480	750	3	0	0	0	5	13	6

Elective Courses

Elective Course 1		
MPE Water Treatment	MPE Water Treatment	MPE Water Treatment
Elective Course 2		
MPE Water desalination	MPE Water desalination	MPE Water desalination

The student chooses two elective courses from one of the following groups

	First Group	Second Group	Third Group	Fourth Group
Elective Course 3	New and renewable energy	Heat exchangers	Engine performance	Fluid machines
Elective course 4	Solar energy	Solar cooling and heating	Fuel and combustion systems	Hydraulic control
	Nuclear energy	Refrigeration and air conditioning control systems	Natural gas technology	Hydraulic machines design

Total teaching hours and subject's distribution over the subject are asaccording the Reference Framework and NARS

Semester		Teaching Hours				Equivalent Criedit Hours	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
PDEparatory year/ 1st		13	4	12	**29**	17	17	220	20	510	**750**	4	0	15	0	10	0	0
PDEparatory year/		12	4	12	**28**	16	17	200	20	530	**750**	1	0	12	2	13	0	0
First year/1st semester		17	8	3	**28**	18	17	215	30	480	**725**	1	1	9	4	7	6	0
First year/ 2nd semester		16	6	5	**27**	17	17	295	40	440	**775**	7	0	4	3	7	6	0
Second year/1st semester		17	10	3	**30**	18	17	205	80	490	**775**	2	0	6	2	8	10	2
Second year/ 2nd semester		17	9	2	**28**	17	17	205	30	490	**725**	2	0	7	1	8	10	0
Third year/1st semester		18	8	2	**28**	18	18	220	60	495	**775**	2	0	0	2	9	14	1
Third year/ 2nd semester		18	8	0	**26**	18	17	220	30	475	**725**	0	4	0	2	8	12	0
Fourth year/1st semester		17	10	2	**29**	18	14	220	100	430	**750**		2	3		6	12	6
Fourth year/ 2nd semester		17	6	4	**27**	18	14	230	40	480	**750**	3	0	0	0	5	13	6
Total		162	69	45	**276**	175	165	2310	350	4840	**7500**	22	7	56	16	81	83	15
%								30.8	4.67	64.53	100	7.8	2.5	20	5.7	28.9	29.6	5.4
% NARS And Reference framework	minimum				**250**	**160**						**8.0**	**2.00**	**18.0**	**4.00**	**25.00**	**25.00**	**4.00**
	maximum				**280**	**180**						**12.0**	**4.0**	**22.0**	**6.0**	**30.0**	**30.0**	**6.0**

Requirements	No. of Courses	Hours of Study	Percentage	Objectives
Humanities & Social Science	**11**	**22**	**7.8**	Provide students with important concepts in thinking, research, and communication.
Business Administration	**4**	**7**	**2.5**	Student should be aware of working flow and planning in factories and companies.
Mathematics & Basic Science	**14**	**56**	**20**	Increase student's skills by building strong background in basic sciences.
Engineering Culture	**10**	**16**	**5.7**	Increase student's background in different engineering fields.
Basic Engineering Sci.	**34**	**81**	**28.9**	Building the basic backgound in Engineering.
Applied Eng. & Design	**30**	**83**	**29.6**	Building the background in Textile field and its Practical/Oral/ORAL implementation.
Projects & Practice	**7**	**15**	**5.4**	Student's ability to apply the knowledge and skills acquired during study under supervision of the academic mentor.

Course Contents

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Mathematics 3				Course Name		BAS 4111		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
110			Written Exam	40	Term Work		شفوي/ Practical	Marking

Ordinary Differential Equations (ODE)

Homogeneous higher order ODE – Nonhomogeneous higher order ODE with constant coefficients (undetermined coefficients method and variation of parameters method for finding the particular solution) – Cauchy-Euler ODE (homogeneous and nonhomogeneous) – System of ODE– Laplace transform – Inverse Laplace transform –Applications of Laplace transform – Series solution of ODE.

Functions of Several Variables

Differentiation of integration – Vector calculus –Multiple integrals (double and triple) and their applications –Line integral – Green's theorem – Surface integral – Divergence (Gauss) and Stokes' theorems –Mathematical modeling using partial differential equations.

Applied mechanics				Course Name		BAS 4112		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي/ Practical	Marking

The kinematics and Kinetics of a particle in space curvilinear motion (Equation of motion – work and energy – Impulse and momentum) – The Kinematics , Kinetics and a general Planar motion of a rigid body.

Civil engineering				Course Name		STE4113		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي/ Practical	Marking

The general principles of structural theory - Structural analysis of reactions – Loads - Moments - Shear forces -Normal forces - Statically determinate structures- Types and usage of buildings (concrete & steel) - Types of roofs and walls -Types of foundation

Thermodynamics 1				Course Name		MPE 4114		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
120			Written Exam	60	Term Work	20	شفوي/ Practical	Marking
Basic concepts -Energy concepts -Pure substance - First law of thermodynamics - Second law of thermodynamics - Entropy -Exergy and thermodynamic equilibrium.								

Mechanical power engine drawing*				Course Name		MPE 4115		Code
2	Equivalent Credit Hr	4	Contact Hours	1	Lecture	3	Practical	Teaching Hours
75			Written Exam	40	Term Work	10	شفوي/ Practical	Marking
Basic concepts - Surface finishing - Tolerances & fits -Threads and thread rePDEsentation - Bolts specifications-Locking devices for nuts - Din standards - Springs - Keys-Pedestal bearing -Bearing-Footstep or pivot bearing - Rigid coupling-Friction grip coupling-Flexible coupling - Stuffing boxes - Crank shaft.								

Engineering Economy				Course Name		MPE 4116		Code
	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
50			Written Exam	25	Term Work		شفوي/ Practical	Marking
Economic approach -Some tools of the economist -Supply, demand, and the market process-Supply and demand for the public sector -Demand and consumer choice -Costs and the supply of goods-The energy market -Problem areas for the market -Introduction in laborlaw.								

Material strength & stresses analysis				Course Name		PDE 4121		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
90			Written Exam	60	Term Work		شفوي/ Practical	Marking
Review of statics -The concept and relationship between stress and strain. -Normal stresses, statically indeterminate systems-Bearing stresses, factor of safety and stress concentration-Thermal stresses and statically indeterminate problems-Shearing stress and strain & Direct shearing stress-Bending of beams-Stresses in beams -Beam deflections-Combined stresses-Principal stresses - Maximum shearing stress - (MOHR'S circle)-Combined normal loads & ECACntricity loads - Columns - PDEssure vessels - Mechanical properties of materials and materials testing.								

الفرقة : الاولى القسم : ميكانيكا الفصل الدراسي :الثاني

Production and material engineering				Course Name		PDE 4122		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical	Teaching Hours
60			Written Exam	40	Term Work		شفوي/ Practical	Marking
Cast iron production in blast furnaces - Steel production - Production of nonferrous metals- Properties of metals and alloys- Crystal structure of materials - Phase theory and phase diagram of binary systems -Iron-carbon diagram - Heat treatment - Techniques and equipment of shaping and machining of metals (casting - welding - blanking -piercing- rolling – bending - forging - turning - extrusion).								

Fluid mechanics 1				Course Name		MPE 4123		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
120			Written Exam	60	Term Work	20	شفوي/ Practical	Marking
Fluid definition, fluid properties, dimensions and units - Fluid statics-Kinematics of fluid motion, continuity equation, circulation and vorticity- Flow of an ideal incomPDEssible fluid-Theory of momentum and its applications - Fluid flow in pipes -Dimensional analysis and similarity - Fluid measurements.								

Mechanical power engine drawing*				Course Name		MPE 4124		Code
2	Equivalent Credit Hr	4	Contact Hours	1	Lecture	3	Practical	Teaching Hours
75			Written Exam	40	Term Work	10	شفوي/ Practical	Marking
Piston & connecting rod - ECACntric - Safety valves–Lever safety valve-Stop valve - Spring relief valve – 20& 75mm cock - Drain valve - Three-way stop valve - Non-return valve - Cam shaft pump - Worm screw pump.								

Computer applications in mechanical power engineering 1				Course Name		MPE 4125		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
60			Written Exam	30	Term Work	10	شفوي/ Practical	Marking
Introduction-Modelling and simulation -Error analysis - Linear algebraic equations - Roots of equations - Applications in mechanical power engineering.								

Technical reports in mechanical power engineering				Course Name		MPE 4126		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
50			Written Exam	25	Term Work		شفوي/ Practical	Marking
Introduction -Types of technical reports -Writing the report -Choosing the right words - Polishing a report - References - Appendices.								

الفرقة :الثانيه القسم : ميكانيكا الفصل الدراسي :الاول

Mathematics 4				Course Name		BAS 4211		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
110			Written Exam	40	Term Work		شفوي/ Practical	Marking
Partial Differential Equations (PDE) Special functions (Gamma, Beta, Bessel and Legendre) – Fourier series – Fourier integral – Fourier transform – Partial differential equations (PDE)– Separation of variables method (heat equation, wave								

equation and Laplace equation) – Traveling wave solutions to PDE.

Complex Analysis

Complex Numbers – Functions of complex variable – Complex derivative – Analytic functions – Harmonic functions and their applications – Elementary functions – Complex integration – Cauchy theorems and their applications – Taylor and Laurent series – Residue theorem and its applications – Conformal mapping.

Thermodynamics 2				Course Name		MPE 4212		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي/ Practical	Marking
Gas power cycles - Steam power cycles -Efficiency analysis of thermal power plant - Combustion of fuels-Application of the first and second law of thermodynamics on combustion processes–Properties of moist air (psychometrics) -Basic air conditioning processes- Thermodynamics of fluid flow - Air comPDEssors.								

Measurements and measuring devices				Course Name		MPE 4213		Code
4	Equivalent Credit Hr	6	Contact Hours	3	Lecture	3	Practical	Teaching Hours
90			Written Exam	40	Term Work	20	شفوي/ Practical	Marking
Configurations and descriptions of measuring instruments -Characteristics of instruments and measurement systems- Errors analysis during the measurement process- PDEssure measurements - Flow measurements - Temperature measurements - Force, torque, and shaft power measurements - Miscellaneous measurements.								

Electrical engineering				Course Name		EE 4214		Code
4	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي/ Practical	Marking

The direct current - Electrical circuits theories -Delta and star junction and the conversion between them - Continuous sinusoidal AC circuits - RePDEsentation using time vectors - Electrical power and power coefficient in AC circuits – Three-phase current - Electrical machines - DC machines - Electrical transformers -Induction machines - Synchronize machines - Small power motors.

Theory of machine 1				Course Name		PDE 4215		Code
4	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي/ Practical	Marking
Positions and displacements - Velocity and aCACleration -Design of Cams - Gears and their types - Analysis of dynamic forces - The balance - Reciprocating engine dynamics - Torsional moment - Flywheels - Gear train -Gyroscopic forces - Applications.								

Introduction to Environmental Science				Course Name		MPE 4216		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
50			Written Exam	25	Term Work		شفوي/ Practical	Marking
Environment pollution and the natural balance - Air pollution - Disasters and environmental phenomena- air pollutants (source- effects - methods of control)- Important considerations about dealing with air pollutants - Water pollution and methods of control- Water pollution by oil and petroleum materials - Solid wastes pollution - Noise and morale pollution.								

التدريب الصيفى	Course Name	MPE 4217	Code

Numerical methods and statistics				Course Name		BAS 4221		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical	Teaching Hours
110			Written Exam	40	Term Work		شفوي/ Practical	Marking

Numerical Methods

Curve fitting – Interpolation – Numerical integration – Numerical solution of algebraic and transcendental equations – Iterative methods for solving system of linear algebraic equations – Numerical differentiation – Numerical solution of ordinary differential equations – Numerical solution of partial differential equations– Finite difference method.

Applied Probability and Statistics

Introduction to probability – Discrete random variables – Special discrete distributions – Continuous random variables – Special continuous distributions – Multiple random variables – Sampling distribution and estimation theory – Test of hypotheses – Correlation theory – Analysis of time series.

Fluid mechanics 2				Course Name		MPE 4222		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي/ Practical	Marking

Control volume analysis -Differential equations of fluid motion–Boundary layer theory- Ideal fluid flow.

Heat transfer 1				Course Name		MPE 4223		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي/ Practical	Marking

Principles of heat transfer -Conduction heat transfer -One, two, three-dimensional Heat Transfer- Numerical heat transfer, two-dimensional steady heat conduction -Fins - Transient heat conduction equations- External forced convection -Internal forced convection -Natural convection.								

Electronic engineering				Course Name		ECE 4224		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture	1	Practical	Teaching Hours
50			Written Exam	25	Term Work		شفوي/ Practical	Marking
Conductors and semiconductors - Diodes and its applications - Bipolar transistor - Field effect transistor - Basic amplifier transistor circuits - Feed and biasing transistors - Small signals transistors models -Single stage amplifier analysis - RC amplifiers -Time and frequency range - Impulse response - Feedback - Oscillators - Operational amplifiers and theirapplications- Switches - Logic gates - Logic circuits principles –Thyristors.								

Theory of machine 2				Course Name		PDE 4225		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي/ Practical	Marking
Introduction to mechanical vibration - Simple harmonic motion -Classification of mechanical vibrating systems - Free vibration - Forced harmonic vibration - Shafts vibration -Two-degree of freedom vibration of bodies - Multi-degree of freedom vibration of bodies -Torsional vibration in rotating shafts - Vibration of Geared systems - Critical speed of shafts-whirling of shafts.								

Computer applications in mechanical power engineering 2				Course Name		MPE 4226		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
60			Written Exam	30	Term Work	10	شفوي/ Practical	Marking
Introduction - Optimization-Curve fitting - Differentiation - Quadrature - Solving ordinary differential equations - Applications in mechanical power engineering (thermodynamics – heat transfer – fluid mechanics).								

Energy conversion				Course Name		MPE 4311		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي/ Practical	Marking
Energy classification, sources, utilization, economics, and terminology -Principal fuels for energy conversion- Production of thermal energy - Production of mechanical energy - Production of electrical energy - Energy storage.								

Heat and Mass transfer				Course Name		MPE 4312		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي/ Practical	Marking
Forced convection- Free or natural convection-Heat transfer by radiation-Condensation, evaporation, and boiling heat transfer- Heat exchangers- Mass transfer by molecular diffusion- Convective mass transfer.								

Theory of combustion				Course Name		MPE 4313		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	100	شفوي/ Practical	Marking
Introduction - Thermochemistry of combustion - Chemical equilibrium - Chemistry of combustion; (Rate of reaction - Order of reaction - Elementary reaction - Chain Reaction - Global Reaction) – PDEmixed combustion- Diffusion combustion- Combustion and environment.								

Steam Technology				Course Name		MPE 4314		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical	Teaching Hours
75			Written Exam	40	Term Work	10	شفوي/ Practical	Marking
Steam properties and processes -Measurement of dryness-fraction or quality of steam-Power plant cycles, advantages, disadvantages, and economics - Steam Generators - High PDEssure boilers - Boiler mountings and aCACssories -Steam nozzle-Draft of air and gases in boiler - Types of steam condensers.								

Elective course 1				Course Name		MPE 4315		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
60			Written Exam	30	Term Work	10	شفوي/ Practical	Marking
MPE Water Treatment Introduction -Characterization of domestic and industrial water-PDEtreatment and primary treatment- Theory and practice of aeration in wastewater treatment - Secondary treatment - Sludge treatment and disposal - Tertiary treatment of water. **MPE Petroleum engineering** History of the petroleum industry -Petroleum origins and accumulations -Petroleum exploration-Drilling prospects - Formation evaluation - Well completion -Artificial lift - Surface facilities -Reservoir performance -Natural gas processing and treatments - Refining and petrochemicals - Field management. **MPE Two-phase flow** Introduction -Two-phase flow patterns-Homogeneous flow model -Separated flow model-Drift flux model-Gravitational component of PDEssure gradient - PDEssure gradient due to changes in momentum - PDEssure drop due to friction.								

Computer applications in mechanical power engineering 3				Course Name		MPE 4316		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
60			Written Exam	30	Term Work	10	شفوي/ Practical	Marking
Governing equations of fluid flow and heat transfer -Construction of mathematical models for mechanical power engineering applications-Numerical solution and programming of systems of initial value problems in ordinary differential equations-Numerical solution and programming of systems of boundary value problems in ordinary differential equations-Numerical solution and programming of Diffusion process problem by FDM and FVM - Numerical solution and programming of Diffusion-Convection process problem by FDM and FVM -Numerical solution and programming of time								

dependent Diffusion-Convection processes problem by FDM and FVM.

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Gas dynamics				Course Name		MPE 4321		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي/ Practical	Marking
Basic concepts of comPDEssible fluid flow -Wave propagation in comPDEssible flow -Steady one-dimensional isentropic flow -Normal shock waves -Oblique shock waves- Flow in variable area ducts - Adiabatic flow in constant area ducts (Fanno Flow)-Isothermal flow in constant area ducts with friction - Flow in ducts with heat transfer (Rayleigh Flow) - Generalized one dimensional gas flow.								

Combustion engines				Course Name		MPE 4322		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي/ Practical	Marking
Introduction - Operating characteristics of internal combustion engines - Actual and standard cycles - Air and fuel induction–Combustion - Engine heat transfer –Engine exhaust - Engine cooling - Engine maintenance and lubrication - Engine performance tests.								

Power & Electrical machines				Course Name		EE 4323		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي/ Practical	Marking
Principles of electrical machines - AC and DC machines -Induction motors -Synchronized motors - Special motors - Transformers - AC and DC distribution systems - Transmission lines - Secondary stations - Stations devices.								

Design of machines				Course Name		PDE 4324		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical	Teaching Hours
85			Written Exam	40	Term Work		شفوي/ Practical	Marking

The Nature of mechanical design - Materials in mechanical design-Stress and deformation analysis - Combined stresses-loading-Columns - Shaft design-Types of gears, and gear forces - Belt and chain drives-Keys and couplings -Power screw - Fasteners and bolted connections - Riveted joints - Welded joints - PDEssure vessels - Liquid and gas pipe lines -Separation and transmission of motion (brakes-clutches).

Elective course 2				Course Name		MPE 4325		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
60			Written Exam	30	Term Work	10	شفوي/ Practical	Marking

MPE Water desalination

Single effect evaporation -Multiple effect evaporation– Multi-stage flash distillation-Reverse osmosis -Reverse osmosis feed treatment, fouling, and membrane cleaning - Solar desalination - Economic analysis of desalination processes.

MPE Fuel and oils

Fuel systems and technologies - Biofuels and fossil fuels - Solid fuel - Liquid fuel - Gas fuel - Fuel technology - Types of lubricants- Lubricant systems and technologies.

MPE Pipe lines

Energy transmission by pipes - PDEssure transport theory -Series and parallel pipes- Pipelines networks-Pumps-Fluid transient - Design using computer coding.

project management				Course Name		MPE 4326		Code
3	Equivalent Credit Hr	3	Contact Hours	3	Lecture		Practical	Teaching Hours
60			Written Exam	40	Term Work		شفوي/ Practical	Marking

Engineering project and project management -Assessment of environmental impact and project management -The technical and economic feasibility study and project management-Quality and project management-Project planning-Environmental management of projects.

Hydraulic machines				Course Name		MPE 4411		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي/ Practical	Marking
Basic theory of turbo-machines- Dimensional analysis and similitude of turbo-machines-Cascade mechanics - Pumps-Turbines -Fans, blowers and comPDEssors- Volumetric machines -Theory of cavitation in centrifugal pumps.								

Operation research				Course Name		PDE 4412		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي/ Practical	Marking
Linear programming - Transportation problem - Assignment problem -Simulation and Modeling - Analysis of stochastic models in OR –markovseries-Networks-Queuing theory -Sequencing and scheduling -Inventory control -Integer linear programming- Dynamic programming.								

Refrigeration and air conditioning				Course Name		MPE4413		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي/ Practical	Marking
Gas Refrigeration cycles - Vapor comPDEssion cycle- Working fluids - Multi PDEssure cycles - ComPDEssors - Condensers - Expansion devices - Evaporators - Complete vapor comPDEssion refrigeration system - Psychometric chart and air conditioning processes - Vapor absorption cycle - Applications in air conditioning- Designing considerations - Load estimation - Air transport and distribution -Design of air conditioning apparatus - Control units - Non-conventional cooling systems.								

Design of mechanical power engines				Course Name		MPE 4414		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي/ Practical	Marking
Introduction-Important characteristics and design parameters of ICE-Vibration and balancing of ICE-Design of ICE parts -Mechanical standards of gas turbine-Gas turbine dynamics and balancing-Design of axial turbine Blades-Centrifugal comPDEssor - Axial comPDEssor.								

Elective course 3				Course Name		MPE 4415		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
60			Written Exam	30	Term Work	10	شفوي/ Practical	Marking

MPE New and renewable energy

Introduction - Solar energy and its applications - Wind energy and its conversion systems - Biomass energy and its utilization systems - Hydraulic energy - Energy storage - Energy economics.

MPE Heat exchangers

Review of principles of heat transfer and thermodynamics - Classifications of heat exchangers - Fouling-Design of heat exchangers -Compact heat exchangers-Thermodynamic optimization of heat exchangers-Heat transfer and PDEssure drop analysis - Correlations in boiling and condensation processes.

MPE Engine performance

Characteristics of internal combustion engine performance - Constant velocity engine performance for variable loads - Engines and performance tests - Governors (types, and applications).

MPE Fluid machines

Introduction- Fans and blowers - ComPDEssors–Pumps - Wind Turbines- Hydraulic Devices.

Project*				Course Name		MPE 4416		
1	Equivalent Credit Hr	2	Contact Hours		Lecture	2	Practical	Teaching Hours
			Written Exam	40	Term Work	10	شفوي/ Practical	Marking

التدريب الصيفى	Course Name	MPE 4417	Code

Turbo machines				Course Name		MPE 4421		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي/ Practical	Marking

Introduction in Turbo machines - Thermodynamic cycles of turbo machines - Steam flow through steam turbine nozzles - Steam flow through turbine blades - Bleeding and reheat systems in steam turbines - Performance parameters at variable loads - Methods of steam turbine control - Velocity regulation - Gas turbines types - Elements of gas turbines used in power stations and jet engines - Gas turbine performance - Air comPDEssors - Design and methods of cooling of gas turbine blades - Inlet and outlet ports of gas turbines used in airplanes - Diffusers design - Combustion chambers in gas turbines.

Power plants				Course Name		MPE 4422		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي/ Practical	Marking

Engineering economy for power plants -Environmental aspects of power generation-Innovation technologies in the field of power plants-Basics of nuclear power plants- Steam generators and cycles -Watersystems in power plants.

Automatic control of energy systems				Course Name		MPE 4423		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
		60	Written Exam	40	Term Work		شفوي/ Practical	Marking

The principles of automatic control -Definitions - Modeling of natural systems - Open and closed systems -Laplace transformation-Block diagram and transfer functions- Signal flow diagram - Characteristics modeling - Design of feedback control systems - Temperature control systems -

PDEssure control systems - Velocity, and flow rate control systems - Computer applications on control systems.

Elective course 4				Course Name		MPE 4424		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
60			Written Exam	30	Term Work	10	شفوي/ Practical	Marking

MPE Solar energy

Introduction - Solar radiation - Solar energy col1ecton - Reflectors and lenses - Photovoltaic systems -Solar energy systems - Solar energy economics.

MPE Nuclear energy

Principals of nuclear physics - Reactor theory principals -Conversion of nuclear energy - Composition of power reactor systems-Reactor thermal design -Reactor operation - Nuclear energy economics.

MPE Solar cooling and heating

Introduction - Solar energy collection - Solar thermal systems - Solar powered adsorption cooling systems -Solar energy storage.

MPE Refrigeration and air conditioning Control systems

Control systemsfundamentals -Control system components - Methods of control -Types of system (classification by energy source)-Refrigerant flow expansion devices-Operational control devices - Refrigeration system aCACssories and safety devices.

MPE Fuel and combustion systems

Fuel types, characterization and specifications - Gaseous fuel combustion systems - Liquid fuel combustion systems- Solid fuel combustion systems- Fuel systems in petrol engines - Fuel systems in diesel engines - Fuel systems in gas turbines - Other applications in fuel systems.

MPE Natural gas technology

Properties of natural gases -Gas gathering and inlet separation -Sour gas treating - Natural gas dehydration - Sulfur recovery - Acid gas comPDEssion and injection - Hydrocarbon dew point control - NGLs recovery and fractionation - Gas comPDEssion and comPDEssible flow in pipes - Economics.

MPE Hydraulic control

Hydraulic control principles - Hydraulic control systems -Hydraulic pumps -Strainers and filters-Coolers - Heaters-Hydraulic motors -Hydrostatic drive -Hydraulic cylinders-Control valves-Accumulators - Basic circuits and sizing of hydraulic components.

MPE Hydraulic machines design

Theory and design of pumps and lifters - Performance curves - Design of radial flow devices - Pipe lines -Pelton wheel design

Contracts and Specifications				Course Name		MPE 4425		Code
3	Equivalent	3	Contact	3	Lecture		Practical	Teaching

	Credit Hr		Hours					Hours
60			Written Exam	40	Term Work		شفوي/ Practical	Marking
Contract Types -General Conditions of the tender and specifications -The drafting of technical specifications for engineering works-Specifications and technical requirements of the mechanical works-Technical specifications for the work of air conditioning - Applications and cases study.								

Project*				Course Name		MPE 4426		Code
3	Equivalent Credit Hr	6	Contact Hours	2	Lecture	4	Practical	Teaching Hours
100			مناقشة	40	Term Work	10	شفوي/ Practical	Marking

5 Production and Mechanical Design Engineering Program

Basic Information:

Program Name	Production and Mechanical Design Engineering
Department	Production and Mechanical Design Engineering
Program Type	**Single**
No of Semesters	**10**
No of Contact Hour	**278**
Lecture	**150**
Tutorial and Practical	**128**
Equivalent Credit Hours	**164**

Graduate attributes:

1. Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
2. Design a system; component and process to meet the required needs within realistic constraints.
3. Design and conduct experiments as well as analyze and interpret data.
4. Identify, formulate and solve fundamental engineering problems.
5. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
6. Work effectively within multi-disciplinary teams.
7. Communicate effectively.
8. Consider the impacts of engineering solutions on society & environment.
9. Demonstrate knowledge of contemporary engineering issues.
10. Display professional and ethical responsibilities and contextual understanding
11. Engage in self and life-long learning.
12. Work with mechanical design and manufacturing systems.
13. Use of mathematics, physical and engineering sciences as well as system analysis tools in mechanicaldesign and manufacturing.
14. Use different instruments appropriately and carry-out experimental design, automatic data acquisition, data analysis, data reduction and interpretation, and data presentation, both orally and in the written form.
15. Use the computer capabilities for design, analysis and visualization.
16. Use anddevelop computer software, necessary for design, manufacturing and management of industrial systems and projects.
17. Analyze multi-disciplinary mechanical, electrical, thermal and hydraulic systems.
18. Lead and supervise a group of designers or technicians and other work force.

CoursesDistributionof Production and Mechanical Design Engineering Department based on the Requirementsof Reference Framework and NARS

Code	Course Name	Contact Hrs.	Equiv. Credit Hrs	Requirements				Semester	Year
				University	Faculty	Dept.			
						Major	Minor		
BAS 1011	Mathematics (1)	5	3		5			First	Preparatory Year
BAS 1012	Physics (1)	6	4		6				
BAS 1013	Mechanics (1)	4	2		4				
PDE+BAS 1014	Engineering drawing and projection	5	3		5				
BAS 1015	Chemistry	5	3		5				
BAS 1016	English	4	2	4					
BAS 1021	Mathematics (2)	5	3		5			Second	
BAS 1022	Physics(2)	6	4		6				
BAS 1023	Mechanics(2)	4	2		4				
PDE 1024	Engineering drawing	4	2		4				
PDE 1025	Production engineering	4	2		4				
CAC 1026	Introduction to computer programming	4	2	4					
BAS1027	Introduction to Engineering Specialties	2	2	2					
BAS5111	Mathematics (3)	5	3		5			First	First Year
BAS5112	Applied Mechanics	4	2		4				
PDE 5113	Engineering Materials (1)(Faculty)	2	2			2			
PDE 5114	Mechanical Drawing (1)	4	2			4			
PDE 5115	Computer Applications (1)	5	3	5					
PDE 5116	Machining Processes and Equipment (1)	5	3			5			
PDE 5117	Engineering Economy	2	2		2				
BAS5121	Mathematics (4)	5	3		5			Second	
PDE 5122	Mechanics of Materials	4	3			4			
MPE 5123	Principles of Mechanical Engineering	5	3			5			
PDE 5124	Mechanical Drawing (2)	5	3			5			
PDE 5125	Forming Processes and Equipment (1)	5	3			5			
PDE 5126	Professional Ethics	2	2	2					
PDE 5127	Technical Reports	2	1	2					
PDE5211	Machine Design (1)	5	3			5		First	Second Year
PDE 5212	Forming Processes and Equipment (2)	4	2				4		
PDE 5213	Stress Analysis Systems	4	2			4			
EE5214	Electrical and Electronic Engineering	3	2		3				

PDE 5215	Computer Applications (2)	4	2	**4**					
PDE 5216	Engineering Management (1)	2	2			**2**			
PDE 5217	Finite element analysis of solids	4	2			**4**			
PDE 5218	Summer Training (1)	2							
BAS 5221	Mathematics (5)	4	2		**4**			**Second**	
PDE 5222	Machining Processes and Equipment (2)	5	3				**5**		
PDE 5223	Theory of Machine (1)	4	2			**4**			
PDE 5224	Machine Design (2)	5	3			**5**			
PDE 5225	Metrology (1)	5	3			**5**			
PDE 5226	Engineering Materials (2)	5	3			**5**			
PDE 5311	Theory of Machine (2)	**5**	3			**5**		**First**	**Third Year**
PDE 5312	Machine Tool Design (1)	**3**	2				**3**		
PDE 5313	Metrology (2)	**5**	3			**5**			
PDE 5314	Theory of Metal Cutting	**5**	3				**5**		
PDE 5315	Factory Planning and Production Processes	**5**	3				**5**		
PDE 5316	Elective Course (1)	**3**	2				**3**		
PDE 5317	Analytical & Research Skills	**2**	2	**2**					
PDE 5321	Computer Numerical Control Machines	**5**	3			**5**		**Second**	
PDE 5322	Machine Tool Design (2)	**5**	3				**5**		
PDE 5323	Theory of Metal Forming	**5**	3				**5**		
PDE 5324	Statistical Applications in Production Engineering	**3**	2			**3**			
PDE 5325	Machining Processes and Equipment (3)	**4**	2				**4**		
PDE 5326	Engineering Management (2)	**3**	2			**3**			
PDE 5327	Elective Course (2)	**3**	2				**3**		
PDE 5411	Analysis of Production Systems	**4**	3			**4**		**First**	**Fourth Year**
PDE 5412	Production Tools and Equipment Design	**5**	3				**5**		
CAC 5413	Systems and Control (1)	**4**	3			**4**			
PDE 5414	Fine Measurements	**6**	4				**6**		
PDE 5415	Elective Course (3)	**4**	2				**4**		
PDE 5416	Graduation Project (1)	**3**	1				**3**		
PDE 5417	Summer Training (2)	**2**				**2**			
PDE 5421	Mechanical Maintenance	**2**	2				**2**	**Second**	
PDE 5422	Machine Tool Design (3)	**5**	3				**5**		
PDE 5423	Production Quality Control	**5**	3			**5**			

CAC 5424	Systems and Control (2)	**5**	3			**5**		
PDE 5425	Elective Course (4)	**2**	2				**2**	
PDE 5426	Graduation Project (2)	**6**	2				**6**	
Total		**276**	**164**	**25**	**71**	**102**	**75**	
Percentage				**8.9**	**25.4**	**36.5**	**26.8**	
Min		**250**	**160**	**6**	**22**	**30**	**20**	
Max		**280**	**180**	**10**	**30**	**35**	**30**	

Program Courses and Subject Areas:

PreparatoryYear -First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1011	Mathematics (1)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1012	Physics (1)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1013	Mechanics (1)	2	2	0	**4**	2	3	35	0	90	**125**			3		1		
PDE+BAS 1014	Engineering drawing and projection	2	0	3	**5**	3	3	50	0	100	**150**					5		
BAS 1015	Chemistry	2	0	3	**5**	3	3	35	10	80	**125**			3		2		
BAS1016	English	1	0	3	**4**	2	2	10	0	40	**50**	4						
Total		13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0

Preparatory Year- Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Duration	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1021	Mathematics (2)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1022	Physics(2)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1023	Mechanics(2)	2	2	0	**4**	2	2	30	0	70	**100**			3		1		
PDE1024	Engineering drawing	1	3	0	**4**	2	3	30	0	70	**100**					4		
PDE1025	Production engineering	1	0	3	**4**	2	2	30		70	**100**				2	2		
CAC 1026	Introduction to computer programming	1	0	3	**4**	2	2	20	10	70	**100**					4		
BAS1027	Introduction to Engineering Specialties	2	0	0	**2**	2	2	0	0	50	**50**	2	0	0	0	0	0	0
Total		13	7	9	29	17	17	200	20	530	750	2	0	12	2	13	0	

First Year- First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Duration	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS5111	Mathematics (3)	3	2		5	3	3	50		75	**125**			5				
BAS5112	Applied Mechanics	2	2		4	2	3	25		75	**100**			2		2		
PDE 5113	Engineering Materials (1)	2			2	2	2	25		75	**100**			1		1		
PDE 5114	Mechanical Drawing (1)	1	3	0	4	1	4	25		75	**100**					2	2	
PDE 5115	Computer Applications (1)	2	0	3	5	3	2	25	25	75	**125**						5	
PDE 5116	Machining Processes and Equipment (1)	2	0	3	5	3	3	50	25	50	**125**					3	2	
PDE 5117	Engineering Economy	2	0		2	2	2	25		50	**75**		2		1			
Total		14	4	9	**27**	17	19	265	50	435	**750**	0	2	8	1	8	9	

First Year- Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Duration	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS5121	Mathematics (4)	3	2		**5**	3	3	50		75	**125**			5				
PDE 5122	Mechanics of Materials	3	1		**4**	3	3	40		60	**100**			2		2		
MPE 5123	Principles of Mechanical Engineering	3	2		**5**	3	3	50		100	**150**				3	3		
PDE 5124	Mechanical Drawing (2)	2		3	**5**	3	3	40		60	**100**					2	3	
PDE 5125	Forming Processes and Equipment (1)	2	0	3	**5**	3	3	25	25	100	**150**					2	3	
PDE 5126	Professional Ethics	2	0		**2**	2	2	25		50	**75**	2						
PDE 5127	Technical Reports	1	1		**2**	1	2	25		25	**50**							2
Total		16	6	6	**28**	18	18	255	25	470	**750**	2		7	3	9	6	2

Second Year- First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Duration	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
PDE 5211	Machine Design (1)	3	2		5	3	3	50		75	**125**						5	
PDE 5212	Forming Processes and Equipment (2)	1		3	4	2	3	25	25	50	**100**					2	2	
PDE 5213	Stress Analysis Systems	2	2		4	2	3	40		60	**100**					2	2	
EE5214	Electrical and Electronic Engineering	2	1		3	2	4	50		75	**125**				1	2		
PDE 5215	Computer Applications (2)	1	0	3	4	2	3	25	25	50	**100**	2					2	
PDE 5216	Engineering Management (1)	2			2	2	3	25		25	**50**	1	1					
PDE 5217	Finite element analysis of solids	1		3	4	2	3	35	15	50	**100**			2			2	
PDE 5218	Summer Training (1)		2		2						**50**							2
Total		12	7	9	**28**	15	22	260	115	400	**750**	3	1	2	1	6	13	2

Second Year- Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 5221	Mathematics (5)	2	2		4	2	3	40		60	**100**			4				
PDE 5222	Machining Processes and Equipment (2)	2		3	5	3	3	40	25	60	**125**					2	3	
PDE 5223	Theory of Machine (1)	2	2		4	2	3	50		75	**125**					2	2	
PDE 5224	Machine Design (2)	3	2		5	3	3	60		90	**150**						5	
PDE 5225	Metrology (1)	2		3	5	3	3	25	25	75	**125**				2	3		
PDE 5226	Engineering Materials (2)	3	2		5	3	3	40		60	**100**					3	2	
Total		14	10	6	**28**	16	18	255	50	420	**725**			4	2	10	12	

Third Year- First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
PDE 5311	Theory of Machine (2)	3	2		**5**	3	3	50		75	**125**					4	1	
PDE 5312	Machine Tool Design (1)	2	1		**3**	2	2	25		75	**100**						3	
PDE 5313	Metrology (2)	2		3	**5**	3	3	25	25	75	**125**			3		2		
PDE 5314	Theory of Metal Cutting	3	2		**5**	3	3	50		75	**125**				2	3		
PDE 5315	Factory Planning and Production Processes	3	2		**5**	3	3	50		75	**125**	3			2			
PDE 5316	Elective Course (1)	2	1		**3**	2	3	40		60	**100**					1	2	
PDE 5317	Analytical & Research Skills	2	0		**2**	2	2	20		30	**50**	2						
Total		18	9	3	**28**	17	19	235	25	465	**750**	5	2	3	4	13	6	

Third Year- Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
PDE 5321	Computer Numerical Control Machines	2		3	**5**	3	3	25	25	75	**125**					2	3	
PDE 5322	Machine Tool Design (2)	2		3	**5**	3	3	25	25	50	**100**						3	2
PDE 5323	Theory of Metal Forming	3	2		**5**	3	3	50		75	**125**				2	3		
PDE 5324	Statistical Applications in Production Engineering	2	1		**3**	2	3	25		75	**100**			2			1	
PDE 5325	Machining Processes and Equipment (3)	2	2		**4**	2	3	50		75	**125**					2	2	
PDE 5326	Engineering Management (2)	2	1		**3**	2	2	25		50	**75**	2	1					
PDE 5327	Elective Course (2)	2	1		**3**	2	3	40		60	**100**						3	
Total		15	7	6	**28**	17	20	240	50	485	**750**	2	1	2	2	7	12	2

Fourth Year -First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Duration	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
PDE 5411	Analysis of Production Systems	3	1		**4**	3	3	50		75	**125**	2					2	
PDE 5412	Production Tools and Equipment Design	3	2		**5**	3	3	50		75	**125**					2	3	
CAC 5413	Systems and Control (1)	3	1		**4**	3	3	70		80	**150**				2	2		
PDE 5414	Fine Measurements	3		3	**6**	4	3	40	30	80	**150**					3	3	
PDE 5415	Elective Course (3)	2	2		**4**	2	3	40		60	**100**					1	3	
PDE 5416	Project (1)	1	2		**3**	1	0	50			**50**							3
PDE 5417	Summer Training (2)		2		**2**				50		**50**							2
Total		15	10	3	**28**	15	18	300	80	370	**750**	2			2	8	11	5

Fourth Year- Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
PDE 5421	Mechanical Maintenance	2			**2**	2	3	50		50	**100**						2	
PDE 5422	Machine Tool Design (3)	2		3	**5**	3	3	30	25	70	**125**						5	
PDE 5423	Production Quality Control	3	2		**5**	3	3	40		85	**125**	2	3					
CAC 5424	Systems and Control (2)	2		3	**5**	3	3	50	20	80	**150**					2	3	
PDE 5425	Elective Course (4)	2			**2**	2	3	40		60	**100**						2	
PDE 5426	Graduation Project (2)	0	0	6	**6**	2	0	25	50	75	**150**						3	3
Total		11	5	12	**25**	15	14	235	95	420	**750**	2	3			2	15	3

Elective Courses

Elective Course (1)			
1.	Robot Arm Engineering	5.	Product Design
2.	Production Technology	6.	Environmental Engineering
3.	Nontraditional Measurements	7.	Industrial and Professional Safety
4.	Packing and Packaging Engineering	8.	Biomedical Engineering
Elective Course (2)			
1.	Heat Treatment	5.	Design of Mechanical Equipment
2.	Industrial Oil Engineering	6.	Engineering Materials Selection
3.	Work Study	7.	Micro Electro-Mechanical Systems (MEMS)
4.	Industrial Relation and Regulation laws		
Elective Course (3)			
1.	Methods and Techniques of Design	5.	Reverse Engineering in Mechanical Design
2.	Scientific Management Systems	6.	Mechatronic
3.	Design and Production of Dies	7.	Design and Production of Cutting Tools
4.	Nontraditional Forming Processes		
Elective Course (4)			
1.	Computer Aided Manufacturing	5.	Feasibility Study
2.	Optimum Design	6.	Composite Materials
3.	Operations Research	7.	Hydraulic Control Systems
4.	Nontraditional Machining Processes		

Total teaching hours and subject's distribution over the subject areasaccording theReference Framework and NARS

Semester	Teaching Hours				Equivalent Criedit Hours	Wr. Exam Dur.	Marking				Subject Area						
	Lectures	Tutorial	Practical	Total Hours			Year Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
Preparatory year/ 1st semester	13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0
Preparatory year/ 2ndsemester	13	7	9	29	17	17	200	20	530	750	2	0	12	2	13	0	
First year/1st semester	14	4	9	**27**	17	19	265	50	435	**750**	0	2	8	1	8	9	
First year/ 2nd semester	16	6	6	**28**	18	18	255	25	470	**750**	2		7	3	9	6	2
Second year/1st semester	12	7	9	**28**	15	22	260	115	400	**750**	3	1	2	1	6	13	2
Second year/ 2nd semester	14	10	3	**27**	15	18	255	50	420	**725**	0	0	6	2	8	10	
Third year/1st semester	18	9	3	**28**	17	19	235	25	465	**750**	5	2	3	4	13	6	
Third year/ 2nd semester	15	7	6	**28**	17	20	240	50	485	**750**	2	1	2	2	7	12	2
Fourth year/1st semester	15	10	3	**28**	15	18	300	80	370	**750**	2			2	8	11	5
Fourth year/ 2nd semester	11	5	12	**25**	15	14	235	95	420	**750**	2	3			2	15	3
Total	**141**	**66**	**72**	**279**	**164**		**2490**	**515**	**4495**	**7500**	**24**	**9**	**55**	**17**	**84**	**82**	**14**
%											**8.6**	**3.2**	**19.7**	**6**	**30**	**29.3**	**5**
% NARS And Reference framework — **minimum**				**250**	**160**						**8.00**	**2.00**	**18.00**	**4.00**	**25.00**	**25.00**	**4.00**
% NARS And Reference framework — **maximum**				**280**	**180**						**12.00**	**4.00**	**22.00**	**6.00**	**30.00**	**30.00**	**6.00**

Requirements	No. of Courses	Hours of Study	Percentage	Objectives
Humanities & Social Science	**5**	**23**	8.3	Provide students with important concepts in thinking, research, and communication.
Business Administration	**5**	**7**	2.5	Student should be aware of working flow and planning in factories and companies.
Mathematics & Basic Science	**22**	**59**	21.7	Increase student's skills by building strong background in basic sciences.
Engineering Culture	**8**	**12**	4.3	Increase student's background in different engineering fields.
Basic Engineering Sci.	**40**	**80**	28.9	Building the basic backgound in Engineering.
Applied Eng. & Design	**42**	**83**	30.3	Building the background in Textile field and its Practical/Oral/ORAL implementation.
Projects & Practice	**7**	**13**	4.7	Student's ability to apply the knowledge and skills acquired during study under supervision of the academic mentor.

Course contents

First Year First Semester

Course Code		**BAS 51111**		**Course title**		**Mathematics (3)**		
Hours	Tutorial/Practical	2/0	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	50	Written exam	75	Total	125

Ordinary Differential Equations (ODE) course

Homogeneous higher order ODE – Nonhomogeneous higher order ODE with constant coefficients (undetermined coefficients method and variation of parameters method for finding the particular solution) – Cauchy-Euler ODE (homogeneous and nonhomogeneous) – System of ODE – Laplace transform – Inverse Laplace transform – Applications of Laplace transform – Series solution of ODE.

Functions of Several Variables course

Differentiation of integration – Vector calculus – Multiple integrals (double and triple) and their applications – Line integral – Green's theorem – Surface integral – Divergence (Gauss) and Stokes' theorems – Mathematical modeling using partial differential equations.

Course Code		**BAS 5112**		**Course title**		**Applied Mechanics**		
Hours	Tutorial/Practical	2/0	Lectures	2	Contact hours	4	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	25	Written exam	75	Total	100

The kinematics and Kinetics of a particle in space curvilinear motion (Equation of motion – work and energy – Impulse and momentum) – The Kinematics, Kinetics and a general Planar motion of a rigid body.

Course Code		**PDE 5113**		**Course title**		**Engineering Materials (1)**		
Hours	Tutorial/Practical	0	Lectures	2	Contact hours	2	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	25	Written exam	75	Total	100

Engineering Materials - Mechanical testing and Properties - Atomic Structure and arrangement- Imperfections in the Atomic Arrangement- Strengthening by Cold-Working- Thermal Equilibrium Diagrams.

Course Code		**PDE5114**		**Course title**		**Mechanical Drawing (1)**		
Hours	Tutorial/Practical	3/0	Lectures	1	Contact hours	4	Credit hours	1
Course grades	Practical/Oral	0/0	Semester Work	25	Written exam	75	Total	100

Types of joints -Bolted joints drawings and types of bolts - Key, Pin joints drawing and its applications- Welded, Riveted joints drawing and its applications- Screw jack drawing- Fits,Tolerance,Machining remarks and application on machine element drawing- Sliding bearing drawing- Gear drawing and applications.

Course Code		**PDE 5115**		**Course title**		**Computer Applications (1)**		
Hours	Tutorial/Practical	0/3	Lectures	2	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	25/0	Semester Work	25	Written exam	75	Total	125

Basic Programming Languages- Method of writing programs- Arithmetic Computations- Variables and Functions- Loops and Arrays- Decision Taking- Basic Computer Drawing- Methods of describing coordinates and dimensions- Applications.

Course Code		**PDE 5116**		**Course title**		**Machining Processes and Equipment (1)**		
Hours	Tutorial/Practical	0/3	Lectures	2	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	25/0	Semester Work	50	Written exam	50	Total	125

Safety and safety precautions in production workshops - Concept of metal cutting process - Cutting conditions - Transmission methods and speed change mechanisms in production machines - Sawing - Turning - Shaper and planner - Drilling - Reaming - Milling - Workpiece holding devices - holding devices of cutting tools

Course Code		**PDE 5117**		**Course title**		**Engineering Economy**		
Hours	Tutorial/Practical	0/0	Lectures	2	Contact hours	2	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	25	Written exam	50	Total	75

Introduction to cost analysis - Present worth – future worth analysis- Uniform series cash flow- Gradient series cash flow - Geometric series cash flow - Comparing alternatives using present worth analysis- Comparing alternatives using annual worth analysis - Comparing alternatives using future worth analysis- Rate of return analysis - Incremental rate of return analysis - Break-even analysis - Sensitivity analysis - Replacement analysis - Risk analysis.

First Year Second Semester

Course Code		**BAS 5121**		**Course title**		**Mathematics (4)**		
Hours	Tutorial/Practical	2/0	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	75	Total	125

Partial Differential Equations (PDE) course

Special functions (Gamma, Beta, Bessel and Legendre) – Fourier series – Fourier integral – Fourier transform – Partial differential equations (PDE) – Separation of variables method (heat equation, wave equation and Laplace equation) – Traveling wave solutions to PDE.

Complex Analysis course

Complex Numbers – Functions of complex variable – Complex derivative – Analytic functions – Harmonic functions and their applications – Elementary functions – Complex integration – Cauchy theorems and their applications – Taylor and Laurent series – Residue theorem and its applications – Conformal mapping

Course Code		**PDE 5122**		**Course title**		**Mechanics of Materials**		
Hours	Tutorial/Practical	1/0	Lectures	3	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	40	Written exam	60	Total	100

Review of statics (force, moment, couples, transfer of force, equilibrium of force system, free-body diagrams) - The concept and relationship between stress and strain - Axial stresses, statically indeterminate systems - Bearing stresses, factor of safety and stress concentration - Thermal stresses and statically indeterminate problems - Shearing stress and strain & Direct shearing stress - Bending of beams: shear and moment diagrams - Stresses in beams - Beam deflections (Double integration & Superposition) - Combined stresses (combined normal & shear), Principal stresses - Maximum shearing stress - (MOHR'S circle) - Combined normal loads & ECACntric loads - Columns: EULER'S column formula - Mechanical properties of materials and materials testing.

Course Code		**MPE 5123**		**Course title**		**Principles of Mechanical Engineering**		
Hours	Tutorial/Practical	2/0	Lectures	4	Contact hours	6	Credit hours	4
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	100	Total	150

Thermodynamics

What is thermal systems engineering and theuse of energy - Evaluating properties of ideal gas: p-v-T relation- The first law and thermodynamic processes - The second law of thermodynamics: Carnot cycle, 2nd law applications tothermodynamic cycles(I.C.E., Air standard gas cycles) - Properties of pure substance and processes of steam - Classification of boilers, construction and safety devices, Improving Performance- superheat and Reheat steam power cycles - Reversed Carnot cycle & Analysis of vapor refrigeration and heat pump systems; refrigerant, properties and p-H charts - Modes of Heat Transfer; conduction, convection and radiation - Psychrometric applications, moist air properties, A/C processes, and psychrometric chart.

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Fluid Mechanics

Fundamental concepts: Definition of a fluid, Dimensions and units. Fluid properties- Fluid static: Pressure and pressure measurements, Hydraulic forces on submerged surfaces, Forces on floating and submerged bodies, Fluid masses under aCACleration, Rotating containers - Basic Equations of Fluid Mechanics: kinematics of flow, continuity, momentum, energy and Bernoulli's Equations. Hydraulic and energy gradient lines - Flow in pipes: laminar and turbulent flows, primary and minor losses, pipes in parallel and series and pipe branching.

Course Code		**PDE 5124**		**Course title**		**Mechanical Drawing (2)**		
Hours	Tutorial/Practical	0/3	Lectures	2	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	40	Written exam	60	Total	100
Vices drawings - Spring drawing and applications - Valve drawings - Pump drawing - Reduction gear box drawing - Chuck and hand drill drawing								

Course Code		**PDE 5125**		**Course title**		**Forming Processes and Equipment (1)**		
Hours	Tutorial/Practical	1/1	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	25/0	Semester Work	25	Written exam	100	Total	150
Introduction to manufacturing technology - Manufacturing economics - Mechanical behavior of metals - Casting processes - Casting defects - Welding processes - Welding inspection and test								

Course Code		**PDE 5126**		**Course title**		**Professional Ethics**		
Hours	Tutorial/ Practical	0/0	Lectures	1	Contact hours	1	Credit hours	1
Course grades	Practical/Oral	0/0	Semester Work	25	Written exam	50	Total	75
What is a Profession - Professional Codes of Ethics - Individual Responsibility - Professional Competence/Autonomy - Tension Between Professional Standards and Moral Rules.								

Course Code		**PDE5127**		**Course title**		**Technical Reports**		
Hours	Tutorial/Practical	1/0	Lectures	1	Contact hours	2	Credit hours	1
Course grades	Practical/Oral	0/0	Semester Work	25	Written exam	25	Total	50

Texts in production engineering - Writing experimental and technical reports - Preparation of abstracts of specialized articles - Discussions and training between students- Preparation of abstracts of read articles.

Second Year First Semester

Course Code		**PDE5211**		**Course title**		**Machine Design (1)**		
Hours	Tutorial/Practical	2/0	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	75	Total	125
Introduction to Design Codes and Standards - Theories of Failure - Material Selection - Design of Riveted Joints and Welded Joints - Design of Threaded Fasteners and Power Screws - Design of Couplings, Keys, Pins and Splines - Design of Mechanical Springs - Design of Shafts - Design of Cylinders - Design of Sealing and Gaskets – Design of Power Screw Jack								
Course Code		**PDE5212**		**Course title**		**Forming Processes and Equipment (2)**		
Hours	Tutorial/Practical	0/3	Lectures	1	Contact hours	4	Credit hours	2
Course grades	Practical/Oral	25/0	Semester Work	25	Written exam	50	Total	100
Introduction to metal forming processes - Upset forming processes - Extrusion processes - Cold hobbing process - Coining - Stamping process - Ironing process - Wire drawing process - Tube drawing process - Deep drawing processes - Bending process - Shearing processes - Fine blanking - Types of presses.								

Course Code		**PDE5213**		**Course title**		**Stress Analysis Systems**		
Hours	Tutorial/Practical	2/0	Lectures	2	Contact hours	4	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	40	Written exam	60	Total	100
Elementary Elasticity: Stress & strain relation, Transformation & principal values of stress & strain - Types of stress & strain measuring apparatus - Electrical resistance strain gauges: Various arrangements, Recording instrument & Analysis of data - Photo elasticity Methods: two & three-dimensional photo elasticity - Moire method - Coating methods: Photo elastic coating & Brittle coating.								

Course Code		**EE5214**		**Course title**		**Electrical and Electronic Engineering**		
Hours	Tutorial/Practical	1/0	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	75	Total	125

Basic elements of electrical circuits - The direct current - Electrical circuits theories - Delta and star junctions and the conversion between them- Continuous sinusoidal AC circuits solving using time vectors- Conductors and semiconductors - Diodes and its applications - Bipolar transistor - Basic amplifier circuits.

Course Code		**PDE 5215**		**Course title**		**Computer Applications (2)**		
Hours	Tutorial/Practical	0/2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	25/0	Semester Work	25	Written exam	50	Total	100
Importance of computers for engineering applications - Computer Aided Drafting and Design (CAD)- Computer Aided Manufacturing (CAM) - Simulation Using computers - Computer Aided Manufacturing for rapid prototyping - Using PLC in industrial processes - Robot programming and material handling using Automated Guided Vehicles - Programming and simulation of precision controllers.								

Course Code		**PDE 5216**		**Course title**		**Engineering Management (1)**		
Hours	Tutorial/Practical	1/0	Lectures	1	Contact hours	2	Credit hours	1
Course grades	Practical/Oral	0/0	Semester Work	25	Written exam	25	Total	50
Introduction to engineering management - Organizing and the human element - Tools for effective engineering and technology management - Project selection and management - Management of engineering design and product costing - Management of proposals and contracts - Creativity and innovation.								

Course Code		**PDE 5217**		**Course title**		**Finite Element Analysis of Solids**		
Hours	Tutorial/ Practical	1/2	Lectures	1	Contact hours	4	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	50	Total	100
Introduction - Useful Definitions (Analysis Discipline, Time Dependence, Nonlinearity, Practical Modeling Considerations) - Fundamentals Of Discretization - FEA Software, i.e. ANSYS Preprocessor, ANSYS Solution and Post processing- Finite Element Equations - Use of Commands in ANSYS (APDL) - Linear Structural Analysis (Static, Linear Buckling, Thermomechanical, Fracture Mechanics, And Dynamic Analysis) - Nonlinear Structural Analysis (Geometric Nonlinearity - Material Nonlinearity - Contact) - Solution of dynamic equilibrium equations								

Course Code		**PDE 5218**		**Course title**		**Summer training**		
Hours	Tutorial/Practical	2/0	Lectures	2	Contact hours		Credit hours	

Course grades	Practical/Oral	0/0	Semester Work		discussion	50	Total	50
Training is carried out according to a program developed by the scientific department annually**.**								

Second Year Second Semester

Course Code		**BAS 5221**		**Course title**		**Mathematics (5)**		
Hours	Tutorial/Practical	2/0	Lectures	2	Contact hours	4	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	40	Written exam	60	Total	100

Numerical Methods

Curve fitting – Interpolation – Numerical integration – Numerical solution of algebraic and transcendental equations – Iterative methods for solving system of linear algebraic equations – Numerical differentiation – Numerical solution of ordinary differential equations – Numerical solution of partial differential equations – Finite difference method.

Applied Probability and Statistics

Introduction to probability – Discrete random variables – Special discrete distributions – Continuous random variables – Special continuous distributions – Multiple random variables – Sampling distribution and estimation theory – Test of hypotheses – Correlation theory – Analysis of time series.

Course Code		**PDE 5222**		**Course title**		**Machining Processes and Equipment (2)**		
Hours	Tutorial/Practical	1/2	Lectures	2	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	25/0	Semester Work	40	Written exam	60	Total	125

Grinding machines - Grinding wheels - Grinding parameters - Wheels and workpiece holders - Cutting tool materials - Turret and Capstan lathes - Advanced methods for producing holes - Gear manufacturing - Cam-shafts manufacturing - Economy of traditional machining processes - Computer applications.

Course Code		**PDE 5223**		**Course title**		**Theory of Machine (1)**		
Hours	Tutorial/Practical	2/0	Lectures	2	Contact hours	4	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	75	Total	125

Mechanisms and Machines: Classification of Machines, Kinematic Pairs - Velocity Analysis: Analytical, Graphical, Instantaneous center method - ACACleration Analysis: Analytical, Graphical - Epicyclical Gear trains - Cams and followers - Static force analysis - Balancing.

Course Code		PDE5224		Course title		Machine Design (2)		
Hours	Tutorial/Practical	2/0	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	60	Written exam	90	Total	150
Design of shafts - Types of gears - Design of spur gears (gear geometry- contact ratio- kinematics- gear tooth correction- design of gear tooth according to tooth breakage- tooth surface failure- gear construction) - Design of helical gears and double helical gears - Design of bevel gears - Design of worm gears - Types of bearing - Journal bearing design - Rolling bearing design - Reduction speed gear box design and construction drawing.								

Course Code		PDE5225		Course title		Metrology (1)		
Hours	Tutorial/Practical	1/1	Lectures	2	Contact hours	4	Credit hours	2
Course grades	Practical/Oral	25/0	Semester Work	25	Written exam	75	Total	125
Introduction and basic measurement fundamentals - Measurement error - Linear measurements - Comparators (Mechanical – Electrical – Pneumatic – Optical) - Angular measurements - Pressure and Temperature measurements - Time, velocity and aCACleration measurements - Force, torque and power measurements.								

Course Code		PDE5226		Course title		Engineering Materials (2)		
Hours	Tutorial/Practical	2/0	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	40	Written exam	60	Total	100
Iron ores and their preparations - Production of cast iron in blast furnace - Steel making processes - Production of aluminum, copper and titanium - Mechanical properties of metals and their alloys - Heat treatment of ferrous and nonferrous metals - Corrosion of metals and alloys- Reports and presentation.								

Third Year First Semester

Course Code		PDE5311		Course title		Theory of Machine (2)		
Hours	Tutorial/Practical	2/0	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	75	Total	125
Introduction to mechanical vibration - Simple Harmonic Motionand classification of mechanical vibrating systems- Single degree of freedom free Undamped system - Single degree of freedom free damped system - Single degree of freedom forced damped system - Applications on single degree forced damped system - Transverse vibration and critical speed of shafts (whirling of shafts)-								

Torsional vibration in rotating shafts - Vibration of Geared systems- Two degrees of freedom (Newton's Method)- Two degrees of freedom (Lagrange's equation)- Multi-Degree of freedom- Introduction to finite element method - Vibration analysis using finite element method (modal, harmonic, transient)

Course Code		**PDE 5312**		**Course title**		**Machine Tool Design (1)**		
Hours	Tutorial/Practical	1/0	Lectures	2	Contact hours	3	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	25	Written exam	75	Total	100
Classification of metal cutting machine tools - Cutting and feed motions for machine tools - Machine tool elements - Force analysis and derivation on machine tool parts - Speed and feed gearboxes design.								

Course Code		**PDE 5313**		**Course title**		**Metrology (2)**		
Hours	Tutorial/Practical	1/1	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	25/0	Semester Work	25	Written exam	75	Total	125
IT system for engineering tolerance - Limits, fits, and gauges design.(determine GO and NOGO for limit gauges by using measure scope, sigma comparator and optical comparator) - Geometrical and Dimensional tolerance - Surface Texture Tolerances - Metrology of thread.(measuring the major diameter, minor diameter, pitch, helix angle and pitch error by using measure scope, projector, and microscope) - Gauges for Thread. (measuring the effective diameter by floating micrometer) - Metrology of Bearing - Flatness and straightness measurements. (straightness and flatness measurements by using dial indicator, spirit level, and clinometers) - Machine tool tests. (Test for level of installation, Spindle axis parallel to bed, The axial slip or float of the spindle, Tailstock quill movement parallel to bed, Cross-slide perpendicular to spindle axis)								

Course Code		**PDE 5314**		**Course title**		**Theory of Metal Cutting**		
Hours	Tutorial/Practical	2/0	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	75	Total	125
Mechanics of metal cutting - Geometry of cutting tools - Cutting forces for machining processes - Methods of measurement of cutting forces - Tool Wear - Tool Life - Heat Generation in metal cutting - Measuring Methods of cutting heat.								

Course Code		PDE 5315		Course title		Factory Planning and Production Processes		
Hours	Tutorial/Practical	2/0	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	75	Total	125
Introduction to manufacturing enterprises - Manufacturing systems - Management of design - Introduction to system analysis and system design - Probability and statistics - Forecasting - Open-loop control systems - Closed-loop control systems - Master production scheduling - Just-in-time.								

Course Code		PDE 5316		Course title		Elective Course (1)		
Hours	Tutorial/Practical	1/0	Lectures	2	Contact hours	3	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	40	Written exam	60	Total	100

Courses

1.	Robot Arm Engineering	5.	Product Design
2.	Production Technology	6.	Environmental Engineering
3.	Nontraditional Measurements	7.	Industrial and Professional Safety
4.	Packing and Packaging Engineering	8.	Biomedical Engineering

Robot Arm Engineering:
Introductionon robotics - Homogenous Transformations - Forward Kinematics - Inverse Kinematics - Velocity Kinematics - Trajectory Planning - Dynamics - Introduction to Joints Control - Robot programming and applications

Production Technology:
Introduction - Concurrent engineering - Configuration management - Value engineering - Reverse engineering - Total Quality Management - Maintenance management.

Nontraditional Measurements:
Surface Roughness - Measuring Techniques and Instruments - 3D Surface Roughness Characterization - Computer aided measurements - Mechanical Vibration Measurements - Laser measurements.

Packing and Packaging Engineering:
Packaging design - Packaging materials and testing- Distribution packaging design, analysis and testing - Packaging machinery systems - Packaging industry projects-

Product Design:
Introduction- Kansei Engineering- Quality Function Deployment - Axiomatic Design - Failure Mode and Effect Analysis - Design-for-X.

Environmental Engineering:
Introduction and definitions - Water quality- Air pollution- Solid waste management - Environmental modeling - Solid pollution- Problems & applications.

Industrial and Professional Safety:
Introduction: safety in the use of machines - Systems safety analysis and management - Personal

safety and life support - Human factors in health and safety: injury and illness record keeping- Identifying hazards: hazards and risk management - Disaster response and management - Theories of accident causation - Accident investigation and analysis- Industrial hygiene instrumentation - Fire safety- Safety audit and inspection.
Biomedical Engineering: Introduction to biomechanical engineering - Anatomy and structure of natural and artificial human joints - Failure of artificial joints - Biomaterials - Kinematics and kinetics of joints- Force analysis of natural and artificial joints - Analyze the stresses and strains in natural and artificial joints - Lubrication in natural and artificial joints- Modeling and simulation of natural joints.

Course Code		**PDE 5317**		**Course title**		**Analytical & Research Skills**		
Hours	Tutorial/Practical	0/0	Lectures	1	Contact hours	1	Credit hours	1
Course grades	Practical/Oral	0/0	Semester Work	20	Written exam	30	Total	50
Problem solving/reasoning. Interpreting Data –Planning - Prioritizing - Experimental design - Scientific Method - Informational technology. Graphical Methods - Data Analysis - Time Management. Organizational Skills - Resource Management - Organizing Resources - Scientific Literature. Historical Literature- Top Five Analytical Skills (Communication, Creativity, Critical Thinking, Data Analysis, and Research).								

Third YearSecond Semester

Course Code		**PDE 5321**		**Course title**		**Computer Numerical Control Machines**		
Hours	Tutorial/Practical	1/1	Lectures	2	Contact hours	4	Credit hours	2
Course grades	Practical/Oral	25/0	Semester Work	25	Written exam	75	Total	125
Introduction to CNC machine tools - Components of CNC system - Axis system for CNC machine tools- Classification of CNC machine tools - CNC part programming methods - Preparation of CNC machine tools part program - Cutter Compensation - APT programming language - CNC Economics.								

Course Code		**PDE 5322**		**Course title**		**Machine Tool Design (2)**		
Hours	Tutorial/Practical	1/1	Lectures	2	Contact hours	4	Credit hours	2
Course grades	Practical/Oral	25/0	Semester Work	25	Written exam	50	Total	100
Functional design and testing of gears - Main spindle design for different machine tools - Functional design of bearings in machine tools - Machine tool frames design - Different types of slide way in machine tools and their design methods - Functional design and testing of gears.								

Course Code		PDE5323		Course title		Theory of Metal Forming		
Hours	Tutorial/Practical	2/0	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	75	Total	125
Principles of plastic - Large strains - Tensile instability- Bending- Membrane analysis of circular shells - Stretching - Drawing - Stretching and drawing - Slab forming.								

Course Code		PDE5324		Course title		Statistical Applications in Production Engineering		
Hours	Tutorial/Practical	1/0	Lectures	2	Contact hours	3	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	25	Written exam	75	Total	100
Introduction - Data organization - Measures of location, dispersion, and shapes - Probability theory - Random variables and probability distributions - Reliability of systems - Sampling and estimation- Test of hypothesis - Engineering applications.								

Course Code		PDE 5325		Course title		Machining Processes and Equipment (3)		
Hours	Tutorial/Practical	1/1	Lectures	2	Contact hours	4	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	75	Total	125
Introduction to Non-Traditional Machining Processes with classifications - Mechanical Non-Traditional Machining Processes (Water Jet Machining, Abrasive jet machining, Abrasive Water Jet machining, Ultrasonic Machining with applications - Electrical Non-Traditional Machining Processes (Electrochemical Machining with applications) - Thermal Non-Traditional Machining Processes (Electrical Discharge Machining with applications, Electron Beam machining, Laser Beam Machining, Plasma Arc Machining)- Chemical Non-Traditional Machining Processes (Chemical Milling, Photochemical Milling).								

Course Code		PDE 5326		Course title		Engineering Management (2)		
Hours	Tutorial/Practical	1/0	Lectures	2	Contact hours	3	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	25	Written exam	75	Total	100

Development of modern management - Industrial organizations, concepts and principles- Organizational structures, types, advantages, and disadvantages - Quantitative analysis approach and tools - Linear programing, modeling and graphical approach - Linear programing, modeling and graphical approach - Application problems of linear programing - Job sequencing and operations scheduling - Priority rules and performance measuring criteria - Application examples of N-jobs on different system configurations - Transportation problems, balanced and unbalanced cases - Formulation of a transportation problem as LP once - Transportation solution techniques: NWC, MUC, and Vogel's methods - Project management using network analysis - CPM and PERT applications.

Course Code		**PDE 5327**		**Course title**		**Elective Course (2)**		
Hours	Tutorial/Practical	1/0	Lectures	2	Contact hours	3	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	40	Written exam	60	Total	100

Courses			
1.	**Heat Treatment**	5.	**Design of Mechanical Equipment**
2.	**Industrial Oil Engineering**	6.	**Engineering Materials Selection**
3.	**Work Study**	7.	**Micro Electro-Mechanical Systems (MEMS)**
4.	**Industrial Relation and Regulation laws**		

Heat Treatment:
Principles of different heat treatments - Diffusion and solidification of metal alloys - Effect of cooling rates (TTT diagrams & CCT diagrams)- Chemical compositions of different materials - Surface heat treatments - Heat treatments for special steel alloys - Heat treatments for non-ferrous alloys.

Industrial Oil Engineering:
Selection of lubricant type - Mineral oils - Synthetic oils and Greases - Solid lubricants and coatings - Other liquids - Plain bearing lubrication - Rolling bearing lubrication - Gear and roller chain lubrication - Slide lubrication - Coupling lubrication - Wire rope lubrication - Lubrication in metal-working and cutting - Selection of lubrication systems - Total loss grease system - Total loss oil systems - Dip, splash systems - Mist systems - Circulation systems - Selection of pumps and filters - Basic lubrication theories - Hydrodynamic lubrication theory - Elasto-Hydrodynamic lubrication theory.

Work Study:
Work study and productivity - The approach to method study - Methods and movements at workplace - General remarks on work measurements - Time study and work measurements - Motion study - Work sampling.

Industrial Relation and Regulation laws:
Introduction - Theories of industrial relations - Management functions - Motivation theory - Wages and payment rules - Job description - Human factors in industrial organization - Regulation in industry - Methods of manipulating regulations and their consequences.

Design of Mechanical Equipment:
Introduction to the design process of mechanical systems - Material selection - Design for

manufacturing and assembly processes - Design against fatigue loading - Design for reliability - Use of CAD systems - Design applications such as cars, agricultural equipment and production tools.
Engineering Materials Selection: Mechanical and physical properties of engineering materials - Factors affecting selection of engineering materials - Techniques of material selection - Functional requirements of engineering materials - Material selection based on strength and fatigue - Material selection based on corrosion - Material selection based on thermal effects - Material selection using computer software - Applications and case studies.
Micro Electro-Mechanical Systems (MEMS): Overview of MEMS and Microsystems – Working Principles of Microsystems – Engineering Science for Microsystems Design and Fabrication – Engineering Mechanics for Microsystems Design – Materials for MEMS and Microsystems - Microsystems Fabrication Processes –Assembly, Packaging, and Testing of Microsystems.

Fourth Year First Semester

Course Code		**PDE 5411**		**Course title**		**Analysis of Production Systems**		
Hours	Tutorial/Practical	1/0	Lectures	3	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	75	Total	125
Introduction to production systems and related problems - Linear programming: graphical and algebraic methods - Linear programming: transportation, assignment and network models - Inventory management - Project management - Cost analysis.								

Course Code		**PDE 5412**		**Course title**		**Production Tools and Equipment Design**		
Hours	Tutorial/Practical	2/0	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	75	Total	125
Purpose of Tool Design and its Design Objectives - Design of single point tools - Design of form Cutting Tools - Design of twist drills - Design of Milling Cutters - Definition and Types of Jigs & Fixtures - Preliminary Analysis & Fixture Planning - Supporting & Location Principles - Clamping & Work Holding Principles - Centralizers, Equalizers, Chip problems, and Loading & unloading parts - Drill bushings.								

Course Code		**CAC 5413**		**Course title**		**Systems and Control (1)**		
Hours	Tutorial/Practical	1/0	Lectures	3	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	70	Written exam	80	Total	150

Introduction to automatic control - Open loop and closed loop systems - Block diagram and transfer function - Modeling by transfer function - Analysis of frequency response - Stability and root locus technique - Feedback and design methods of feedback systems.

Course Code		**PDE 5414**		**Course title**		**Fine Measurements**		
Hours	Tutorial/Practical	1/1	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	30/0	Semester Work	40	Written exam	80	Total	150
Geometrical and Dimensional tolerance- Roundness measurements.(v-block method-diametrical method-between two centers) - Surface Finish - Surface Topography. (use surftest to measure roughness R_a, R_q) - Gear measurements.(gear rolling test-tooth thickness measurements by pitch circle method, constant chord method and base tangent method-checking involute curve by projector) - Bearing measurements - Automatic measurements - Coordinate Measuring Machines.								

Course Code		**PDE 5415**		**Course title**		**Elective Course (3)**		
Hours	Tutorial/Practical	2/0	Lectures	2	Contact hours	4	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	40	Written exam	60	Total	100

Courses

1.	**Methods and Techniques of Design**	5.	**Reverse Engineering in Mechanical Design**
2.	**Scientific Management Systems**	6.	**Mechatronic**
3.	**Design and Production of Dies**	7.	**Design and Production of Cutting Tools**
4.	**Nontraditional Forming Processes**		

Methods and Techniques of Design:
Design methods - Statistical methods in design - Probability and reliability in design - Material considerations in design - Analytical and numerical solutions - Case studies.

Scientific Management Systems:
Introduction - Overview of operations management - Work study - Plant layout and location - Production planning and control - Production cost analysis - Resource planning -

Work Study:
Work study and productivity - The approach to method study - Methods and movements at workplace - General remarks on work measurements - Time study and work measurements - Motion study - Work sampling.

Design and Production of Dies:
Pressworking Terminology - Stamping Design - Die engineering-Planning and Design - Cutting Dies - Forming Dies - Progressive Dies - Compound and combination Dies- Die sets and components- Ferrous Die materials.

Nontraditional Forming Processes:

Presses types and mechanisms - Composite materials forming - Explosive forming - Electromagnetic forming - Spinning forming and machines- Hydro forming and pad-rubber processes - Bench press and die types - Design of forging dies.
Reverse Engineering in Mechanical Design: Effect of reverse engineering in mechanical design - Reverse engineering techniques - 3D contact and non-contact scanning - Pattern recognition steps - Deriving standard and free surfaces equations - Recognition of other design characteristics - Pattern transfer to CAD/CAM systems.
Mechatronic: Introduction to Mechatronics - Sensors and Transducers - Mechanical Actuation Systems - Pneumatic and Hydraulic Actuation Systems - Electrical Actuation Systems - Dynamic Responses of Systems - Closed-Loop Controllers - Microprocessors - Programmable Logic Controllers - Design of Mechatronics Systems.
Design and Production of Cutting Tools: Design of single point tools- Design of twist drills - Design of face Milling Cutters - Design of Disc-type gear milling cutters - Design of thread tapping - Design of thread-cutting dies.

Course Code		**PDE 5416**		**Course title**		**Graduation Project (1)**		
Hours	Tutorial/Practical	0/0	Lectures	3	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	0	Total	50
Problem Statement – Design Alternatives selection – Mathematical Analysis – Software Training - Simulation Analysis - Analysis and implementation – Progress Presentations.								

Course Code		**PDE 5417**		**Course title**		**Summer training**		
Hours	Tutorial/Practical	0/0	Lectures		Contact hours	2	Credit hours	
Course grades	Practical/Oral	2/0	Semester Work		discussion	50	Total	50
Training is carried out according to a program developed by the scientific department annually**.**								

Fourth Year Second Semester

Course Code		**PDE5421**		**Course title**		**Mechanical Maintenance**		
Hours	Tutorial/Practical	2/0	Lectures	2	Contact hours	4	Credit hours	2
Course grades	Practical/Oral	0/0	Semester Work	50	Written exam	50	Total	100

Sources of failure in mechanical components- Systems and modes of failure - General & Functional failures - Errors - Fatigue, Creep, corrosion - Failure analysis techniques - Failure prediction techniques - Observation of Machine performance - Failure correction & repair techniques - Importance and types of maintenance systems - Selection and management of maintenance systems - Maintenance and risk.

Course Code		**PDE5422**		**Course title**		**Machine Tool Design (3)**		
Hours	Tutorial/Practical	2/1	Lectures	2	Contact hours	5	Credit hours	2
Course grades	Practical/Oral	25/0	Semester Work	30	Written exam	70	Total	125
Design of machine tool structure with joints - Machine tool /Foundation system - Machine tool vibration - Machine tools Performance tests -								

Course Code		**PDE5423**		**Course title**		**Production Quality Control**		
Hours	Tutorial/Practical	2/0	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	0/0	Semester Work	40	Written exam	85	Total	125
Introduction to quality control- Control charts for variables - Control charts for attributes - Lot by lot aCACptance sampling by attributes.								

Course Code		**CAC 5424**		**Course title**		**Systems and Control (2)**		
Hours	Tutorial/ Practical	2/2	Lectures	3	Contact hours	7	Credit hours	4
Course grades	Practical/Oral	20/0	Semester Work	50	Written exam	80	Total	150
Introduction: From the physical model to the ordinary differential equation (ODE) - 1st and 2nd order system behavior (from the ODE) - Translation and rotational mechanical system (in the flywheel) - Laplace transform, solving ODEs - Transfer functions, poles, zeros - Observation of behavior based on transfer functions in the flywheel - Electrical elements R, L, C, op-amp- The DC motor and its dynamics - 1st and 2nd order system characteristics: theory - Feedback TF, MATLAB tools -Root locus (concept and observation) - Drawing root locus (part I: theory) - Drawing root locus (part II: MATLAB and flywheel) - P control-flywheel modeling - P control on the flywheel-effect of gain - PI control on the flywheel-steady state error - PID control: speeding up and stabilization - Control of an Inverted pendulum								

Course Code		**PDE5425**		**Course title**		**Elective Course (4)**		
Hours	Tutorial/Practical	1/0	Lectures	2	Contact hours	3	Credit hours	2

Course grades	Practical/Oral	0/0	Semester Work	40	Written exam	60	Total	100

Courses			
1.	**Computer Aided Manufacturing**	5.	**Feasibility Study**
2.	**Optimum Design**	6.	**Composite Materials**
3.	**Operations Research**	7.	**Hydraulic Control Systems**
4.	**Nontraditional Machining Processes**		

Computer Aided Manufacturing:
Computer Numerical Control of Machine tools - Computer Aided Design & Manufacturing CAD/CAM - Robots - Flexible Manufacturing Systems - Computer Integrated Manufacturing CIM

Optimum Design:
Optimum Design Problem Formulation - Optimum Design Concepts - Numerical Methods for Unconstrained Optimum Design - Numerical Methods for Constrained Optimum Design - Introduction to Optimum Design with MATLAB - Design Optimization Applications.

Operations Research:
Introduction to operations research- Linear programming - Network models - Inventory management - Project management - Decision analysis- Queuing theory.

Nontraditional Machining Processes:
Hybrid Mechanical Nontraditional Processes - Abrasive water jet machining - Abrasive jet machining - Abrasive flow machining - Hybrid Electrical Nontraditional Processes - Electrochemical Honing - Hybrid Thermal Nontraditional Processes - Electro-erosion Dissolution Machining - EDM with Ultrasonic Assistance - Brush Erosion Dissolution Machining - Hybrid Chemical Nontraditional Processes - Chemical Milling - Photo-Chemical Milling.

Feasibility Study:
Investment projects - Introduction to feasibility study - Types of feasibility studies - Costs of investments projects - Financing of investments projects - Planning and monitoring the investment projects - Profitability analysis of investments projects - Case study on production project.

Composite Materials:
Definition & types of composite materials- Fibers& tissues used to strengthen plastics- Methods of manufacturing composite materials- Analysis of composite materials using properties of their components- Selection techniques of composite materials- Mechanical design with composite materials.

Hydraulic Control Systems:
Hydraulic principles - Pumps - Hydraulic valves - Actuators- Fluids for hydraulic systems- Hydraulic system design - Hydraulic system maintenance - Control systems.

Course Code		**PDE 5426**		**Course title**		**Graduation Project (2)**		
Hours	Tutorial/Practical	0/0	Lectures	3	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	50/0	Semester Work	25	Discussion - Dissertation	75	Total	150

Cost Evaluation - Production processes- Project Finalizing – Practical Tests – Collecting Results- Data Analysis - Dissertation Preparation – Presentation Preparation – Discussion.

6 Textile Engineering Program

Basic Information:

Program Name	Textile Engineering
Department	Textile Engineering
Program Type	**Single**
No of Semesters	**10**
No of Contact Hour	**280**
Lecture	**150**
Tutorial and Practical/Oral/ORAL	**130**
Equivalent Credit Hours	**162**

Graduate's Attributes:

1. Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
2. Design a system; component and process to meet the required needs within realistic constraints.
3. Design and conduct experiments as well as analyze and interpret data.
4. Identify, formulate and solve fundamental engineering problems.
5. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
6. Work effectively within multi-disciplinary teams.
7. Communicate effectively.
8. Consider the impacts of engineering solutions on society & environment.
9. Demonstrate knowledge of contemporary engineering issues.
10. Display professional and ethical responsibilities; and contextual understanding
11. Engage in self- and life- long learning.
12. Professionally design and operate different processing systems in the textile industries and plan the related activities of maintenance, modernization and replacement.
13. Improve production plans and effectively apply the special safety measures to preserve inventories of row materials and semi-manufactured products as well.
14. Plan and manage the quality assurance activities in addition to insuring the protection of the production facility environment internally and externally.

Courses distribution based requirement according the

Reference Framework and NARS

Course		Contact Hrs.	Equivalent Credit Hr	Requirements				Semester	Academic Year
Code	Name			University	Faculty	Major	Minor		
BAS 1011	Mathematics (1)	5	3		x			First	Preparatory Year
BAS 1012	Physics (1)	6	4		x				
BAS 1013	Mechanics (1)	4	2		x				
PDE+BAS 1014	Engineering drawing and projection	5	3		x				
BAS 1015	Chemistry	5	3		x				
BAS 1016	English	4	2	x					
BAS 1021	Mathematics (2)	5	3		x			Second	
BAS 1022	Physics(2)	6	4		x				
BAS 1023	Mechanics(2)	4	2		x				
PDE 1024	Engineering drawing	4	2		x				
PDE 1025	Production engineering	4	2		x				
CAC 1026	Introduction to computer programming	4	2	x					
BAS1027	Engineering Entrance	2	2	x					
BAS 6111	Mathematics 3	6	4		x			First	First Year
EE+ECE	Electrical & Electronic Eng.	3	2		x				
TEXE 6113	Textile Raw Materials	5	3			x			
TEXE 6114	Textile Physics 1	5	3			x			
CAC 6115	Computer Programming	4	3	x					
PDE 6116	Strength of Materials	4	2		x				
BAS 6121	Mathematics 4	6	4		x			Second	
BAS 6122	Applied Mechanics	4	2		x				
TEXE 6123	Textile Chemistry	5	4			x			
TEXE 6124	History of Engineering	2	2	x					
MPE 6125	Thermodynamics	3	2			x			
PDE 6126	Machine Drawing	5	1		x				
PDE 6211	Machine Design	5	3			x		First	Second Year
TEXE 6212	Cotton Yarn Manufacturing 1	5	3			x			
TEXE 6213	Weaving Technology 1	5	3			x			
TEXE 6214	Textiles Design and	5	3			x			
TEXE 6215	Computer Applications 1	4	3			x			
PDE 6216	Theory of Machines	4	2			x			
TEXE 6217	Summer Training (1)	2	-		x				
TEXE 6221	Cotton Yarn Manufacturing 2	5	3			x		Second	
TEXE 6222	Wool Yarn Manufacturing	5	3			x			

TEXE 6223	Textile Physics 2	5	3			x			
TEXE 6224	Research & Analysis Skills	2	2	x					
TEXE 6225	Weaving preparation	4	2			x			
MPE 6226	Fluid Mechanics	3	2			x			
MPE 6227	Heat Transfer&Conditioning	3	2			x			
TEXE 6311	Garment Technology	5	3				x	First	Third Year
TEXE 6312	Man-Made Yarn Production	5	3				x		
TEXE 6313	Knitting Technology	5	3				x		
TEXE 6314	Textile Finishing	4	3				x		
TEXE 6315	Theory of Spinning 1	4	3				x		
TEXE 6316	Measurements	4	2			x			
TEXE 6321	Weaving Technology 2	4	2				x	Second	
TEXE 6322	Applied Statistics	4	2			x			
TEXE 6323	Design of Textile Machinaries	6	4			x			
TEXE 6324	Technical writing	2	1		x				
TEXE 6325	Elective Course 1	4	2				x		
TEXE 6326	Elective Course 2	4	2				x		
CAC 6327	Automatic Control	4	2			x			
TEXE 6411	Quality Control	6	4				x	First	Fourth Year
TEXE 6412	Nonwovens	3	2				x		
TEXE 6413	Weaving Technology 3	4	2				x		
TEXE 6414	Spinning Mill Organization	4	2				x		
TEXE 6415	Elective Course 3	4	2				x		
TEXE 6416	Elective Course 4	4	2				x		
TEXE 6417	Senior Project	3	1				x		
TEXE 6418	Summer Training (2)	2	-		x				
TEXE 6421	Spinning Systems	4	3				x	Second	
TEXE 6422	Weaving Mill Organization	4	2				x		
TEXE 6423	Economics and Costs	4	2			x			
TEXE 6424	Computer Applications 2	4	2			x			
TEXE 6425	Elective Course 5	4	2				x		
TEXE 6426	Elective Course 6	4	2				x		
TEXE 6427	Senior Project	4	2				x		
Total	**67**	**280**	**162**	**18**	**82**	**97**	**83**		
Percentage				**6.4**	**29.3**	**34.6**	**29.7**		
Min		**250**	**160**	**6**	**22**	**30**	**20**		
Max		**280**	**180**	**10**	**30**	**35**	**30**		

Program Courses and Subject Areas:

Preparatory Year -First Semester:

Code	Course	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1011	Mathematics (1)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1012	Physics (1)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1013	Mechanics (1)	2	2	0	**4**	2	3	35	0	90	**125**			3		1		
PDE+BAS 1014	Engineering drawing and projection	2	0	3	**5**	3	3	50	0	100	**150**					5		
BAS 1015	Chemistry	2	0	3	**5**	3	3	35	10	80	**125**			3		2		
BAS 1016	English	1	0	3	**4**	2	2	10	0	40	**50**	4						
Total		13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0

Preparatory Year- Second Semester:

Code	Course	Teaching Hours				Equivalent Credit Hour	Wr. Exam Duration	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1021	Mathematics (2)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1022	Physics(2)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1023	Mechanics(2)	2	2	0	**4**	2	2	30	0	70	**100**			3		1		
PDE 1024	Engineering drawing	1	3	0	**4**	2	3	30	0	70	**100**					4		
PDE 1025	Production engineering	1	0	3	**4**	2	2	30		70	**100**				2	2		
CAC 1026	Introduction to computer programming	1	0	3	**4**	2	2	20	10	70	**100**					4		
BAS1027	Engineering Entrance	2	0	0	**2**	2	2	0	0	50	**50**	2	0	0	0	0	0	0
Total		13	7	9	29	17	17	200	20	530	750	2	0	12	2	13	0	

First Year- First Semester:

Code	Course	Teaching Hours				Equivalent Credit Hour	Wr. Exam Duration	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 6111	Mathematics 3	4	2		6	4	3	40		110	150			6				
EE+ECE 6112	Electrical & Electronic Eng.	2	1		3	2	3	30		70	100				3			
TEXE 6113	Textile Materials	3	1	1	5	3	3	40	30	80	150					3	2	
TEXE 6114	Textile Physics 1	3	1	1	5	3	3	40	30	80	150					3	2	
CAC 6115	Computer Programming	2		2	4	3	3	20	20	60	100	4						
PDE 6116	Strength of Materials	2	2		4	2	3	30		70	100				2		2	
Total		**16**	**7**	**4**	**27**	**17**	**18**	**200**	**80**	**470**	**750**	**4**	**0**	**6**	**5**	**6**	**6**	**0**

First Year- Second Semester:

Code	Course	Teaching Hours				Equivalent Credit Hour	Wr. Exam Duration	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 6121	Mathematics 4	4	2		6	4	3	40		110	150			6				
BAS 6122	Applied Mechanics	2	2		4	2	3	40		110	150			2		2		
TEXE 6123	Textile Chemistry	3		2	5	4	3	30	20	100	150					2	3	
TEXE 6124	History of Engineering &Technology	2			2	2	2			50	50	2						
MPE 6125	Thermodynamics	2	1		3	2	3	30		70	100				2	1		
PDE 6126	Machine Drawing	1	4		5	1	3	40		110	150					3	2	
Total		**14**	**9**	**2**	**25**	**15**	**17**	**180**	**20**	**550**	**750**	**2**	**0**	**8**	**2**	**8**	**7**	**0**

Second Year- First Semester:

Code	Course	Teaching Hours				Equivalent Credit Hour	Wr. Exam Duration	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
PDE 6211	Machine Design	3	2		5	3	3	30	15	80	125					5		
TEXE 6212	Cotton Yarn Manufacturing 1	3	2		5	3	3	40	20	90	150					2	3	
TEXE 6213	Weaving Technology 1	3	2		5	3	3	40	20	90	150					2	3	
TEXE 6214	Textiles Design and Manufacturing	3	2		5	3	3	20	20	60	100					2	3	
TEXE 6215	Computer Applications 1	2		2	4	3	3	20	20	60	100	2				2		
PDE 6216	Theory of Machines	2	2		4	2	3	30		70	100					1	3	
TEXE 6217	Summer Training (1)		2		2				50		50							2
Total		**16**	**12**	**2**	**30**	**17**	**18**	**180**	**145**	**450**	**775**	**2**	**0**	**0**	**0**	**1**	**1**	**2**

Second Year- Second Semester:

Code	Course	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
TEXE 6221	Cotton Yarn Manufacturing 2	3	2		5	3	3	30	15	80	125					2	3	
TEXE 6222	Wool Yarn Manufacturing	3	2		5	3	3	30	15	80	125					2	3	
TEXE 6223	Textile Physics 2	3	1	1	5	3	3	30	15	80	125			3			2	
TEXE 6224	Research & Analysis Skills	2			2	2	2			50	50	2						
TEXE 6225	Weaving preparations	2	2		4	2	3	20	10	70	100			2			2	
MPE 6226	Fluid Mechanics	2	1		3	2	3	30		70	100			2			1	
MPE 6227	Heat Transfer& Conditioning	2	1		3	2	3	30		70	100					2	1	
Total		**17**	**9**	**1**	**27**	**17**	**20**	**170**	**55**	**500**	**725**	**2**	**0**	**7**	**0**	**6**	**12**	**0**

Third Year- First Semester:

Code	Course	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
TEXE 6311	Garment Technology	3	2		5	3	3	30	15	80	125					2	3	
TEXE 6312	Man-Made Yarn Production	3	2		5	3	3	35	15	100	150					2	3	
TEXE 6313	Knitting Technology	3	2		5	3	3	40	20	90	150					2	3	
TEXE 6314	Textile Finishing	3		1	4	3	3	20	20	60	100					1	3	
TEXE 6315	Theory of Spinning 1	3	1		4	3	3	30	15	80	125					2	2	
TEXE 6316	Measurements	2	2		4	2	3	30	10	60	100					2	2	
Total		**17**	**9**	**1**	**27**	**17**	**18**	**185**	**95**	**470**	**750**	**0**	**0**	**0**	**0**	**10**	**17**	**0**

Third Year- Second Semester:

Code	Course e	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
TEXE 6321	Weaving Technology 2	2	2		4	2	3	30	10	60	100					2	2	
TEXE 6322	Applied Statistics	2	2		4	2	3	30		70	100			3			1	
TEXE 6323	Design of Textile Machineries	4	2		6	4	3	40	10	100	150				2	2	2	
TEXE 6324	Technical writing	1	1		2	1	2	10		40	50	2						
TEXE 6325	Elective Course 1	2	2		4	2	3	30	15	80	125					2	2	
TEXE 6326	Elective Course 2	2	2		4	2	3	30	15	80	125					2	2	
CAC 6327	Automatic Control	2	2		4	2	3	30	10	60	100		3				1	
Total		**15**	**13**	**0**	**28**	**15**	**20**	**200**	**60**	**490**	**750**	**2**	**3**	**3**	**2**	**8**	**10**	**0**

Fourth Year -First Semester:

Code	Course	Teaching Hours				Equivalent Credit Hour	Wr. Exam Duration	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
TEXE 6411	Quality Control	4	2		6	4	3	30	20	100	150		3		1		2	
TEXE 6412	Nonwovens	2	1		3	2	3	30	10	60	100						3	
TEXE 6413	Weaving Technology 3	2	2		4	2	3	30	10	60	100					1	3	
TEXE 6414	Spinning Mills Organization	2	2		4	2	3	20	10	70	100		2			1	1	
TEXE 6415	Elective Course 3	2	2		4	2	3	30	10	60	100					2	2	
TEXE 6416	Elective Course 4	2	2		4	2	3	30	10	60	100					2	2	
TEXE 6417	Senior Project	1	2		3	1	مناقشة	45	30		75							3
TEXE 6418	Summer Training (2)		2		2				50		50							2
Total		**15**	**15**	**0**	**30**	**15**	**18**	**215**	**150**	**410**	**775**	**0**	**5**	**0**	**1**	**6**	**13**	**5**

Fourth Year- Second Semester:

Code	Course	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
TEXE 6421	Spinning Systems	3	1		4	3	3	35	10	80	125					2	2	
TEXE 6422	Weaving Mills Organization	2	2		4	2	3	20	10	70	100			2		1	1	
TEXE 6423	Economics and Costs	2	2		4	2	3	20	10	70	100	2		2				
TEXE 6424	Computer Applications 2	2	2		4	2	3	20	20	60	100	2					2	
TEXE 6425	Elective Course 5	2	2		4	2	3	30	10	60	100			2			2	
TEXE 6426	Elective Course 6	2	2		4	2	3	30	10	60	100			2			2	
TEXE 6427	Senior Project	1		3	4	2	مناقشة	30	70		100							4
Total		**14**	**11**	**3**	**28**	**15**	**18**	**185**	**140**	**400**	**725**	**4**	**0**	**8**	**0**	**3**	**9**	**4**

Elective Courses

Elective Course 1			
Mechanics of Spinning Machines		Mechanics of Weaving Machines	
Elective Course 2			
Theory of Spinning 2		Yarn's Stress Analysis	
Elective Course 3			
Technical Textiles		Printing Technology	
Elective Course 4			
Mechanics of Knitting and Garment		Woven Structure	
Elective Course 5			
Theory of Spinning 3	Machinery Noise	Planning of Knitting & Garment Mills	
Elective Course 6			
Operational Research	Automatic Control in	Standards and **Specifications**	Filter Fabrics

Total teaching hours and subject's distribution over the subject areas according the Reference Framework and NARS

Semester		Teaching Hours				Equivalent Credit Hours	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total			Year Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
Preparatory year/ 1st semester		13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0
Preparatory year/ 2ndsemester		13	4	12	29	17	17	200	20	530	750	2	0	12	2	13	0	0
First year/1st semester		16	7	4	27	17	18	200	80	470	750	4	0	6	5	6	6	0
First year/ 2nd semester		14	9	2	25	15	17	180	20	550	750	2	0	8	5	8	5	0
Second year/1st semester		16	12	2	30	17	18	180	145	450	775	2	0	0	0	14	12	2
Second year/ 2nd semester		17	9	1	27	17	20	170	55	500	725	2	0	7	0	6	12	0
Third year/1st semester		17	9	1	27	17	18	185	95	470	750	0	0	0	0	10	17	0
Third year/ 2nd semester		15	13	0	28	15	20	200	60	490	750	2	3	3	2	8	10	0
Fourth year/1st semester		15	15	0	30	15	18	215	150	410	775	0	5	0	1	6	13	5
Fourth year/ 2nd semester		14	11	3	28	15	18	185	140	400	725	4	0	8	0	3	9	4
Total of Five Years		150	93	37	280	162	181	1935	785	4780	7500	22	8	59	12	84	84	11
% of Five Years								25.8	10.5	63.7	100.00	7.9	2.8	21	4.3	30	30	4
NARS % and Reference framework	minimum				250	160						8	2	18	4	25	25	4
	maximum				280	180						12	4	22	6	30	30	6

Requirements	No. of Courses	Hours of Study	Percentage	Objectives
Humanities & Social Science	9	22	7.9	Provide students with important concepts in thinking, research, and communication.
Business Administration	3	8	2.8	Student should be aware of working flow and planning in factories and companies.
Mathematics & Basic Science	18	59	21	Increase student's skills by building strong background in basic sciences.
Engineering Culture	5	12	4.3	Increase student's background in different engineering fields.
Basic Engineering Sci.	40	84	30	Building the basic backgound in Engineering.
Applied Eng. & Design	39	84	30	Building the background in Textile field and its Practical/Oral/ORAL implementation.
Projects & Practice	4	11	4	Student's ability to apply the knowledge and skills acquired during study under supervision of the academic mentor.

Course Contents

First Year **First Semester**

Mathematics 3				Course Name		BAS 6111		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	تمرين/Practical	Teaching Hours
110			Written Exam	40	Term Work		شفوي/Practical	Marking

Ordinary Differential Equations (ODE)

Homogeneous higher order ODE – Nonhomogeneous higher order ODE with constant coefficients (undetermined coefficients method and variation of parameters method for finding the particular solution) – Cauchy-Euler ODE (homogeneous and nonhomogeneous) – System of ODE– Laplace transform – Inverse Laplace transform –Applications of Laplace transform – Series solution of ODE.

Functions of Several Variables

Differentiation of integration – Vector calculus –Multiple integrals (double and triple) and their applications –Line integral – Green's theorem – Surface integral – Divergence (Gauss) and Stokes' theorems –Mathematical modeling using partial differential equations.

.

Electrical & Electronic Eng				Course Name		EE+ECE 6112		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture	1	تمرين/Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي/Practical	Marking

DC Circuits – Electric Circuits Theories – Steady state AC Circuits – Vector Representation – Power and Power Factor in AC Systems – Three-Phase Systems – Electric Machines – Transformers – Distribution Systems – **Conductors** and Semiconductors - Diode and its applications - Bipolar transistor and field effect transistor – Transistor circuits - Biasing circuits – Operational Amplifier and its applications..

Textile Raw Material				Course Name		TEXE6 113		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	تمرين/Practical	Teaching Hours

80	Written Exam	40	Term Work	30	شفوي/Practical	Marking

Introduction- Properties of textile fibers - Classification of Fiber Properties- Mechanical Properties of Textile Fibers- Production and Properties of Conventional Fibers - Production and Properties of Un-conventional Fibers- Production and Properties of Fibers out of Mill Waste- Fiber Testing- Exercises on the Field of Textile Fibers.

Textile Physics 1				Course Name		TEXE 6114		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	تمرين/Practical	Teaching Hours
80			Written Exam	40	Term Work	30	شفوي/Practical	Marking

(I) Textile Fibres:

Classification of textile fibres - sampling of textile fibres (zoning method) – sample size – **geometrical properties of fibres**(fibre length- fibre fineness –fibre density) – **physical properties of fibres**(cotton fibre maturity –moisture of fibres – fibre swelling –optical properties of fibres – static electricity – thermal properties and setting of fibres – impurity content) – **mechanical properties of fibres** (tensile strength of fibres- creep of fibres – durability of fibres – compression stresses on fibre masses – poisson 's ratio - bending stiffness of fibres – fibre friction – abrasion of fibres).

(II) Textile Yarns:

Types of textile yarns - **geometrical properties of yarns** (yarn number or count – yarn diameter –yarn regularity).

Computer Programming				Course Name		CAC 6115		Code
3	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	تمرين/Practical	Teaching Hours
60			Written Exam	20	Term Work	20	شفوي/Practical	Marking

Basic concepts of algorithms- Steps of designing an algorithm- Methods of presenting algorithms – Types of algorithms and applications. Introduction to MATLAB programming environment –Basics of programming with MATLAB and applications.

Strength of Materials				Course Name		PDE 6116		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	تمرين/Practical	Teaching Hours

70	Written Exam	30	Term Work		شفوي/Practical		Marking

Types of loads acting on mechanical components - Force analysis of simple mechanical elements - Axial forces - Shear forces - Bending and twisting moments - Stress, strain and Hooke‘s law Design stresses and factor of safety - Stress concentration - Thermal stresses - Bearing stresses - Direct and Torsional shear stresses - Bending stresses shear stresses in beams - Deflection in beams - Stress and strain analysis - Stresses in two dimensions - Principal stresses and maximum shear stresses Mohor stress circle - Power transmission shafts - ECACntric loading - Buckling of columns - Euler equation and empirical equations - Thin walled pressure vessels.

First Year Second Semester

Mathematics 4				Course Name		BAS 6121		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	تمرين/Practical	Teaching Hours
110			Written Exam	40	Term Work		شفوي/Practical	Marking

Partial Differential Equations (PDE)

Special functions (Gamma, Beta, Bessel and Legendre) – Fourier series – Fourier integral – Fourier transform – Partial differential equations (PDE)– Separation of variables method (heat equation, wave equation and Laplace equation) – Traveling wave solutions to PDE.

Complex Analysis

Complex Numbers – Functions of complex variable – Complex derivative – Analytic functions – Harmonic functions and their applications – Elementary functions – Complex integration – Cauchy theorems and their applications – Taylor and Laurent series – Residue theorem and its applications – Conformal mapping.

Applied Mechanics				Course Name		BAS 6122		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	تمرين/Practical	Teaching Hours
110			Written Exam	40	Term Work		شفوي/Practical	Marking

The kinematics and Kinetics of a particle in space curvilinear motion (Equation of motion – work and

energy – Impulse and momentum) – The Kinematics , Kinetics and a general Planar motion of a rigid body.

Textile Chemistry				Course Name		TEXE 6123		Code
4	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	/تمرينPractical	Teaching Hours
100			Written Exam	30	Term Work	20	شفوي/Practical	Marking
Introduction in polymers textile polymers chemical structure of natural fibers — cellulosic and protein fibers — physical and chemical properties of regenerated fibers— synthetic fibers *(* polyester — polyamide - polyacrilic — polyolefins — polypropylene etc*)* — chemical and physical properties — fiber recognition using chemical methods.								

History of Engineering & Technology				Course Name		TEXE 6124		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		/تمرينPractical	Teaching Hours
50			Written Exam		Term Work		شفوي/Practical	Marking
Introduction – The Earliest Builders – Early Empires and the Conquest of Materials – Classical Antiquity – Ancient Power and Metallurgy – Byzantine and Islamic Engineering – The Renaissance – The Advent of Steam and Mechanical Engineering – New Technology and Future.								

Thermodynamics				Course Name		MPE 6125		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture	1	/تمرينPractical	Teaching Hours
70			Written Exam	30	Term Work		شفوي/Practical	Marking
Basic concepts – Energy concepts – Pure substance (Different phases - Ideal and actual gases - Mixtures of gases) - Thermodynamic properties of materials - The first law of thermodynamics - The basic processes - Vapor processes - Heat flow processes - The second law of thermodynamics - Performance of thermal power plants - Gas power cycles - Steam power cycles - Refrigeration cycles - Moist air								

Machine Drawing	Course Name	PDE 6126	Code

1	Equivalent Credit Hr	5	Contact Hours	1	Lecture	4	Practical/تمرين	Teaching Hours
110			Written Exam	40	Term Work		Practical/شفوي	Marking
Layout Construction and working drawing- Drawing a complete assembly drawing for different mechanical examples and show how to assembled it Pullers - Screw jack Tool rest Sliding hearing Vices Valves Reduction gear box Pump Tail stock etc.								

Second Year First Semester

Machine Design				Course Name		PDE 6211		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical/تمرين	Teaching Hours
80			Written Exam	30	Term Work	15	Practical/شفوي	Marking
Introduction to machine element design (design steps and consideration) - Variable loads - Failure theory - Selection of materials for design - Factors of safety - Design of joints (Rivets Welds - Interference - Bolts) Design of power screws - Shafts - Key - Pin Couplings - Clutches - Brakes - Pressure vessels - Sealing and - Gaskets - Standards Project for mechanical element structures using computers - Design of springs.								

Cotton Yarn Manufacturing 1				Course Name		TEXE 6212		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical/تمرين	Teaching Hours
90			Written Exam	40	Term Work	20	Practical/شفوي	Marking
Raw material as a factor influencing spinning . Cotton harvesting and ginning. Blow room : Introduction, Summery of the process, Basic operations in the blow room : Opening, Cleaning , Dust removal and Blending. **Feed material :** Raw material , waste, blending waste material from bale, acclimization. **The component of blow room machines:** Feed apparatus m opening devices, The grid, Interaction of feed assembly, Opening element and grid, Alternative cleaning possibilities , General factors influencing opening and cleaning. **Machine 's comprising an installation:** Opening zoon , Coarse cleaning zone, Blend zone Fine cleaning zone ,Intensive cleaning or opening zone ,Card feeding zone. **Transport of material :** The need for transport , Mechanical transport equipment and pneumatic transport . **Control of material flow :**Classification , optical regulation system and continuous operation. **ACACssories and associated equipment, Recycling** :online and off line systems. **Carding:** Summary, The operating regions of the card(Feed of material, Feed device , The zone of the taker – in ,									

Auxiliary carding device (carding aids), Main cylinder, Flats, Doffing, Detaching and Drive of carding m/c) . Card clothing . Autolevelling equipment. Maintenance of carding . Settings, Auxiliary equipment. Technical data of carding machines. **Drawing : The draft of drafting arrangement**: draft , attenuation and drafting operation, drafting force, stick slip , behavior of fibers in the drafting zone, fiber guidance / floating fibers, friction fields: the fiber friction field/ influencing factor , distribution of draft , effect of draft . **The draw frame** : Tasks, operating principles, operating devices, monitoring devices and autolevelling, blending draw frames and technical data.

Weaving Technology 1				Course Name		TEXE 6213		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical/تمرين	Teaching Hours
90			Written Exam	40	Term Work	20	Practical/شفوي	Marking
The main machine parts for weaving machines – The main motions for weaving machines – The different Beat-Up mechanisms – The weft insertion mechanisms – The shedding mechanisms by cams and dobby.								

Textile Design & Manufacturing				Course Name		TEXE 6214		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical/تمرين	Teaching Hours
60			Written Exam	20	Term Work	20	Practical/شفوي	Marking
The general classifications of textiles – Plain weave – Twill structure – Sateen weave – The honey comb weave – the pique weave – The weft backed structure – double fabrics – The Draft, Duntting and Lifting Plan.								

Computer applications 1				Course Name		TEXE 6215		Code
3	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical/تمرين	Teaching Hours
60			Written Exam	20	Term Work	20	Practical/شفوي	Marking
Procedural programming in MATLAB (Creating functions) –Programmer's Toolbox – Applications of control constructs (selection –loops)- Data Types – File Input/Output – Creating graphical plots and manipulating with figures. Applications in the textile fields.								

Theory of Machines				Course Name		PDE 6216		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	تمرين/Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي/Practical	Marking
Geometry of motion Plane mechanisms Degrees of freedom - Robots and its applications - Velocities - Instantaneous center - Force analysis for static and dynamic mechanisms - Static and dynamic balancing of rotating shafts - Fluctuating energy and flywheels - Planetary gears - Cam kinematics								

التدريب الصيفى				Course Name		TEXE 6217		Code
	Equivalent Credit Hr	2	Contact Hours		Lecture	2	تمرين/Practical	Teaching Hours
50			مناقشه		Term Work		شفوي/Practical	Marking
Training is carried out according to a program developed by the scientific department annually**.**								

Second Year Second Semester

Cotton Yarn Manufacturing 2				Course Name		TEXE 6221		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	تمرين/Practical	Teaching Hours
80			Written Exam	30	Term Work	15	شفوي/Practical	Marking
Combing: aim and objectives, combing preparation, elements of combing machine elements and sequence of operations in comber. Quality aspects in combing. **Roving**: objectives of roving operation, machine elements operating principles, twisting, drafting systems, package building. Quality aspects in speed frame. **Spinning**: Ring spinning" aim and objectives of ring spinning, machine elements of ring frames and operating principles, principles of drafting, twisting; package building". Introduction to open end spinning, rotor spinning. **Basic calculations in spinning mills.**								

Wool Yarn Manufacturing				Course Name		TEXE 6222		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	تمرين/Practical	Teaching Hours
80			Written	30	Term	15	شفوي/Practical	Marking

	Exam		Work			

Wool fiber specifications — wool types and sources — fiber properties — wool preparation for spinning — fiber sorting — mixing — washing — twisted sliver forming on worsted and woolen systems — sliver doubling and drafting — wool combing-roving — yarn producing on different

spinning machine types — blended fibre producing — factors affecting processing and production — technological calculations in different process stages.

Textile Physics 2				Course Name		TEXE 6223		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical/تمرين	Teaching Hours
80			Written Exam	30	Term Work	15	Practical/شفوي	Marking

(I) Textile Yarns:

Physical properties of yarns (yarn twist-yarn hairiness – fibre migration – neps –yarn appearance – yarn luster –mixing or blending in staple yarns) **– mechanical properties of yarns** (yarn tensile strength- yarn deformation due to creep –yarn fatigue due to repeated extension – yarn fatigue due to repeated bending –yarn stiffness – yarn friction –yarn abrasion).

(II) Textile Fabrics :

Types of textile fabrics –**geometrical properties of fabrics** (fabric length –fabric width –fabric thickness –fabric weight –crimp of yarn in fabric –count of warp and weft yarns – threads per inch in woven fabric –cover factor – fabric porosity) – **physical properties of fabrics** (water absorption of fabrics –capillarity of fabrics – air permeability of fabrics – water permeability –water repellency –water vapour permeability of fabrics –dust permeability – shrinkage of fabrics –thermal properties of fabrics – flammability of fabrics – fabrics soiling –fabrics luster) –**mechanical properties of fabrics** (fabric tensile strength –fabric deformation due to creep – fabric fatigue due to repeated extension – fabric fatigue due to repeated bending –tear strength of fabrics – bursting strength of fabrics – crease recovery of fabrics – fabric stiffness - drapeability of fabrics –fabrics handle –fabric friction –pilling of fabrics - abrasion resistance of fabrics).

Research & Analysis Skills				Course Name		TEXE 6224		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical/تمرين	Teaching Hours
50			Written Exam		Term Work		Practical/شفوي	Marking

Introduction, scientific thinking and scientific research, preparing research proposal, methods and types of research, variables, samples, methods of data collection, analytical skills and techniques, description and analysis of data, preparing research findings report.

Weaving preparations				Course Name		TEXE 6225		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	/تمرينPractical	Teaching Hours
70			Written Exam	20	Term Work	10	شفوي/Practical	Marking
Winding and plying processes and its aims — winding units – mechanical clearer – electronic clearer – Yarn tension theories and different brake types – principles of winding types – winding calculations and production – Types of plying machines – yarn balance – plying calculations and production - **W**arping process: types and its aims — calculations of power consumed in driving breaking and production calculations — sizing process; theories and its aims — description of sizing stages — drawing-in and reeding processes; types and its developments								

Fluid Mechanics				Course Name		MPE 6226		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture	1	/تمرينPractical	Teaching Hours
70			Written Exam	30	Term Work		شفوي/Practical	Marking
Fundamental concepts - Fluid properties - Fluids statics - Fluids kinematics - Flow of ideal incomparable fluids - The impulse principle- Pipe flow - Dimensional analysis -- Fluids measurements.								

Conditioning & Heat Transfer				Course Name		MPE 6227		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture	1	/تمرينPractical	Teaching Hours
70			Written Exam	30	Term Work		شفوي/Practical	Marking
Modes of heat transfer: Conduction: Fourier’s law of heat transfer, temperature distribution, electrical analogy, heat transfer conduction through: a plane wall and composite walls – through a hollow and composite cylindrical- Convection: Newton’s law of cooling, temperature distribution, combined conduction and convection , and overall heat transfer - Heat Exchangers: Classification, parallel and counter flow arrangement, shell and tube heat exchanger, Fluid temperature distribution , LMTD, and design of surface heat exchangers - Radiation: Stefan-Boltzmann equation, radiant surface emissivity,								

and radiant heat transfer coefficient - Psychometric applications: moist air properties, A/C processes (humidification and dehumidification, cooling and heating), and psychometric chart - A/C systems: all air, air and water, all water, A/C units and types - A/C cycles: Summer cycle and its processes, winter cycle and its processes, air handling unit components and their functions

Third Year First Semester

Garment Technology				Course Name		TEXE 6311		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical/تمرين	Teaching Hours
80			Written Exam	30	Term Work	15	Practical/شفوي	Marking
Ready-made garments technology — raw material and its assessment human factors — size determining — basic procedures in production: patron design — spreading - marking cutting — sewing finishing and backing sewing stitches — quality control and production calculations — Ready-made garments economics — modern development. detailed study for cutting, spreading, sewing, *ironing* and linen machines with study of driving system, settings and factors affecting machine performance and productivity - new developments in sewing machines.								

Man-Made Yarn Production				Course Name		TEXE 6312		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical/تمرين	Teaching Hours
100			Written Exam	35	Term Work	15	Practical/شفوي	Marking
Principle of spinning manmade fibers. Methods of manufacturing regenerated fibers. Methods of manufacturing synthetic fibers. Tow –to-top conversion . Texturing techniques. **II- Man Made fiber:** The significance , classification and definitions, Over view of textile fiber material. **Manufacture and properties of manmade fibers:** Manufacture , subsequent treatment, production outline, properties of fibers, evaluation of fibers. **-Fiber characteristics and their effect on spinning. Finishes:** Purpose of applying spin finish, requirements to be fulfilled by a spin finish , component of spin finishes , Metering, problems in spinning .**Subsidiary problems in the spinning mill. Blending** : Purpose , proportions, evenness, possibilities for blending , process outline, metering m/c's and blend range in the bale lay down .**Storage of manmade fibers. Processing of manmade fibers in the short staple mill . Staple fiber yarns.**.								

Knitting Technology				Course Name		TEXE 6313		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical/تمرين	Teaching Hours
90			Written Exam	40	Term Work	20	Practical/شفوي	Marking
Introduction about fabric production processes – General classification of knitting – Mechanization of knitting process – The basic knitting stitches – Warp and Weft knitting machines (flat – circular) – Loop formation cycles on different knitting machines – The basic knitting structures – Loop transfer technology – The new development of knitting machines – Knitted fabric defects – The knitting machines productivity.								

Textile Finishing				Course Name		TEXE 6314		Code
3	Equivalent Credit Hr	4	Contact Hours	3	Lecture	1	Practical/تمرين	Teaching Hours
60			Written Exam	20	Term Work	20	Practical/شفوي	Marking
Cellulosic fibers cleaning by desizing boiling, beaching, mercerizing, Hydrocellulose ,Oxicellulose — animal fiber cleaning — man-made fiber processing — sollet theories — dye classification — dye chemistry — dye preparation technology.								

Theory of Spinning 1				Course Name		TEXE 6315		Code
3	Equivalent Credit Hr	4	Contact Hours	3	Lecture	2	Practical/تمرين	Teaching Hours
80			Written Exam	30	Term Work	15	Practical/شفوي	Marking
Opening theory – Cleaning efficiency – Blending theory – Blended yarn properties – The yarn properties and fibre characteristics – Spinnability – Theory of opening, Carding and Stripping in Carding Machine – Feed plate characteristics – Tooth angle and height of different organs – Intensity of Carding – Card clothing – Doubling and irregularity – Attenuation – Drafting Force – Movement of Controlled fibers in Drafting Systems – Different types of feeding Systems in Combing – Combing machine production – Combing cycle diagram – Roving bobbin Calculations Opening theory – Cleaning efficiency – Blending theory – Blended yarn properties – The yarn properties and fibre characteristics – Spinnability – Theory of opening, Carding and Stripping in Carding Machine – Feed plate characteristics – Tooth angle and height of different organs – Intensity of Carding – Card clothing – Doubling and irregularity – Attenuation – Drafting Force – Movement of Controlled fibers in Drafting Systems – Different types of feeding Systems in Combing – Combing machine production – Combing cycle diagram – Roving bobbin Calculations.								

Measurements				Course Name		TEXE 6316		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical/تمرين	Teaching Hours
60			Written Exam	30	Term Work	10	Practical/شفوي	Marking
Measuring definition — international criterias — signal behavior in ideal and practical measuring systems — measuring methods classification — measuring errors — error sources and its type — error classifying due to identifying validity — static and dynamic errors complex measuring systems — measuring devices and its classification measuring of temperature, pressure and density — measuring of concentration degree — measuring of flow rate with different types								

Third Year Second Semester

Weaving Technology 2				Course Name		TEXE 6321		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical/تمرين	Teaching Hours
60			Written Exam	30	Term Work	10	Practical/شفوي	Marking
The Take-up mechanisms – Let-off mechanisms – The Temples – Selvedge mechanisms – The weft feeders – Warp and Weft stop motion – Mathematical models for fabrics under formation.								

Applied Statistics				Course Name		TEXE 6322		Code
Teaching Hours	Lecture	2	Practical	Teaching Hours	Lecture	2	Practical/تمرين	Teaching Hours
70			Written Exam	30	Term Work		Practical/شفوي	Marking
. Statistics and basic concepts, classifications and graphical representations of data, Measures of central tendency, Measures of dispersion, Skewness and kurtosis, Some of probability distributions and applications **:** Discrete probability distributions, Continuous probability distributions, Correlation and regression, Statistical inference: Estimation and Testing of hypothesis.								

Design of Textile Machineries				Course Name		TEXE 6323		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	Practical/تمرين	Teaching Hours
100			Written Exam	40	Term Work	10	Practical/شفوي	Marking

Design of torsional shaft in Carding Machine – Power Consumption in drafting systems – ECACntricity in drafting systems and its problems – Design of bottom roller in drafting systems – Design of roving flyers – Energy consumption in roving frames – Differential gear trains - **Design** of basic parts in production stages — Driving belts Machine brake in warping, sizing and opening — Gear driving — Design of twisting rod on Sulzer machines — Shedding cams — reed cams — Springs — Fly wheel, levers and rods.

Technical Writing				Course Name		TEXE 6324		Code
1	Equivalent Credit Hr	2	Contact Hours	1	Lecture	1	Practical/تمرين	Teaching Hours
40			Written Exam	10	Term Work		Practical/شفوي	Marking

Introduction to technical reports - Technical report preparation stages - Technical report style - Technical report parts - How to prepare CV..

Elective course 1				Course Name		TEXE 6325		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical/تمرين	Teaching Hours
80			Written Exam	30	Term Work	15	Practical/شفوي	Marking

1- Mechanics of Weaving Machines

Study of balance and motion of different weaving machines parts. Analysis and expressing the displacement, velocity and aCACleration of the different parts, also study of causes of motions such as forces, moments. Study of shedding mechanisms, picking mechanisms, beat-up mechanisms, knitting mechanisms, tack-up mechanisms.

2- Mechanics of Spinning Machines

Studying balance and motion in different spinning machines - full analysis and description for spinning machines and identifying speeds, aCAClerations and forces applied on its parts — driving methods — control methods.

Elective course 2				Course Name		TEXE 6326		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical/تمرين	Teaching Hours

80	Written Exam	30	Term Work	15	شفوي/Practical	Marking

1- **Yarn's Stress Analysis**

Factors affecting on yarn strain (weaving machines specifications – yarn specifications and fabric specifications) – Effect of Shedding mechanism, Beating mechanism, Let-off and Take-up mechanisms on yarn strains – prediction of yarn strain during weaving – Effect of shed height on yarn strain – Different methods for measuring warp yarn strain – Warp stresses-strain curve during weaving operation.

3- Theory of Spinning 2

Yarn tension theory during its formation on ring spinning machine – balloon theory – balloon form – Winding tension – method of tension control in ring spinning – Traveller burn problems – Twist insertion in yarn – Twist and yarn properties – Theory of spinning on open end spinning machines – Fiber collection – yarn formation and forces affect on it – Stress analysis in the yarn during winding process – Plied yarn – Twist balance – Plied yarn strength, extension and contraction

Automatic Control				Course Name		CAC 6327		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	تمرين/Practical	Teaching Hours
60			Written Exam	30	Term Work	10	شفوي/Practical	Marking

System modeling in deferential equations — response in steady state — transfer function — vibration characteristics of control devices — Dynamic characteristics of units having and not having inertia — deferential and integrated units — memory unit.

Fourth Year First Semester

Quality Control				Course Name		TEXE 6411		Code
4	Equivalent Credit Hr	6	Contact Hours	4	Lecture	2	تمرين/Practical	Teaching Hours
100			Written Exam	30	Term Work	20	شفوي/Practical	Marking

Spinning mills: Introduction, quality management, statistical description of quality, Six Sigma, control charts, process capability analysis, cotton fibre selection and bale management system. Control of wastes in spinning. Control of neps. Control of count, strength and its variation. Yarn evenness and imperfection. Short-term irregularity. Interpretation and analysis of diagram, spectrogram and CV-L curve. Control of yarn hairiness in spun yarns. Yarn faults. Yarn quality requirements for high-speed machines.

Weaving mills: fault description and its degree in different processing stages in — sample size — knowing the required tests and comparing to quality tables in winding, sizing and final product — product status sheet after determining its quality degree.

Nonwovens				Course Name		TEXE 6412		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture	1	Practical/تمرين	Teaching Hours
60			تحريرى	30	Term Work	10	Practical/شفوي	Marking
Introduction (Definitions - Terminology – SWOT analysis) - Fiber-Fabric Technology - Characteristics of Fibers used in Nonwovens - Batt formation-Batt reinforcement -Nonwovens Finishing-New Trends in Nonwovens - Nonwovens Structure -Technical Fabrics – Quality Control for Nonwovens - Laboratory tests - Exercises (Production Calculations - Feasibility Studies of Nonwovens)								

Weaving Technology 3				Code		TEXE 6413		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical/تمرين	Teaching Hours
60			Written Exam	30	Term Work	10	Practical/شفوي	Marking
Pile fabrics – Circular weaving - Tape weaving – 3D weaving -Electric motors in modern looms - Jacquard weaving.								

Spinning Mills Organization				Course Name		TEXE 6414		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical/تمرين	Teaching Hours
70			Written Exam	20	Term Work	10	Practical/شفوي	Marking
Textile mill planning and organization: Preliminary consideration, Capital requirements, Choice of suitable site, Trends govern location of a mill , Planning for mill building , Mill design and construction. **Documentation relating to preparatory and spinning machinery:** i)choice of raw materials ii) Spin plans waste % and distribution, doubling and draft distribution and twist iii) production plan: machine productivity , machine specification , technological and technical data , layout of machines iv) Labor requirements, power consumption and floor space . **Spinning mill projects**: i) Ring spun yarns " carded, combed cotton yarn and 100% synthetic fibers, cotton / synthetic blend for all yarn counts ii) Open End yarns "cotton , cotton waste blend, combed yarn iii) New spinning techniques for producing compact yarn , siro spun yarn , fancy yarns and elastic yarns .**Calculation of producing cost:** Capital cost, operating cost and wages cost , calculation of standard time for the operator, machine efficiency % and spindle allocation.								

Elective course 3				Course Name		TEXE 6415		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical/تمرين	Teaching Hours
60			Written Exam	30	Term Work	10	Practical/شفوي	Marking

1- Technical Textiles

Terms and definition of technical fabrics- Systematic classification of technical fabrics [Agrotech (Agro-textiles) - Buildtech (Construction Textiles) - Clothtech (Clothing Textiles) - Geotech (Geo-textiles) - Hometech (Domestic Textiles) - Indutech (Industrial Textiles) - Lifting textiles - Mobiltech (Textiles used in transport; automotive and aerospace) - Oekotech or Ecotech (Ecological Protection Textile) - Packtech (Packaging textiles) - Protech (protective textiles) - Sportech (Sports textiles)] - Specific areas of application (Conveyor belts - Electronics in textiles) - Production and properties of technical fabrics - End uses of technical fabrics - Economics of technical fabrics.

2- Printing Technology

Industrial debilitates (Dyes — industrial debilitates — starches) — debilitate mix and preparation — fabric preparation for printing — dyes used in printing — printing methods — color pastes and dyes — direct dyes soluble vat dyes — preparation methods of printing templates — printing with slides — methods of design preparation for printing — different ratios for sensitive gelatin making.

Elective course 4				Course Name		TEXE 6416		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical/تمرين	Teaching Hours
60			Written Exam	30	Term Work	10	Practical/شفوي	Marking

1- Mechanics of Knitting and Garment Machines

Knitting:
Mechanics of movement transfer from motor to all weft knitting machine parts – The different knitted fabric take-up systems on weft knitting machines - Analysis of the various stresses and forces of the knitting needle – The mechanics of knitting needle selection on flat and circular weft knitting machines – Knitting movement timing on weft knitting machines - Mechanics of movement transfer from motor to all warp knitting machine parts.

Garment:
Introduction to apparel technology - Mechanics of inspection machines – Mechanics of fabric spreading machines - Mechanics of fabric cutting machines – Mechanics of sewing machines – Mechanics of packing machines.

2- Woven Structures

Carpet weaving – Towel fabrics – Velvet weaving – The multi layer fabrics – The color effects – Creep fabrics - Mathematical models for estimating the properties of the fabrics.

Project				Course Name		TEXE 6417		Code
1	Equivalent Credit Hr	3	Contact Hours	1	Lecture	2	Practical/تمرين	Teaching Hours
			Written Exam	45	Term Work	30	Practical/شفوي	Marking
Students make a survey about project topic , write review of literature , prepare the proposal and start the experimental work.								

Summer Training				Course Name		TEXE 6418		Code
	Equivalent Credit Hr	2	Contact Hours		Lecture	2	Practical/تمرين	Teaching Hours
50			مناقشه		Term Work		Practical/شفوي	Marking
Summer training program is developed by the scientific department annually.								

Fourth Year Second Semester

Spinning Systems				Course Name		TEXE 6421		Code
3	Equivalent Credit Hr	4	Contact Hours	3	Lecture	1	Practical/تمرين	Teaching Hours
80			Written Exam	35	Term Work	10	Practical/شفوي	Marking
Old and conventional spinning machines : Types, The possibilities of use and the problems associated with them , development of productivity in spinning and total spinning costs / kg of yarn. Yarn classification. Yarn forming : Different spinning techniques , Basic principles , current systems, The features of continues and non continuous spinning .Ring spinning system: Principle of twist insertion mechanism, features of ring spinning , recent development in ring spinning machines. Modification of ring spinning : Compact spinning systems, Siro spinning system ,solo spinning and core yarn spinning system. Non Conventional spinning systems: Open End , core spun rotor spinning, friction spinning systems , Dref I ,DrefII,Dref III , Barmage , Master spinning , Air jet spinning systems, Murata jet spinning (MJS),(MTS), Murata Air vortex(MVS), J. , J, Rieter . Hollow spindle techniques: for producing different structure (wrap , cover and effect yarns). Production of stable fiber yarns using other techniques :Twistless spinning Bobtex spinning system , self twist , fascinated spinning system, and air vortex (Rotofil). Evaluation of new spinning techniques on.								

Weaving Mill Organization	Course Name	TEXE 6422	Code

2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	/تمرينPractical	Teaching Hours
70			Written Exam	20	Term Work	10	شفوي/Practical	Marking
Production and delivery dates –Weaver Loading - Replacement and renewal - Improvement of the weaving environment - Technical specifications of weaving machines - Sections of the weaving mills - The circulation of materials - The spatial planning of the weaving mills - Weaving problems - Increase of weaving efficiency – The change of wrap and style.								

Economics and Costs				Course Name		TEXE 6423		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	20	Term Work	10	شفوي/Practical	Marking
Cost accounting : Costing and cost accounting , objective of costing , cost center, cost unit , element of cost , classification of costs , method of costing , techniques of costing .**Cost theory :** Opportunity costs, explicit cost, fixed costs , variable costs and sunk costs. **Production and costs:** Relationship between production and cost curves , short run costs, (fixed cost, variable costs, total costs) average costs , marginal cost .Cost, volume and profit analysis model . **Breakeven point :**B.E.P analysis , B.E.P analysis for multiple product . **Depreciation:** Purpose of depreciation , Types of depreciation , Method for calculating depreciation. **Systems of wage payment:** wage system in textile mills. **Maintenance. costs studies:** Cost studies in spinning mill and weaving mill**.**								

Computer applications 2				Course Name		TEXE 6424		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	/تمرينPractical	Teaching Hours
60			Written Exam	20	Term Work	20	شفوي/Practical	Marking
Using MATLAB and application software packages for : Creating statistical plots- Regression and Curve fitting – Statistical analysis – Solving algebraic equations – Solving systems of equations - Different mathematical computations and Applications on textile fields.								

Elective course 5				Course Name		TEXE 6425		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	/تمرينPractical	Teaching Hours
60			Written Exam	30	Term Work	10	شفوي/Practical	Marking
1- Planning of Knitting & Garment								

Knitting Mills:
The cost sections of knitting mills – The areal planning of knitting mills – The sections of knitting mills – The productivity calculation for flat weft knitting machines - Preparation of assays and production plans for all circular weft knitting machines - The productivity calculation for circular weft knitting machines - The productivity calculation for warp knitting machines.

Garment Mills:
Choice of plant layout based on quantity and quality factors and break even – continuous and repeated production lines – buffer inventory – production planning based on Index Method – problem of processes sequence in the production departments – problem of industrial processes planning based on PERT Method.

2- Theory of Spinning-3

False twisting process in textile yarn production : The development of false twist in bulking , false twist in bobtex yarn , apparatus for manufacturing yarns of air jet bulked yarn type without the use of air , mechanics of false twist. **Friction spinning :**The yarn formation in friction spinning , fiber speed and yarn tension in friction spinning . analysis of yarn tension in yarn forming zone in friction spinning , spinning limits of the friction spinning system(Dref III) , false twist in core yarn friction spinning. **Theoretical studies on linear textile irregularity :**Mass irregularity in fibrous assemblies , cotton irregularity. A simple model of the worsted drawing system. The ideal weight irregularity of the fibers in a multi component blend, irregularity of a real product (general low).**Theoretical studies of predicting strength properties of yarn:** Fiber properties and yarn twist for max strength , tenacity – length uniformity and fiber properties , predicting single end strength from cotton fiber properties . **Strength of blended yarns:** predicting the theoretical formulas and theoretical model of the strength of wrapped yarns. **Influences of twist :** Relationship of twist multiplier with : yarn twist /unit length and yarn count , Kochlin,Staub,Jatiansen and Rendenbacher formulae's , twist factor vis angle of twist, critical twist factor. **Twist effect on yarn contraction :**Yarn contraction of plied yarn and continuous filament and the retraction and strength of wrapped yarn – elastomeric fibers. **Twist insertion and distribution :** by means of air jets, wrapping twist in single jet false twisting spinning and siro spun yarns .

3- Machinery Noise

- Physics of Noise
- Human Response to Noise
- Machinery Noise
- Assessment of Noise Risk
- Noise Control and Hearing Protection
- Introduction to Environmental Noise
- Standards and Good Practice

Elective course 6				Course Name		TEXE 6426		Code
2	Equivalent	4	Contact	2	Lecture	2	Practical/تمرين	Teaching

	Credit Hr		Hours					Hours
60			Written Exam	30	Term Work	10	شفوي/Practical	Marking

1- Operational Research

Operational research and Art problem solving. Operation research techniques. -Methodology of operation research : Formulating the problem . Constructing a model to represent the system under study , deriving solution from the model , testing the model and the solution derived from it , establishing controls over the solution and implementation of the solution . **Linear programming :**Tools of operation research , graphical solution , algebraic solution , simplex method, duality and sensitivity analysis , integer programming , transportation model , advanced topics. **Application of operation research in textiles:** Material handling in yarn manufacturing , cotton fiber mixes and minimization of costs, Allocation and distribution projects, production and facilities planning , marketing .

2- Standards and Specifications

(I) Specifications:

Definitions of specification- specification limits- advantages of putting specifications – problems of specifications – required specifications of fibres, yarns, grey and finished woven and knitted fabrics – kinds of quality standards – standards making organizations –specification preparation and its approval – specification elements – stages of standard specification preparation – specification aims for (consumer ,producer, merchant and national economy) – sampling inspection by attribute and variables plans.

(II) Standards:

- Standard test methods for stretch properties of fabrics woven from stretch yarns
- Surface water absorption of terry fabric
- Water vapour transmission of materials-
- Pilling resistance of fabrics-
- Abrasion resistance of textile fabrics-
- Flammability of clothing textiles-
- Thermal transmittance of textile fabrics.
- Dimensional changes in laundering of woven or knitted textiles.

3- Automatic Control in Weaving

Appling the theories and routes of automatic control in weaving process, which governing the following actions (yarn breaks in winding and warping machines — temperature regulation in the sizing bathes — controlling the let-of in weaving and others) starting with winding machines, warping machines, sizing machines, weaving machines.

4- Filter Fabrics

An introduction of filtration process – mechanism of filtration process – theory of filtration (particle capture mechanisms) – collection efficiency for a filter bed – filtration efficiency for multiple collectors

- design of filter fabric – pressure drop in a packed filter – collection efficiency and pressure drop for a single-layer filter – bag filters and baghouses – cleaning cycles for bag houses.

Project				Course Name		TEXE 6427		Code
2	Equivalent Credit Hr	4	Contact Hours	1	Lecture	3	Practical/تمرين	Teaching Hours
			Written Exam	30	Term Work	70	Practical/شفوي	Marking
Student continuing the preparation of the project and making theoretical and statistical analysis and design work and complement the project after final term exams.								

7 Civil Engineering

Program Name	B.Sc. Civil Engineering
Department	**Structural Dept.** **Irrigation &Hydraulics Dept.** **Public Works Dept.**
Program Type	**Single**
No of Semesters	**10**
No of Contact Hour	**280 Hrs**
Lecture	
Tutorial and Practical	
Equivalent Credit Hours	**180**

7 Architectural Engineering

Basic Information

Program Name	Architectural Engineering
Department	Architectural Engineering
Program Type	Single
No of Semesters	10
No of Contact Hours	280
Lecture	126
Tutorial and Practical	154
Equivalent Credit Hours	180

Graduate attributes:

The graduates of the engineering programs should be able to:

20. Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
21. Design a system, component and process to meet the required needs within realistic constraints.
22. Design and conduct experiments as well as analyze and interpret data.
23. Identify, formulate and solve fundamental engineering problems.
24. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
25. Work effectively within multi-disciplinary teams.
26. Communicate effectively.
27. Consider the impacts of engineering solutions on society and environment.
28. Demonstrate knowledge of contemporary engineering issues.
29. Display professional and ethical responsibilities; and contextual understanding.
30. Engage in self- and life- long learning.
31. Design robust architectural projects with creativity and technical mastery.

32. Demonstrate investigative skills, attention to details, and visualize/ conceptualize skills.
33. Adopt a holistic problem solving approach for complex, ambiguous, and open-ended challenges and scenarios.
34. Demonstrate knowledge of cultural diversity, differences and the impact of a building on community character and identity.
35. Address urban issues, planning, and community needs through design work.
36. Recognize the new role of architectural engineer as the leader of design projects— who has the ability to understand, assemble, and coordinate all of the disciplines— to create a sustainable environment.

Courses distribution based requirement according the Reference Framework

Code	Course Name	Contact Hrs.	Equivalent Credit Hr	Requirements				Semester	Academic Year
				University	Faculty	Department: Major	Department: Minor		
BAS 1011	Mathematics (1)	5	3					First	Preparatory Year
BAS 1012	Physics (1)	6	4						
BAS 1013	Mechanics (1)	4	2						
PDE+BAS 1014	Engineering drawing and projection	5	3						
BAS 1015	Chemistry	5	3						
BAS 1016	English	4	2						
BAS 1021	Mathematics (2)	5	3					Second	
BAS 1022	Physics(2)	6	4						
BAS 1023	Mechanics(2)	4	2						
PDE 1024	Engineering drawing	4	3						
PDE 1025	Production engineering	4	2						
CAC 1026	Introduction to computer programming	4	2						
BAS1027	Engineering Entrance	2	2						
BAS7111	Mathematics (3)	4	2					First	First Year
ARE7112	Principles& skills of architectural	5	3						
ARE7113	Building Construction (1)	5	3						
ARE7114	History of Art &Architecture	2	2						
ARE7115	Theories of Architecture (1)	2	2						
ARE7116	Architecture techniques	5	3						
STE7117	Theories of Structures	4	2						
ARE7121	Architectural Design Studio (1)	5	3					Second	
ARE7122	Building Construction (2)	5	3						
ARE7123	Properties and techniques of building materials (1)	3	3						
ARE7124	Visual Design	5	3						
ARE7125	Technical writing	3	1						
PWE7126	Surveying	5	3						
ARE7127	Free Course(1)	2	2						
ARE7211	Architectural Design Studio(2)	7	3					First	Second Year
ARE7212	Building Construction (3)	5	3						
ARE7213	Computer Applications in Architecture (1)	4	2						
ARE7214	Theories of Architecture (2)	2	2						
ARE7215	Properties and techniques of building material(2)	3	3						
ARE7216	Theories of town Planning	3	3						
ARE7217	Summer Training(1)	2	0						
ARE7221	Architectural Design Studio(3)	7	3					Second	
ARE7222	Building Construction (4)	5	3						

ARE7223	Computer Applications in Architecture (2)	4	2						
ARE7224	Urban Design	5	3						
ARE7225	Environmental Control	3	2						
STE7226	Concrete Structures	4	2						
ARE7311	Architectural Design Studio(4)	7	3					First	Third Year
ARE7312	Working drawing(1)	7	3						
ARE7313	Interior design	5	3						
ARE7314	Urban Planning (1)	5	3						
STE7316	Steel structure	4	2						
ARE7321	Architectural Design Studio(5)	7	3					Second	
ARE7322	Working drawing (2)	7	3						
ARE7323	Housing	5	3						
ARE7324	Technical supply	4	2						
BAS7325	Statistics and programming	3	2						
ARE7326	Elective course(1)	2	2						
ARE7411	Architectural Design Studio(6)	7	3					First	Fourth Year
ARE7412	Working drawing (3)	5	3						
ARE7413	Urban Planning (2)	5	3						
ARE7414	Graduation Research Project	3	1						
ARE7415	Specifications, Quantities & Quality Control	4	2						
ARE7416	Summer Training (2)	2	0						
ARE7421	Project	12	6					Second	
ARE7422	Regional Planning	7	3						
ARE7423	Elective course (2)	3	2						
ARE7424	Elective course (3)	3	2						
ARE7425	Free Course (2)	2	2						
No Of hours		276	177	16	83	99	78		
Percentage				5.8	30	35.8	28.2		
Min		**250**	**160**	**6**	**22**	**30**	**20**		
Max		**280**	**180**	**10**	**30**	**35**	**30**		

Program courses and subject area:

PreparatoryYear-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial Practical		Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1011	Mathematics (1)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1012	Physics (1)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1013	Mechanics (1)	2	2	0	**4**	2	3	35	0	90	**125**			3		1		
PDE+BAS 1014	Engineering drawing and projection	2	0	3	**5**	3	3	50	0	100	**150**					5		
BAS 1015	Chemistry	2	0	3	**5**	3	3	35	10	80	**125**			3		2		
BAS1016	English	1	0	3	**4**	2	2	10	0	40	**50**	4						
Total		13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0

Preparatory Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1021	Mathematics (2)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1022	Physics(2)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1023	Mechanics(2)	2	2	0	**4**	2	2	30	0	70	**100**			3		1		
PDE1024	Engineering drawing	1	0	3	**4**	2	3	30	0	70	**100**					4		
PDE1025	Production engineering	1	0	3	**4**	2	2	30		70	**100**				2	2		
CAC 1026	Introduction to computer programming	1	0	3	**4**	2	2	20	10	70	**100**					4		
BAS1027	Engineering Entrance	2	0	0	**2**	2	2	0	0	50	**50**	2	0	0	0	0	0	0
Total		13	4	12	29	17	17	200	20	530	750	2	0	12	2	13	0	

First Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours			Semester Work	Oral /Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS7111	Mathematics (3)	2	2	0	**4**	2	3	40	0	110	**150**			4				
ARE7112	Principles& skills of architectural	2	0	3	**5**	3	3	50	10	40	**100**	2				3		
ARE7113	Building Construction (1)	2	0	3	**5**	3	4	80	10	60	**150**				2	3		
ARE7114	History of Art &Architecture	2	0	0	**2**	2	3	25	0	50	**75**	2						
ARE7115	Theories of Architecture (1)	2	0	0	**2**	2	3	25	0	50	**75**				2			
ARE7116	Architecture techniques	2	0	3	**5**	3	4	50	10	40	100					5		
STE7117	Theories of Structures	2	2	0	**4**	2	3	30	0	70	**100**					2	2	
Total		14	4	9	**27**	17	23	300	30	420	**750**	4	0	4	4	13	2	0

First Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours			Semester Work	Oral l / practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
ARE7121	Architectural Design Studio (1)	2	0	3	**5**	3	6	80	10	60	**150**					2	3	
ARE7122	Building Construction (2)	2	0	3	**5**	3	4	80	10	60	**150**					2	3	
ARE7123	Properties and techniques of building materials (1)	3	0	0	**3**	3	3	40	10	50	**100**			1		2		
ARE7124	Visual Design	2	0	3	**5**	3	4	65	10	50	**125**						5	
ARE7125	Technical writing	1	2	0	**3**	1	3	40	10	50	**100**	3						
PWE7126	Surveying	2	0	3	**5**	3	3	45	10	70	**125**			2		3		
ARE7127	Free Course(1)	2	0	0	**2**	2	3	20	0	30	**50**	2						
Total		14	2	12	**28**	16	23	350	60	340	**750**	5	0	3	0	9	11	0

Second Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours			Semester Work	Oral/ Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
ARE7211	Architectural Design Studio(2)	1	0	6	**7**	3	6	80	10	60	**150**			1			6	
ARE7212	Building Construction (3)	2	0	3	**5**	3	4	80	10	60	**150**			2			3	
ARE7213	Computer Applications in Architecture (1)	2	2	0	**4**	2	---	40	60	—	**100**						4	
ARE7214	Theories of Architecture (2)	2	0	0	**2**	2	3	25	0	75	**100**				2			
ARE7215	Properties and techniques of building material(2)	3	0	0	**3**	3	3	40	10	50	**100**			1		2		
ARE7216	Theories of town Planning	3	0	0	**3**	3	3	30	10	60	**100**					3		
ARE7217	Summer Training(1)	0	2	0	**2**	0	0	50			**50**							2
Total		13	4	9	**26**	16	22	345	100	305	**750**	0	0	4	2	5	13	2

Second Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours			Semester Work	Oral/ Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
ARE7221	Architectural Design Studio(3)	1	0	6	**7**	3	6	80	10	60	**150**					1	6	
ARE7222	Building Construction (4)	2	0	3	**5**	3	4	80	10	60	**150**			2			3	
ARE7223	Computer Applications in Architecture (2)	2	2	0	**4**	2	---	40	60	—	**100**						4	
ARE7224	Urban Design	2	0	3	**5**	3	4	40	10	50	**100**					2	3	
ARE7225	Environmental Control	2	1	0	**3**	2	3	40	10	50	**100**	2			1			
STE7226	Concrete Structures	2	2	0	**4**	2	4	50	0	100	**150**			2			2	
Total		11	5	12	**28**	15	21	330	100	320	**750**	2	0	4	1	3	18	0

Third Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours			Semester Work	Oral/ Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
ARE7311	Architectural Design Studio(4)	1	0	6	**7**	3	6	80	10	60	**150**						7	
ARE7312	Working drawing(1)	1	0	6	**7**	3	5	80	10	60	**150**				1	6		
ARE7313	Interior design	2	0	3	**5**	3	4	80	10	60	**150**				2		3	
ARE7314	Urban Planning (1)	2	0	3	**5**	3	4	80	10	60	**150**					5		
STE7315	Steel structure	2	2	0	**4**	2	3	50	0	100	**150**			1		3		
Total		8	2	18	**28**	14	25	410	45	370	**750**	0	0	1	3	14	10	

Third Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours			Semester Work	Oral/ Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
ARE7321	Architectural Design Studio(5)	1	0	6	**7**	3	6	90	15	70	**175**					2	5	
ARE7322	Working drawing (2)	1	0	6	**7**	3	5	90	15	70	**175**				2	5		
ARE7323	Housing	2	0	3	**5**	3	3	50	10	40	**100**			2		3		
ARE7324	Technical supply	2	2	0	**4**	2	3	40	0	60	**100**	2		2				
BAS7325	Statistics and programming	2	1	0	**3**	2	3	40	0	60	**100**			3				
ARE7326	Elective course(1)	2	0	0	**2**	2	3	30	10	60	**100**						2	
Total		10	3	15	**28**	17	23	310	45	320	**750**	2	0	7	2	10	7	0

Fourth Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours			Semester Work	Oral/ Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
ARE7411	Architectural Design Studio(6)	1	0	6	**7**	3	6	90	15	70	**175**						7	
ARE7412	Working drawing (3)	2	0	3	**5**	3	5	90	15	70	**175**				2	3		
ARE7413	Urban Planning (2)	2	0	3	**5**	3	6	80	10	60	**150**				2	3		
ARE7414	Graduation Research Project	1	2	0	**3**	1	---	60	40	---	**100**							3
ARE7415	Specifications, Quantities & Quality Control	2	2	0	**4**	2	3	30	0	70	**100**	2	2					
ARE7416	Summer Training (2)	0	2	0	**2**	0					**50**							2
Total		8	6	12	**26**	12	23	365	75	310	**750**	2	2	0	4	6	7	5

Fourth Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours			Semester Work	Oral/ Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
ARE7421	Project	3	0	9	**12**	6	0	150	150	-	**300**						4	8
ARE7422	Regional Planning	1	0	6	**7**	3	4	80	10	60	**150**	3	4					
ARE7423	Elective Course (2)	2	1	0	**3**	2	3	45	10	70	**125**						3	
ARE7424	Elective Course (3)	2	1	0	**3**	2	3	45	10	70	**125**						3	
ARE7425	Free Course (2)	2	0	0	**2**	2	3	20	0	30	**50**		2					
Total		10	2	15	**27**	15	10	290	80	380	**750**	3	6	0	0	0	10	8

Total teaching hours and subject's distribution over the subject areas:

Semester	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
	Lectures	Exercises	Practical	Total Hours			Semester Work	Oral/Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
Preparatory year/ 1st semester	13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0
Preparatory year/ 2ndsemester	13	4	12	29	17	17	200	20	530	750	2	0	12	2	13	0	
First year/1st semester	14	4	9	**27**	17	23	300	30	420	**750**	4	0	4	4	13	2	0
First year/ 2nd semester	14	2	12	**28**	16	23	350	60	340	**750**	5	0	3	0	9	11	0
Second year/1st semester	13	4	9	**26**	16	22	345	100	305	**750**	0	0	4	2	5	13	2
Second year/ 2nd semester	11	5	12	**28**	15	21	330	100	320	**750**	2	0	4	1	3	18	0
Third year/1st semester	8	2	18	**28**	14	25	410	45	370	**750**	0	0	1	3	14	10	
Third year/ 2nd semester	10	3	15	**28**	17	23	310	45	320	**750**	2	0	7	2	10	7	0
Fourth year/1st semester	8	6	12	**26**	12	23	365	75	310	**750**	2	2	0	4	6	7	5
Fourth year/ 2nd semester	10	2	15	**27**	15	10	290	80	380	**750**	3	6	0	0	0	10	8
Total of Five Years	126	148	6	276		203	3075	575	3850	7500	24	8	50	16	83	78	15
% of Five Years							41.00	7.67	51.33	100	8.6	2.8	18.1	5.7	30	28.2	5.4
% NARS **minimum**											8.00	2.00	18.00	4.00	25.00	25.00	4.00
% NARS **maximum**											12.00	4.00	22.00	6.00	30.00	30.00	6.00

The above table shows the agreement with NARS requirements.

Mathematics (3)				Course Name		BAS7111		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practicalتمارين/	Teaching Hours
110			Written Exam	40	Term Work	0	شفوي/Practical	Marking
Homogeneous higher order ODE – Non-homogeneous higher order ODE with constant coefficients (undetermined coefficients method and variation of parameters method for finding the particular solution) – Cauchy-Euler ODE (homogeneous and non-homogeneous) – Differentiation of integration – Multiple integrals (double and triple) and their applications. Curve fitting – Interpolation – Numerical integration –Numerical solution of algebraic and transcendental equations– Numerical solution of ordinary differential equations – Statistics and probability principles.								

Principles& skills of architectural				Course Name		ARE7112		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	3	Practical	Teaching Hours
40			Written Exam	50	Term Work	10	شفوي /Practical	Marking
Introduction to architectural design — training the students to study and solve simple design problems — developing skills and abilities to multiple types and techniques of presentation for architectural design projects.								

Building Construction (1)				Course Name		ARE7113		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	3	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking
Traditional construction - masonry - raw bricks & brick masonry - construction buildings types & techniques: the wall bearing type — construction of roofs, floors, and ceilings — building insulation against dampness, rain drainage - construction buildings types & techniques: the skeleton type and its construction components — mortars arid finishing materials — applications and working drawings of simplified buildings - introduction to technical sanitary installations.								

History of Art &Architecture				Course Name		ARE7114		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours

50	Written Exam	25	Term Work		شفوي /Practical	Marking
Arts and architecture for history of architecture: Prehistoric architecture — Ancient Egyptian architecture — Ancient Egyptian cities — Castles and forts — Houses — Temples (for life & funeral ceremonies) — Tombs — Mesopotamian architecture — Greek Architecture — Roman Architecture.							

Theories of Architecture (1)				Course Name		ARE7115		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
50			Written Exam	25	Term Work		شفوي /Practical	Marking
Study of the concept of architecture and its theories — Building types — Design constraints of private and public building elements — Human dimensions and used spaces and zones — vertical and horizontal circulation elements in buildings — criteria and principles of planning and designing parking lots								

Architecture techniques				Course Name		ARE7116		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	3	Practical	Teaching Hours
40			Written Exam	50	Term Work	10	شفوي /Practical	Marking
Training on architectural representation, make models- studying the principles of architectural photography - studying the architectural styles of the city heritage buildings- documenting their architectural details by photography and sketching								

Theories of Structures				Course Name		STE7117		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practicalتمارين/	Teaching Hours
70			Written Exam	30	Term Work		شفوي/Practical	Marking
Basic concepts and analysis of structures - equilibrium — stability and compatibility — external and internal equilibrium of statically determined plane structures, beams, frames, and trusses — normal shear — torsion and combined stresses — elastic deformations — introduction to the analysis of statically indeterminate structures through consistent deformations and moment distributions — buckling of columns — introduction to space structures.								

Architectural Design Studio (1)				Course Name		ARE7121		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	3	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking
Simplified projects dealing with aesthetic, cultural, environmental, functional, and structural constraints of architectural form and space — principles of using and designing building interiors and external spaces, services, and vertical and horizontal circulation, with reference to human needs and interactions with the surrounding built and natural environments — applications with architectural models and studying types and techniques of presentation in architectural design and projects.								

Building Construction (2)				Course Name		ARE7122		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	3	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking
Study of diverse types and techniques of building construction - skeleton buildings —frames — sliding slabs — pre-stressed concrete — shell constructions — steel constructions — trusses — thermal insulation of roofs and external walls — construction details of stairs.								

Properties and techniques of building materials (1)				Course Name		ARE7123		Code
3	Equivalent Credit Hr	3	Contact Hours	3	Lecture	0	Practical	Teaching Hours
50			Written Exam	40	Term Work	10	شفوي /Practical	Marking
Study of the physical and mechanical properties of building materials and traditional and modern techniques - Standards - Codes - Thermal and sound behavior of materials - Appropriate with surrounding environment								

Visual Design				Course Name		ARE7124		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture		Practical	Teaching Hours
50			Written Exam	65	Term Work	10	شفوي /Practical	Marking

A. Introducing various drawing principles and artistic techniques; pencil techniques, pen & ink - proportions perspective, scale and composition - foreground, middle and background - sketching architectural elements and landscapes - architectural presentation. **B.** Theory of colors: Study of color circles, hues, grades, and schemes — use of colors in drawing built-up and natural elements - colors and presentation media - drafting and rendering, manual and mental skills — application on interior design of buildings;fundamentals of vision and light; **c.** Study of the shade of a dot, straight lines, plane shapes, and objects, Methods of shading projection — application on partial architectural drawings with recessed and protruded parts of buildings and regrouping

Technical writing				Course Name		UNI7125		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
50			Written Exam	40	Term Work	10	شفوي /Practical	Marking
Issues and subjects in the architectural engineering of projects throughout phases preparation of preliminary and final reports — written exercises — oral discussions — ways and techniques of data presentation.								

Surveying				Course Name		PWE7126		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	45	Term Work	10	شفوي /Practical	Marking
The course aims to introduce theto basic elements of engineering surveying and its architectural applications: **A** Surveying and measuring operations: plotting scales, venires, linear and simple angular measurement devices. **B** Chain surveying: leveling and theodolites — map drawing — photogrammetry and its architectural applications								

Free course (1)				Course Name		ARE7127		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	0	Practical	Teaching Hours
30			Written Exam	20	Term Work	0	شفوي /Practical	Marking
Free Course (1) a sculpture The basics of sculpture and formation using different materials clay - gypsum - wood **Free Course (1) b Photography** Study the basics of photography - examples and experiments								

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Architectural Design (2)				Course Name		ARE7211		Code
3	Equivalent Credit Hr	7	Contact Hours	1	Lecture	6	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking
Study and analysis of building elements for average-scale project programs and compositions — principles of the environmental impact assessment in the design phase — study of the importance of structural significance in forming architectural spaces.								

Building Construction (3)				Course Name		ARE7212		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	3	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking
Working steps to implement different construction and finishing procedures in buildings: Detailing of site works — excavation and foundation works - concrete and reinforced concrete works - masonry, raw bricks & brick masonry - wooden construction details - drawing details of doors, windows, and wardrobes - plaster and finishes of internal and external building surfaces water and damp proofing - thermal insulation techniques flooring works — sanitary and electrical works - applications.								

Computer Applications in Architecture (1)				Course Name		ARE7213		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	تمارين	Teaching Hours
--			Written Exam	40	Term Work	60	شفوي /Practical	Marking
Prevailing operating system — trainings - architectural drawing programs — applications on architectural-related cases.								

Theories of Architecture (2)				Course Name		ARE7214		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture	0	Practical	Teaching Hours
75			Written Exam	25	Term Work	0	شفوي /Practical	Marking

Study of the theories of the different schools of architecture - Functional theory - organic theory - Bauhaus - deconstruction -..... Postmodern architecture - The architectural trends of the twentieth century and the 21st century.

Properties and techniques of building material (2)				Course Name		ARE7215		Code
2	Equivalent Credit Hr	3	Contact Hours	3	Lecture	0	Practical	Teaching Hours
50			Written Exam	40	Term Work	10	شفوي /Practical	Marking

The study of building materials and new technologies-their role in local architecture - manifestations of transformation and change in building materials and their impact on contemporary architecture - sustainable building materials - green building materials

Theories of town Planning				Course Name		ARE7216		Code
3	Equivalent Credit Hr	3	Contact Hours	3	Lecture	0	Practical	Teaching Hours
60			Written Exam	40	Term Work	10	شفوي /Practical	Marking

-study the History of the earliest human settlements in different civilizations and study of the evolution and historical development of city planning in ancient Egypt, Mesopotamia, Greek and Roman Civilizations-Renaissance

--Studying the development of the shape of the city through the different theories of town planning (linear city – garden city - the big block - industrial city - the city of tomorrow - the city model ...)and study the advantages and disadvantages for all of it

Contemporary town planning trends in the 20th and 21st century-

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Architectural Design Studio (3)				Course Name		ARE7221		Code
3	Equivalent Credit Hr	7	Contact Hours	1	Lecture	6	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking

Making researches and field visits and their application on architectural design projects — ways of identifying dealing with problems — design approaches to average-scale projects — studies of environmental impact assessment.

Building Construction (4)				Course Name		ARE7222		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	3	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking
Steel works and details — ways and techniques of expansion joints and treatments of different building cracks and caulks — prefabricated buildings, prestressed, and precast concrete — concrete and reinforced concrete and their ratios of their components — ways and techniques of mixing and casting concrete — laboratory setups of quality assurance — thermal and damp proofing, noise-reduction, antistatic, and anti-radiation materials — recent finishing materials and buildings and attributed physical and mechanical features.								

Computer Applications in Architecture (2)				Course Name		ARE7223		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	تمارين	Teaching Hours
----			Written Exam	40	Term Work	60	شفوي /Practical	Marking
Defining methods and techniques of computer applications in the architectural and urban design fields — use of computer in programming, architectural design aiding, working drawings, quantities, and descriptions. Drawing and presentation — preparation of two and three-dimensional drawings. — use of computers in preparing researches and environmental								

Urban Design				Course Name		ARE7224		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	3	Practical	Teaching Hours
50			Written Exam	40	Term Work	10	شفوي /Practical	Marking
Definition of urban design: aims, programs, constituents, and attributes — study of principles of urban design — ecological and environmental effect on urban shaping.								

Environmental Control				Course Name		ARE7225		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture	1	تمارين	Teaching Hours
50			Written Exam	40	Term Work	10	شفوي /Practical	Marking

Environmental control: The natural environment and climatic factors — human thermal comfort in building interiors — buildings and streets orientation — natural ventilation in buildings — solar control in windows — design of buildings and windows to adapt with the surrounding environment — landscaping and use of trees for shading, air purification, and control of ventilating patterns — protection from desertification.								
Concrete Structures				Course Name		STE7226		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	تمارين	Teaching Hours
100			Written Exam	50	Term Work	0	شفوي /Practical	Marking
Reinforced Concrete (RC) principles of designing RC constructions — analysis and design of sections that are subject to bending load distribution — reinforcement details of beams, flat slabs, columns, and stairs.								

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Architectural Design Studio (4)				Course Name		ARE 7311		Code
3	Equivalent Credit Hr	7	Contact Hours	1	Lecture	6	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking
Study of external environmental conditions and development of students‘ perception of urban forms the kind of relationship between external volumes and building shapes — significance of structural concept in shaping and formulating architectural spaces * raising efficiency in the design process architectural projects characterized with complicated, diversified elements — introduction to the strategic environmental studies of projects								

Working Drawing (1)				Course Name		ARE 7312		Code
3	Equivalent Credit Hr	7	Contact Hours	1	Lecture	6	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking
Detailed study and preparation of the various and recent structural systems covering wide spans in buildings — preparation of the complete working drawings and details of major projects with wide-span facilities — field visits to similar projects.								

Interior Design				Course Name		ARE 7313		Code
3	Equivalent	5	Contact	2	Lecture	3	Practical	Teaching

	Credit Hr		Hours					Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking
Principles of design and shaping the interior design of public and private buildings — building interior components, the architectural styles of interior design ---- technical systems: lighting theories— materials types and tools — textures finishing aesthetics of architectural spaces— visual perception of spaces -- researches and applicable researches — study of colors and their psychological effects — application of the color theory on the interior design of buildings.								

Urban Planning				Course Name		ARE 7314		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	3	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking
Study of the carious levels of planning (national — regional — local) — development studies— structural planning — environmental, social, economical, and demographic studies — legislations and laws — elements and factors of Residential Neighborhood (road system-services system- housing system) planning development of planning goals and programs — population density activities and economical bases social and population possibilities analysis and design of urban spaces inside the neighborhood— characteristics of visual conception in the urban environment.								

Steel structure				Course Name		STE 7315		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture	2	تمارين	Teaching Hours
100			Written Exam	50	Term Work	0	شفوي /Practical	Marking
Structural systems of steel constructions - design loads — design of members which are subjected to central forces, moments, or shear forces — design of bolted and welded connections.								

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Architectural Design Studio (5)				Course Name		ARE 7321		Code
3	Equivalent Credit Hr	7	Contact Hours	1	Lecture	6	Practical	Teaching Hours
70			Written Exam	90	Term Work	15	شفوي /Practical	Marking
The course concentrates on enhancing the students‘ skills in developing architectural solutions and alleviating the environmental design problems — studying a variety of structural solutions to help construct wide-span structures and study their potential associated complications - study of natural and mechanical ventilation — study of artificial and daylighting — use of computer applications and programs in designing, developing, and presenting architectural projects — applications with help of simplified architectural models.								

Working Drawing (2)				Course Name		ARE 7322		Code
3	Equivalent Credit Hr	7	Contact Hours	1	Lecture	6	Practical	Teaching Hours
70			Written Exam	90	Term Work	15	شفوي /Practical	Marking
Preparation detailed working drawings of buildings both architectural and structural connections and elements — preparation of sanitary, electrical, and mechanical drawings of architecturally design projects.								

Housing				Course Name		ARE 7323		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	3	Practical	Teaching Hours
40			Written Exam	50	Term Work	10	شفوي /Practical	Marking
This program is specifically designed to enable students to understand the basis of issues related to housing theory, housing problems in developing countries and Egypt, study the physical and intangible aspects that affect the design of housing projects in urban areas, domestic and global housing policies. Identify current issues affecting the formulation and implementation of housing programs in developing countries. It covers classification of housing types, analysis of housing design, and interior design of housing projects								

Technical supply				Course Name		ARE 7324		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	تمارين	Teaching Hours
60			Written Exam	40	Term Work	0	شفوي /Practical	Marking
Hydraulic services and plumbing fixtures in buildings — hot and cold water supply and distribution, sewage systems and waste disposal — ovens and kitchen appliance- fire alarm and distinguishers, HVAC systems in buildings.								

Statistics and programming				Course Name		BAS7325		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture	1	تمارين	Teaching Hours
60			Written Exam	40	Term Work	0	شفوي /Practical	Marking
basic concepts of statistics and probability: displaying the data, measures of central tendency, measures of dispersion, simple regression, probability, types of random variables and some discrete probability distributions. Outline the basic information of different types of samples and the sampling distributions, Study the methods of point estimation, Study the hypothesis testing concerning the variance and the ratio of two variances, Study the basic concepts in the theory of hypothesis testing Develop the methods for								

construction of Good test

Elective courses (1)				Course Name		ARE 7326		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture		Practical	Teaching Hours
60			Written Exam	30	Term Work	10	شفوي /Practical	Marking
a- Environmental design The variety of existing environments — climate and climatic regions — human thermal comfort — environmental impact on architectural designs case studies and applicable researches. **b- Landscape Design** Analytical studies of site characteristics and its surrounding environment — urban database — social, economical, and cultural database — detailed study of transportation networks within the site — numerical analysis of functional relationships of the site — study of design and shaping the space and the visual form — project of urban design and infrastructure planning.								

الفرقة : الرابعه القسم : عمارة الفصل الدراسي :الاول

Architectural Design Studio (6)				Course Name		ARE 7411		Code
3	Equivalent Credit Hr	7	Contact Hours	1	Lecture	6	Practical	Teaching Hours
70			Written Exam	90	Term Work	15	شفوي /Practical	Marking
Application of knowledge and skills of the professional, technical, architectural, structural, and technological sciences in the architectural and urban design processes for applicable projects using architectural modeling as a design aid discussion of design alternatives and solutions of the same problem study, analysis, and criticism of the alternatives studies of the environmental strategy applied to the architectural and urban projects.								

Working Drawing (3)				Course Name		ARE 7412		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	3	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking

Preparation of a complete group of executive architectural design drawings for a project with a specific function, characterized with wide span - making studies and detailed architectural drawings of cladding, (internal and external), suspended ceilings, acoustical treatments, damp and water proofing, thermal insulation, lighting, furniture, technical facilities and supplements legislations and building codes use of computer programs in calculating and preparing the qualitative and quantitative preconditions.								

Urban planning (2)				Course Name		ARE 7413		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	3	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking
A study of the characteristics of the city and its governing systems. Studying the characteristics of the site and its surroundings. An urban database. A social, economic and cultural database. Detailed study of the city's transport network. Numerical analysis of functional relations within the project site in one of the old or new cities. Visual perception and mental image of the city.								

Graduation Research Project.				Course Name		ARE 7414		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture	1	Practical	Teaching Hours
			Written Exam	60	Term Work	40	شفوي /Practical	Marking
Independent study in research as approach to undergraduate project work								

Specifications, Quantities & Quality Control.				Course Name		ARE 7415		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	تمارين	Teaching Hours
70			Written Exam	30	Term Work	0	شفوي /Practical	Marking
General and detailed specifications for building items - quantity and surveying methods - tendering and bidding — contracting - bids analysis — commissioning project management (time, labor, cash flow, machinery and equipment) - professional practice - designer and supervisors responsibilities - quality and quality control - contractor and owner responsibilities actors relations and roles — using computer programs in preparation of executive plans.								

الفرقة : الرابعه القسم : عمارة الفصل الدراسي :الثاني

Project				Course Name		ARE7421		Code
6	Equivalent Credit Hr	12	Contact Hours	3	Lecture	9	Practical	Teaching Hours

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Regional Planning.				Course Name		ARE7422		Code
3	Equivalent Credit Hr	7	Contact Hours	1	Lecture	6	Practical	Teaching Hours
60			Written Exam	80	Term Work	10	شفوي /Practical	Marking
Study of the theoretical framework of city and regional planning processes - This course aims to raise the level of students by introducing a concept and basic frameworks for urban and regional planning - discussing issues of urban and regional development. The course will be done through examples of the lecturer's experiences and class discussion								

Elective courses (2)				Course Name		ARE7423		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture	1	تمارين	Teaching Hours
70			Written Exam	45	Term Work	10	شفوي /Practical	Marking
Elective courses (2) a- Advanced Building Technologies An approach to the study of advanced construction systems improved with the development of sophisticated technologies loads and construction methods structural materials — examples and case studies. **Elective courses (2) b- Architectural Criticism and Competitions** Defining the concepts and history of architectural criticism — tools and parameters of architectural criticism outlines of architectural criticism trends and concepts criteria and principles of architectural criticism, evaluation and assessment - defining the concept of architectural competitions, their importance, and their aims — concepts and trends of design — preparation of drawings and technical reports application studies of architectural criticism processes.								

Elective courses (3)				Course Name		ARE 7424		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture	1	تمارين	Teaching Hours
70			Written Exam	45	Term Work	10	شفوي /Practical	Marking
a- Urban Renovation and Upgrading Maximum use of available environmental possibilities and human and urban resources study of local								

and global experiments in development and upgrading standing problems of urban decay, its causes and factors tools and techniques of rectification used in renovation and upgrading - conservation and maintenance — case studies and applications.

b- Detailed Planning

The role of planning in achieving a strong relationship between the built-up areas and spaces — forming of spaces, their sequential arrangement, dimensions, detailing, and relationships — visual forming with its variable parameters — circulation paths — landscaping and its corresponding parameters and details.

Free Course (2).				Course Name		ARE7325		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture	0	Practical	Teaching Hours
30			Written Exam	20	Term Work	0	شفوي/Practical	Marking

a. Marketing

Study the development and implementation of the marketing plan, and techniques related to the marketing of architectural projects - the importance of linking projects to the labor market

b-Engineering Projects Management

Study of making executive programs for site management (time, labor, equipment) cash flow and time plans - project management methods — management principles implementation policies, programs, and schedules — practice principles — evaluation quality control economical management of projects — ease studies, applicable researches, and field visits

8 Civil Engineering Program

Basic Information

Program Name	Bsc. Civil Engineering
Department	**Irrigation &Hydraulics Dept.** **Public Works Dept.** **Structural Dept.**
Program Type	**Single**
No of Semesters	**10**
No of Contact Hour	**280 Hrs**
Lecture	
Tutorial and Practical	
Equivalent Credit Hours	

Graduate Attributes:

Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
Design a system; component and process to meet the required needs with realistic constraints.
Design and conduct experiments as well as analyze and interpret data.
Identify formulate and solve fundamental engineering problems.
Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
Work effectively within multi-disciplinary teams.
Communicate effectively.
Consider the impacts of engineering solutions on society & environment.
Demonstrate knowledge of contemporary engineering issues.
Display professional and ethical responsibilities; and contextual understanding.
Engage in self-and life-long learning.
Act professionally in design and supervision of civil engineering disciplines.
Use the codes of practice of all civil engineering disciplines effectively and professionally.
Design, construct and protect all types of excavations and tunneling systems for different purposes.
Manage construction sites.

Select appropriate building materials from the perspective of strength, durability, suitability of use to location, temperature, weather conditions and impacts of seawater and environment.
Select and design adequate water control structures, irrigation and water networks, sewerage systems and pumping stations.
Define and preserve properties (lands, real estates) of individuals, communities and institutions, through different surveying and GIS tools.
Design and construct structures for protection against dangers of unexpected natural events such as floods and storms.
Lead and supervise a group of designers and site or lab technicians.

Courses distribution based requirement according to the Reference Framework and NARSE of Civil Engineering Program

Code	Course Name	Contact Hrs.	Equivalent Credit Hr	Requirements				Semester	Academic Year
				University	Faculty	Department			
						General	Specified		
BAS1011	Mathematics & Statistics (1)	6			6			First	Preparatory Year
BAS1012	Physics (1)	7			7				
BAS1013	Mechanics (1)	4			4				
BAS1014	Engineering drawing and Projection (1)	4			4				
BAS1015	Chemistry (1)	5			5				
UNI1016	English	2		2					
BAS1021	Mathematics & Statistics (2)	5			5			Second	
BAS1022	Physics(2)	6			6				
BAS1023	Mechanics(2)	4			4				
BAS1024	Engineering drawing and Projection (2)	4			4				
PRE1025	Production engineering	4			4				
CSE1026	Introduction to computer programming	4		4					
UNI1027	Humanities(1)	2		2					
STE-111	Theory of structures 1	4	3			4		First	First Year
IRH -112	Civil Engineering Drawing	4	3			4			
PWE -113	Plane Surveying	4	3			4			
IRH -114	Law and Engineering Economics	3	3		3				
MPE+ElE -115	Mechanical and Electric Engineering	4	3		4				
PWE -116	Statistical Applications in Civil Engineering	5	3		5				

BAS -117	Mathematics (3)	4	3		4				
STE -121	Theory of structure 2	4	3			4		Second	
PWE -122	Plane Surveying 2	4	3			4			
STE -123	Strength of materials 1	8	5			8			
ARC -124	Building Systems	3	3		3				
PWE -125	Environmental Impact Assessment	3	3		3				
IRH -126	Hydrology	4	3			4			
STE-211	Theory of structure 3	4	3			4		First	Second Year
PWE -212	Topographic Surveying and Geodesy 2	4	3			4			
IRH -213	Hydraulics 1	5	4			5			
PWE -214	Geology and soil mechanics	4	3			4			
STE -215	Strength of materials 2	8	5			8			
IRH -216	Elective IRH1	3	3				3		
STE -221	Theory of structure 4	4	3			4		Second	
STE -222	Reinforced Concrete 1	6	5			6			
PWE -223	Topographic Surveying and Geodesy 2	4	3			4			
PWE -224	Potable Water Engineering	4	3				4		
IRH -225	Irrigation and drainage engineering	4	3			4			
PWE -226	Transportation and Traffic Engineering	4	3			4			
UNI-227	Humanities(2)	2	2	2					
IRH -311	Hydraulic (II)	4	3			4		First	Third Year
STE -312	Reinforced Concrete 2	4	3			4			
STE -313	Steel Structure 1	4	3			4			
IRH -314	Design of Water Structures 1	4	3			4			
PWE -315	Highway and Airport Engineering	6	5				6		
PWE-316	Wastewater Engineering	4	3				4		

STE -317	Professional Ethics	3	3	3					
IRH -321	Hydraulic (III)	4	3				4	Second	
STE -322	Reinforced Concrete 3	4	3			4			
STE -323	Steel Structures 2	4	3			4			
STE -324	Soil Mechanics and Foundations 1	8	6				8		
IRH -325	Elective IRH2	3	3				3		
PWE -326	PWE elective 1	2	2				2		
UNI-327	Technical Writing Reports 1	3	3	3					
STE -411	Soil Mechanics and Foundations 2	8	6				8	First	Fourth Year
IRH -412	Design of Water Structures2	4	3				4		
STE -413	Project Management	4	3		4				
IRH -414	Port Engineering	4	3				4		
STE -415	Elective STE 1	3	3				3		
PWE -416	Railway Engineering	3	3				3		
UNI-417	Technical Writing Reports 2	3	3	3					
STE-421	Reinforced concrete 4	6	5				6	Second	
STE -422	Steel Structures 3	6	5				6		
STE -423	Elective STE 2	3	3				3		
PWE -424	PWE Elective 2	3	3				3		
IRH -425	Elective IRH3	3	3				3		
STE+PWE+IRH-426	Graduation Projects	6	3		6				
No Of Courses		280		19	81	103	77		
Percentage				6.79%	28.93%	36.79%	27.50%	100.00%	
Min		250	160	6	22	30	20		
Max		280	180	10	30	35	30		

Program courses and subject area:

PreparatoryYear-First Semester:

Code	Course Name	Contact Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS-011	Mathematics & Statistics (1)	3	3	0	**6**	3	3	50	0	100	**150**			4		2		
BAS-012	Physics (1)	4	0	3	**7**	4	3	50	25	100	**175**			4		2		
BAS-013	Mechanics (1)	3	1	0	**4**	3	3	40	0	60	**100**			3		1		
BAS-014	Engineering drawing and Projection	1	0	3	**4**	3	3	45	0	80	**125**					3	2	
BAS-015	Chemistry (1)	2	0	3	**5**	3	3	35	10	80	**125**			2	1	2		
UNI-016	English	1	1	0	**2**	1	2	15	0	35	**50**	2						
Total		14	5	9	28	17	17	235	35	455	725	2	0	13	1	10	2	

Preparatory Year-Second Semester:

Code	Course Name	Contact Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS-021	Mathematics(2)	3	2	0	**5**	4	3	35	0	90	**125**			5				
BAS-022	Physics(2)	3	1	3	**6**	4	3	30	20	100	**150**			4		2		
BAS-023	Mechanics(2)	2	2	0	**4**	2	2	35	0	90	**125**			2		2		
BAS-024	Engineering drawing	2		2	**4**	2	3	30	0	70	**100**					2	2	
PRE-025	Production engineering	1		3	**4**	2	2	30		70	**100**		1			2	1	
CSE-026	Introduction to computer programming	1		3	**4**	2	2	10	20	70	**100**	2	1				1	
UNI-027	Humanities(1)	1	1		**2**	1	2	15	0	35	**50**	2						
Total		12	6	11	29	17	17	185	40	525	750	4	2	11		8	4	0

First Year Civil- First Semester:

Code	Course Name	Contact Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical/Oral	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
STE-111	**Theory of Structures 1**	2	2		4	3	3	30	10	60	**100**			1		2	1	
IRH -112	**Civil Engineering Drawing**	1	3		4	3	3	45	10	70	**125**				1	2	1	
PWE - 113	**Plane surveying 1**	2	2		4	3	3	20	20	60	**100**			1		2	2	
IRH -114	Law and Engineering Economics	3	0		3	3	3	30	10	60	**100**	1	2		1			
MPE+El E -115	Mechanical and Electric Engineering	2	2		4	3	3	30	10	60	**100**	2			2			
PWE - 116	**Statistical Applications in Civil Engineering**	3	2		5	4	3	45	10	70	**125**			2	1		2	
BAS-117	Mathematics (3)	3	1		4	3	3	30	10	60	**100**			4				
Total		16	12		**28**	22	21	230	80	440	**750**	3	2	7	5	6	6	

First Year-Second Semester:

Code	Course Name	Contact Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical/Oral	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
STE -121	Theory of structure 2	2	2		**4**	3	3	30	10	60	**100**			1		2	1	
PWE -122	**Plane Surveying 2**	2	2		**4**	3	3	20	20	60	**100**			1		2	1	
STE -123	Strength of materials 1	4	4		**8**	6	3	60	20	120	**200**	1		2		2	2	1
ARC -124	**Building Systems**	2	1		**3**	3	3	30	10	60	**100**	1			1		1	
PWE -125	**Environmental Impact Assessment**	2	1		**3**	3	3	30	10	60	**100**	1	1		1			
IRH -126	Hydrology	2	2		**4**	3	3	30	10	60	**100**	1				2	1	
Total		14	12		**26**	21	18	200	80	420	**700**	4	1	4	2	8	6	1
التدريب الصيفي بالمعامل 4 أسابيع					-						**50**							

Summer training1- 50 Marks (4 Weeks at Labs.)

Second Year-First Semester:

Code	Course Name	Contact Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical/Oral	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
STE-211	Theory of structure 3	2	2		4		3	30	10	60	**100**					2	2	
PWE -212	**Topographic Surveying and Geodesy 1**	2	2		4		3	20	20	60	**100**					2	2	
IRH -213	Hydraulics 1	3	2		5		3	30	25	70	**125**			1		2	2	
PWE -214	**Geology and Soil Mechanics**	2	2		4		3	30	25	70	**125**			1		2	1	
STE -215	**Strength of materials 2**	4	4		8		3	60	20	120	**200**			2	2	2	2	
IRH -216	**Elective IRH1**	2	1		3		3	30	10	60	**100**	1		1		1		
Total		15	13		**28**		18	200	110	440	**750**	1	0	5	2	11	9	0

Second Year-Second Semester:

Code	Course Name	Contact Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical/Oral	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
STE -221	Theory of structure 4	2	2		4		3	30	10	60	**100**					2	2	
STE -222	Reinforced Concrete 1	4	2		6		3	40	10	100	**150**			2		2	2	
PWE -223	**Topographic Surveying and Geodesy 2**	2	2		4		3	20	20	60	**100**			1		1	2	
PWE -224	**Potable Water Engineering**	2	2		4		3	30	10	60	**100**			1		2	1	
IRH -225	Irrigation and drainage engineering	2	2		4		3	30	10	60	**100**			1		2	1	
PWE -226	**Transportation and Traffic Engineering**	2	2		4		3	30	10	60	**100**			1		2	1	
UNI-227	Humanities(2)	2			2		2	15		35	**50**	2						
Total		16	12		**28**		20	195	70	435	**700**	2		6	0	11	9	
التدريب الصيفي بالشركات 2 4 أسابيع					-						**50**							

Summer Training 2- 4 weeks at field = 50 Marks

Third Year-First Semester:

Code	Course Name	Contact Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical/Oral	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
IRH -311	Hydraulic (II)	2	2		**4**		3	20	20	60	**100**			1		2	1	
STE -312	Reinforced Concrete 2	2	2		**4**		3	30	10	60	**100**			1		2	1	
STE -313	Steel Structure 1	2	2		**4**		3	30	10	60	**100**			1		2	1	
IRH -314	Design of Water Structures 1	2	2		**4**		3	30	10	60	**100**			1		2	1	
PWE -315	Highway and Airport Engineering	4	2		**6**		3	40	20	90	**150**			1		2	2	
PWE-316	Wastewater Engineering	2	2		**4**		3	30	10	60	**100**				1	2	1	
STE -317	Professional Ethics	3			**3**		2	15		35	**50**	3						
Total		16	12		**28**		20	185	85	405	**675**	3		5	1	12	7	
التدريب الصيفي بالشركات 3 4 أسابيع					-						**75**							

Third Year-Second Semester:

Code	Course Name	Contact Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical/Oral	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
IRH -321	Hydraulic (III)	2	2		**4**		3	20	20	60	**100**						2	2
STE -322	Reinforced Concrete 3	2	2		**4**		3	30	10	60	**100**					2	2	
STE -323	Steel Structures 2	2	2		**4**		3	30	10	60	**100**					2	2	
STE -324	Soil Mechanics and Foundations 1	4	4		**8**		3	60	20	120	**200**				1	3	4	
IRH -325	Elective IRH2	2	1		**3**		3	40		60	**100**	1					2	
PWE -326	PWE elective 1	2	-		**2**		2	---		50	**50**						2	
UNI-327	Technical Writing Reports 1	3			**3**		2	25		50	**75**	3						
Total		17	12		**29**		20	235	60	455	**750**	5			1	7	14	2

Summer Training 3- 4 weeks at field = 75 Marks

Fourth Year-First Semester:

Code	Course Name	Contact Hours	Equivalent Credit Hour	Exam Dur.	Marking	Subject Area

		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical/Oral	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
STE -411	Soil Mechanics and Foundations 2	4	4		**8**		3	60	20	120	**200**	1		1	1	2	2	1
IRH -412	Design of Water Structures2	2	2		**4**		3	30	10	60	**100**			1		1	2	
STE -413	Project Management	2	2		**4**		3	30	10	60	**100**		1	1	1		1	
IRH -414	Port Engineering	2	2		**4**		3	30	10	60	**100**				1	1	2	
STE -415	Elective STE 1	2	1		**3**		3	30	10	60	**100**			1			1	1
PWE -416	Railway Engineering	2	1		**3**		3	30	10	60	**100**	1					2	
UNI-417	Technical Writing Reports 2	3			**3**		2	15		35	**50**	3						
Total		17	12		**29**		20	225	70	455	**750**	5	1	4	3	4	10	2

Fourth Year-Second Semester:

Code	Course Name	Contact Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Semester Work	Practical/Oral	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
STE-421	Reinforced concrete 4	4	2		**6**		3	40	10	100	**150**					2	3	1
STE -422	Steel Structures 3	4	2		**6**		3	40	10	100	**150**					2	3	1
STE -423	Elective STE 2	2	1		**3**		3	40		60	**100**	1		1			1	
PWE -424	**PWE Elective 2**	2	1		**3**		3	40		60	**100**	1			1		1	
IRH -425	Elective IRH3	2	1		**3**		3	40		60	**100**	1					2	
STE+PWE +IRH-426	Graduation Projects	2	4		**6**			50		100	**150**	2					1	3
Total		16	11		**27**		15	250	20	480	**750**	5		1	1	4	11	5

الدراسى الأول الفرقة الأولى برنامج الهندسة المدنية ـ الفصل

Course Code	STE-111	Course title	Theory of Structures 1

Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Loads and reactions - Statically determinate beams -Statically determinate rigid frames-Statically determinate trusses								

Course Code		**IRH-112**		**Course title**		**Civil Engineering Drawing**		
Hours	Tutorial/ Practical	3	Lectures	1	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	45	Written exam	70	Total	125
Introduction: legend, symbols, scales, general layout, plan and longitudinal section- Earth works and intersections Drawing of Retaining walls: stepped brick wall, battered back wall, cantilevers type wall, and counterfort wall.-Water structures-Reinforced concrete elements-Foundation details- Steel structures								

Course Code		**PWE-113**		**Course title**		**Plane Surveying**		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	20	Semester Work	20	Written exam	60	Total	100
Surveying Fundamentals Distance Measurements (experiment: Mapping with tape) Angular measurements (experiment: Compass) Traverses and Traverse Computations (experiment: traverse field works) Coordinate transformation								

Course Code		**IRH-114**		**Course title**		**Law and Engineering Economics**		
Hours	Tutorial/ Practical	0	Lectures	3	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Introduction in low-legislation of work and regulated laws for engineering works Contracts of engineering works liabilities and arbitration-legislation of industrial safety and environment Legal rules of civil law and related contracting Cost theories in contracting Feasibility studies Principles of Engineering Economics								

Construction economics Risk Analysis Principles of civil projects evaluation Funding

Course Code		**MPE+ElE -115**		**Course title**		Mechanical and Electric Engineering		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Introduction to thermal systems engineering First law of thermodynamics and its applications Second law of thermodynamics and its applications Fundamentals of heat transfer Internal combustion engine fundamentals Basic Electrical Theory | Ohms Law, Current, Circuits Electrical Systems in a Building								

Course Code		**PWE-116**		**Course title**		**Statistical Applications in Civil Engineering**		
Hours	Tutorial/ Practical	2	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	45	Written exam	70	Total	125
Central Tendency Frequency Distributions Curve Fitting and regression methods Forecasting technique Probability distributions for design and analysis Sampling Distribution Hypothesis Testing								

Course Code		**BAS-117**		**Course title**		**Mathematics 3**		
Hours	Tutorial/ Practical	1	Lectures	3	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Partial differential equations applications in civil engineering Applications of multiple integrations Non-finite series Differential equations of first order Second degree integration Laplace transformation								

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Course Code		STE -121		Course title		Theory of Structures 2		
Hours	Tutorial/ Practical	2/0	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Statically determinate arches-Statically determinate trusses-influence lines for statically determinate structures-Moving Loads for Statically Determinate Beams								

Course Code		PWE-122		Course title		Plane Surveying 2		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	20	Semester Work	20	Written exam	60	Total	100
Leveling (Experiment: longitudinal section leveling, cross section leveling) Horizontal curves (Experiment: setting out of curves) Vertical curves Areas and volumes (Experiment: grid leveling and volumes) Theory of errors Sampling Distribution Hypothesis Testing								

Course Code		STE-123		Course title		Strength of Materials 1		
Hours	Tutorial/ Practical	4/0	Lectures	4	Contact hours	8	Credit hours	6
Course grades	Practical/Oral	20	Semester Work	60	Written exam	120	Total	200

General Classes of materials, testing, inspection, specifications-Testing machines, strain gauges General features of mechanical behavior of metals, static tension, static compression, static bending, static shear-Cement, composition, types, manufacture, properties, test-Mineral aggregates-classification, properties, Lime and Gypsum, classification, manufacture

Course Code		ARC -124		**Course title**		Building Systems		
Hours	Tutorial/ Practical	1	Lectures	3	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Details of Construction Process including: Concrete and reinforced concrete works Internal and external walls Cracks and humidity Finishing works Maintenance works Lightening, ventilation, and Aesthetic Designs								

Course Code		**PWE-125**		**Course title**		**Environmental Impact Assessment**		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Introduction Environmental Ethics, Legislation & Regulation Environmental Impact Assessment Procedures Material &Energy Balances Ecosystems Risk Perception , Assessment and Management Water Pollution Control Air Pollution Control Noise Pollution Control								

Course Code		IRH-126		**Course title**		Hydrology		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3

Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Introduction, Dimensions, and units Hydrologic cycle Precipitation Hydrologic losses Hydrographs Flood routing groundwater hydrology Introduction to hydrological simulation								

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Course Code		STE-211		**Course title**		Theory of Structures 3		
Hours	Tutorial/ Practical	2/0	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Properties of plane areas- Straining actions- Normal stresses, shear stresses, torsion stress and combined stress.-Determined the elastic deformation for beam, frame and truss statically determined structure by virtual work-Analysis of statically determined structural by force method-Buckling of columns.								

Course Code		**PWE-212**		**Course title**		**Topographic Surveying and Geodesy 1**		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	20	Semester Work	20	Written exam	60	Total	100
Observations, data corrections and reductions. (Theodolite Applications) Reduction of observations to the ellipsoid and Reduction from the ellipsoid to the projection plane. Total Station Measurement and Analysis of observations. (Total Station Applications) Network adjustment and Analysis of adjustment.								

Course Code		**IRH-213**		**Course title**		**Hydraulics 1**		
Hours	Tutorial/ Practical	2	Lectures	3	Contact hours	5	Credit hours	3
Course grades	Practical/Oral	25	Semester Work	30	Written exam	70	Total	125

Fluid properties and dimensions
Fluid pressure and its measurements
Application of hydrostatic forces
Equilibrium of floating bodies
Fluid masses subjected to acceleration
Hydro-kinematics of fluid flow
Application of Bernoulli's equation
Flow through offices, mouthpieces
Flow over notches and weirs
Dimensional analysis and similarity
Flow through simple pipes

Course Code		**PWE-214**		**Course title**		**Geology and Soil Mechanics**		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	25	Semester Work	30	Written exam	70	Total	125

Introduction to Soil Mechanics : Soil Origin and Characteristics of Soil deposits; Soil Types and Soil Structure
Soil Composition: Terminology and Volumetric and Weight Definitions and Relations
Soil grading and Index properties and Classification tests.
Soil Moisture and Pressure in Soil Mass
Soil Classification systems
Permeability of Soil
Settlement: Soil volume change and consolidation
Shear strength theory
Introduction on Geology and Earth Origin
Rocks and its composition
Geological Maps

Course Code		STE-215		**Course title**		Strength of Materials 2		
Hours	Tutorial/ Practical	4/0	Lectures	4	Contact hours	8	Credit hours	6
Course grades	Practical/Oral	20	Semester Work	60	Written exam	120	Total	200

Introduction of concrete types and materials-Concrete technology-Fresh Concrete properties and tests
Destructive and nondestructive tests of hardened concrete-Concrete additives-Concrete Mix design

Course Code		IRH-216-E1		**Course title**		Civil drawing using computer		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100

Introduction to drawing softwares Earthen works and intersections Retaining structures Water structures Structural Drawings Public works drawings

Course Code		IRH-216 –E2		**Course title**		Groundwater Hydrology		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Background: Hydrologic Cycle, Water Budgets Properties of Aquifers Principles of Groundwater Flow Groundwater Flow to Wells Solute Transport in Groundwater Application of Computer Soft ware								

Course Code		IRH-216 –E3		**Course title**		Statistical Hydrology		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Introduction to Statistical Hydrology Preliminary Analysis of Hydrologic Data Elementary Probability Theory Random Variables Parameter and Quantile Estimation Statistical Hypothesis Testing Correlation and Regression Application of Computer Soft ware								

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Course Code		STE-221		**Course title**		Theory of Structures 4		
Hours	Tutorial/ Practical	2/0	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100

Elastic deformations of structures-Statically indeterminate structures by 3 moments equation Statically indeterminate structures by force method-Moving loads for statically indeterminate beams

Course Code		STE-222		**Course title**		Reinforced Concrete 1		
Hours	Tutorial/ Practical	2/0	Lectures	4	Contact hours	6	Credit hours	-
Course grades	Practical/Oral	10	Semester Work	40	Written exam	100	Total	150
Introduction and Reinforced Concrete Materials-Design Philosophy, Methods and Procedures Design for Flexure-Design for Bond -Design for Shear-Design of One-Way Solid Slabs Design of Two-Way Solid Slabs-Design of Reinforced Concrete Beams-Columns: Sections subjected to Axial Loads and Bending Moments-Design of Reinforced Concrete Walls-Working Stress Design Method (Elastic method)-General Review of the Course								

Course Code		**PWE-223**		**Course title**		**Topographic Surveying and Geodesy 2**		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	20	Semester Work	20	Written exam	60	Total	100
Route Surveying: Horizontal And Vertical Curves. (Total Station and Theodolite Applications). Shape of Earth Surface, Historic Development, Geoid, Reference Ellipsoid and Spheroid, Coordinate Systems, Datum. Traverse Network adjustment and Analysis of adjustment. Theory of errors Principle of photogrammetry								

Course Code		**PWE-224**		**Course title**		**Potable Water Engineering**		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Introduction Water resources and quality standards Pre-design studies of water supply systems Surface water collection works Coagulation & flocculation Sedimentation								

Filtration Disinfection and water storage tanks Distribution networks

Course Code		**IRH-225**		**Course title**		**Irrigation and drainage engineering**		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Introduction to Irrigation Irrigation water requirements Water resources in Egypt Design of canals and drains networks Management and distribution of irrigation water Modern irrigation systems Drainage principles (Open drains - subsurface drains)								

Course Code		**PWE-226**		**Course title**		**Transportation and Traffic Engineering**		
Hours	3	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	100	10	Semester Work	30	Written exam	60	Total	100
Introduction to transportation engineering and urban areas planning Phase I : Data Collection Phase II : Transportation Models. Phase III : Evaluation Introduction to traffic engineering Highway capacity. Traffic flow count, speed and delay measurements Parking surveys. At grade intersection (design and control)								

Course Code		**UNI-227**		**Course title**		**Humanities(2)**		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100

Environmental Pollution (Sources, impacts, and mitigation methods) Environmental balance Natural disasters Air Pollution Environmental pollution caused by Civil engineering Water pollution and Oil Spills Noise pollution Introduction to Eco-constructing techniques (Environmentally Friendly Concrete., Eco Friendly Construction Methods and Materials).

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Course Code		IRH-311		Course title		Hydraulic (II)		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	20	Semester Work	20	Written exam	60	Total	100
Introduction Basic concepts of open channel flow Energy principle in open channel Flow resistance Hydraulic machinery								

Course Code		STE-312		Course title		Reinforced Concrete 2		
Hours	Tutorial/ Practical	2/0	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	20	Semester Work	20	Written exam	60	Total	100
Ribbed and Hollow-Block slabs-Design of Grid floors / Paneled Beam systems-Analysis and Design for Torsion-Flat slab systems: shear and moment analysis-Reinforced concrete stairs.								

Course Code		STE-313		Course title		Steel Structures 1		
Hours	Tutorial/ Practical	2/0	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100

Types of steel structures.Types of loads on steel structural building. Method of Design of steel structural buildings. (ASD - LRFD. Methods)-Allowable stress in different steel structural buildings.
Design of tension members, according to (ASD - LRFD. Methods)-Design of Compression members, according to (ASD - LRFD. Methods).-Design of bolted connections in trusses (ASD - LRFD. Methods) Design of welded connections in trusses (ASD - LRFD. Methods)-Design of columns under axial loads. (ASD - LRFD. Methods)-General review of the course

Course Code		**IRH-314**		**Course title**		**Design of Water Structures 1**		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Introduction Retaining walls Design of culvert Design of syphon Aqueducts Escapes Reinforced concrete bridges								

Course Code		**PWE-315**		**Course title**		**Highway and Airport Engineering**		
Hours	Tutorial/ Practical	2	Lectures	4	Contact hours	6	Credit hours	3
Course grades	Practical/Oral	20	Semester Work	40	Written exam	90	Total	150
Introduction Subgrade, base and subbase material characterization Bituminous materials characterization Hot-Mix-Asphalt weight-volume relationships Hot-Mix-Asphalt design and testing Hot-Mix-Asphalt production & construction Traffic Characterization Thickness design of flexible and rigid pavements Introduction to airport engineering Airport site selection and layout Wind rose, runways, taxiways, and apron area								

Course Code		PWE-316		Course title		Wastewater Engineering		
Hours	Tutorial/ Practical	-	Lectures	2	Contact hours	2	Credit hours	3
Course grades	Practical/Oral	-	Semester Work	15	Written exam	35	Total	50
Introduction Wastewater Sources and Quality Standards Pre-Design Studies for Wastewater Collection and Treatment Sewerage Systems (Sewers network, Pumping Stations and Rising Main Pipes) Wastewater Primary Treatment Unites Wastewater Biological Treatment Processes Wastewater Treatment in Ponds Land Systems And Wetlands Sludge Processing & Disposal								

Course Code		STE-317		Course title		Professional Ethics		
Hours	Tutorial/ Practical	0/0	Lectures	3	Contact hours	3	Credit hours	-
Course grades	Practical/Oral	0	Semester Work	15	Written exam	35	Total	50
The Emergence of Engineering Relationships and Aim to understand and identify the Concepts of Engineering Work.-Parties to Engineering Work and Organization of Relationships between them. Attributes and Values in Engineering Work.-Regulations and Ethics of the Practice of Engineering. Rules and Ethics of Practicing Engineering Professions.-Areas of the Practice of Engineering.-Duties of the engineering union members and Divisions.								

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Course Code		IRH-321		Course title		Hydraulic (III)		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	20	Semester Work	20	Written exam	60	Total	100
Momentum principles in open channel Gradually Varied Flow Design of Open Channels Hydraulic Models								

Course Code		STE-322		Course title		Reinforced Concrete 3		
Hours	Tutorial/ Practical	2/0	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Design of reinforced concrete halls using simple and continuous girders-Design of reinforced concrete frames-Design of Radial frames-Design of different types of reinforced concrete hinged supports-Design of different types of reinforced concrete Arches and Arched slabs-Design of reinforced concrete halls using Vierendeel girders-Design and analysis of saw-tooth reinforced concrete halls-Structural systems for halls require natural North light-General review of the course								

Course Code		STE-323		Course title		Steel Structures 2		
Hours	Tutorial/ Practical	2/0	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Design of beams subjected to static and dynamic loadings (ASD - LRFD. Methods)-Design of columns and beam- columns (ASD - LRFD. Methods)-Design of steel frames. (ASD - LRFD. Methods)-Design of rigid and semi-rigid connections (ASD - LRFD. Methods)-Design of bases (roller, hinged, fixed bases) (ASD - LRFD. Methods)-Design of composites structures (ASD - LRFD. Methods)-Design of bracings and portal frames (ASD - LRFD. Methods)-Design of cold formed sections (thin walled structures) (ASD - LRFD. Methods)								

Course Code		STE324		Course title		Soil Mechanics and Foundations 1		
Hours	Tutorial/ Practical	4/0	Lectures	4	Contact hours	8	Credit hours	6
Course grades	Practical/Oral	20	Semester Work	60	Written exam	120	Total	200

Soil Mechanics-Foundation settlement-Bearing capacity and soil stability-Slopes and earth pressure Shallow Foundation: isolated, strip, combined and raft-Slope stability

Course Code		**IRH-325-1**		**Course title**		**Elective IRH2-Storm Water Collection System Design**		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Introuduction Hydrology for Drainage System Design and Analysis Design Of Storm Inlets Hydraulic of storm collection System Design of Detention System Applications and Case Study (Using Software)								

Course Code		**IRH-325-E2**		**Course title**		**Elective IRH2- Water distribution Systems**		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Water Transport and Distribution Systems Water Demand Hydraulic Analysis of Flows in Pressurised Networks Design of Water Transport and Distribution Systems Network Construction Workshop Problems & Design Exercise (through Excel and Epanet)								

Course Code		**IRH-325-E3**		**Course title**		**Elective IRH2 –Design of modern irrigation systems**		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Introduction Irrigation methods Sprinkler rrigation Dripping Irrigation Advanced surface irrigation								

Course Code		IRH-325-E4		Course title		Elective Course II- Water resources Eng.		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Introduction, Optimization Concepts Optimization Methods (Linear, Quadratic, nonlinear(Economic Aspects Water Resource Applications/Case Studies Design Of Detention System Applications and Case Study (Using Excel or MatLab)								

Course Code		PWE-326-1		Course title		Construction Equipment and Technology		
Hours	Tutorial/ Practical	0	Lectures	2	Contact hours	2	Credit hours	2
Course grades	Practical/Oral	0	Semester Work	0	Written exam	50	Total	50
Introduction and basic fundamentals Selection of construction equipment Equipment and methods of moving earth Excavation equipment and cranes Design of concrete structures formworks Methods of buildings and bridges construction Soil compaction and foundation injection Surveying works for construction projects								

Course Code		PWE-326-2		Course title		Public Transportation Systems		
Hours	Tutorial/ Practical	0	Lectures	2	Contact hours	2	Credit hours	2
Course grades	Practical/Oral	0	Semester Work	0	Written exam	50	Total	50
Study the evolution and role of urban public transportation modes, systems and services, focusing on bus and rail. Study the Technological characteristics, along with their impacts on capacity, service quality, and cost. Study the Current practice and new methods for data collection and analysis, performance monitoring. Study route and network design and frequency determination Study vehicle and crew scheduling Study effects of pricing policy and service quality on ridership, methods for estimating costs								

associated with proposed service changes together with means to improve operations through real time intervention.

Course Code		UNI-327		Course title		Technical Writing Reports 1		
Hours	Tutorial/ Practical	0	Lectures	3	Contact hours	3	Credit hours	2
Course grades	Practical/Oral	0	Semester Work	25	Written exam	50	Total	75
Writing scientific and technical reports Creating summaries for research articles Discussions and trainings among students Summarizing specialized articles								

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Course Code		STE-411		Course title		Soil Mechanics & Foundations 2		
Hours	Tutorial/ Practical	4/0	Lectures	4	Contact hours	8	Credit hours	6
Course grades	Practical/Oral	20	Semester Work	60	Written exam	120	Total	200
Introduction to soil hydraulics-hydraulic Conductivity determination-Flow through porous media-One dimensional flow-Two dimensional flow-Sheet pile design-Determination of pile capacity-Design of pile cap								

Course Code		IRH-412		Course title		Design of Water Structures2		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Introduction Basis and procedures for designing heading up structures. Seepage theory and design of heading-up foundations. Weirs.								

Regulators and barrages Navigation Locks

Course Code		STE-413		**Course title**		Project Management		
Hours	Tutorial/ Practical	2/0	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Projects Characteristics-Contracts and organizational structure-Planning-Scheduling-Resources Management-Schedule Compression (Time-cost Trade-off)-Estimating Direct and Indirect Cost and Cash Flow Analysis-Time and Cost Control								

Course Code		IRH-414		**Course title**		Port Engineering		
Hours	Tutorial/ Practical	2	Lectures	2	Contact hours	4	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Introduction to coastal engineering Natural Phenomena (Wind, Waves, Tide and coastal currents(Port Planning Port Structures Design. (Breakwaters, Quay walls(Introduction to Inland Navigation								

Course Code		STE 415_1		**Course title**		Design of Earthquake Resistant structures		
Hours	Tutorial/ Practical	1/0	Lectures	2	Contact hours	3	Credit hours	-
Course	Practical/Oral	10	Semester	30	Written	60	Total	100

grades			Work		exam			
Introduction to earthquake engineering-Seismology-Introduction to Structural Dynamics-Behavior of Structures and structural Elements under earthquake type loading-Principles of Earthquake Resistant Design of Structures-Equivalent Lateral Force Method-Seismic Design of R/C Beams, Columns and Beam-Column Joints according to the Egyptian Code								

Course Code		STE415-2		**Course title**		Repair and Strengthening of Construction		
Hours	Tutorial/ Practical	1/0	Lectures	2	Contact hours	3	Credit hours	-
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Causes of cracks and damage of buildings-Methods of buildings investigation-Modern and traditional methods for Rehabilitation and strengthening of buildings-Modern and traditional materials for Rehabilitation and strengthening of buildings-Methods of protecting and maintenance of concrete structures.								

Course Code		**PWE-416**		**Course title**		**Railway Engineering**		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	10	Semester Work	30	Written exam	60	Total	100
Introduction and Definition Running Stock Dynamics Alignment of Rail Lines Structure Design of Track Elements Design of efficient and safe Railway Turnouts Planning of Rail Station Signaling System of Railway Tracks								

Course Code		UNI-417		**Course title**		Technical Reports in Civil Engineering 2		
Hours	Tutorial/	0/0	Lectures	3	Contact	3	Credit hours	-

	Practical				hours			
Course grades	Practical/Oral	0	Semester Work	15	Written exam	35	Total	50
The rule of preparing technical reports- The content of technical reports-analysis of experimental data view of data- studies , testing and review								

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Course Code		STE-421		**Course title**		Reinforced Concrete 4		
Hours	Tutorial/ Practical	2/0	Lectures	4	Contact hours	6	Credit hours	-
Course grades	Practical/Oral	10	Semester Work	40	Written exam	100	Total	150
Design of concrete structures for serviceability- Design of water structures (swimming pools, rectangular tanks, circular tanks)- Design of surface of revolution structures- Design of pre-stressed concrete structures- Design of multistory buildings for lateral loads.								

Course Code		STE-422		**Course title**		Steel structures 3		
Hours	Tutorial/ Practical	2/0	Lectures	4	Contact hours	6	Credit hours	-
Course grades	Practical/Oral	10	Semester Work	40	Written exam	100	Total	150
Parts and Types of Railway Steel Bridges- Loads on Bridges and Allowable Stresses Design of Floor Beams of Railway (ASD - LRFD. Methods)- Design of Main Girder (ASD - LRFD. Methods)- Design of Stiffeners (ASD - LRFD. Methods) - Parts and Types of Roadway Steel Bridges (ASD - LRFD. Methods) - Loads on Bridges and Allowable Stresses Roadway - Design of Floor Beams of Roadway Bridge (ASD - LRFD. Methods) - Analysis and Design of Wind Bracing System (ASD - LRFD. Methods)- Design of Main Girder (ASD - LRFD. Methods)- Box Section of Bridge Truss								

Course Code		STE423-1		Course title		Advanced construction materials		
Hours	Tutorial/ Practical	1/0	Lectures	2	Contact hours	3	Credit hours	-
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Introduction of a New Technology of Material-Classification of Composite Materials-Properties of Composite Materials-Carbon Fiber and Uses in Construction-Damp Proofing Material and Heat Insulation								

Course Code		STE423_2		Course title		Brick Constructions Design		
Hours	Tutorial/ Practical	1/0	Lectures	2	Contact hours	3	Credit hours	-
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Components of Bricks, types of structural's and properties of brick materials-Types of Brick mortars and reinforcement-Behavior of brick walls under compression, shear, and bending Bending for reinforced beams and lentils-Analysis and design of reinforced and non-reinforced brick walls-Design of shear walls and its behavior under shear and bending								

Course Code		STE423_3		Course title		Structural Analysis Using Computers		
Hours	Tutorial/ Practical	1/0	Lectures	2	Contact hours	3	Credit hours	-
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Using of stiffness method for plane structures.- Design of Fortran programs and it's application for civil engineering- Using specialized computer software, and packages								

Course Code		PWE-424_1		Course title		Advanced Sanitary Engineering		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Introduction Water softening Chemical stabilization of water Iron and manganese removal Carbon adsorption Ion exchange systems Membrane processes Wastewater advanced Treatment processes Wastewater Disposal & Reuse								

Course Code		PWE-424_2		Course title		Solid waste management		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Introduction solid waste management fundamental elements Solid waste generation Solid waste storage Solid waste collection Solid waste recycle Transfer stations Solid waste disposal								

Course Code		PWE-424_3		Course title		Pavement Management		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Introduction to Pavement Management Application of Systems Concepts to Pavement Management Pavement Management Levels and Functions Using PMS as a Research Planning and Technology Improvement Tool Inventory Pavement Management Data Needs								

Pavement Performance - Evaluation of Pavement Structural Capacity
Evaluation of Pavement Distress: Condition Surveys - Prediction Models for Pavement Deterioration
Rehabilitation and Maintenance Strategies

Course Code		**PWE-424_4**		**Course title**		**Structural Design of Flexible and Rigid Pavements**		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Introduction Stresses and Strains in Flexible Pavements Stresses/Strains and Deflections in Flexible and Rigid Pavements Traffic Mix, Analysis, and Prediction Material Characterization Mechanistic-Empirical Process and Framework Flexible Pavement Structural and Performance Models Rigid Pavement Structural and Performance Models Structural Design Methods for Flexible Pavements Structural Design Methods for Rigid Pavements								

Course Code		**IRH 425 –E1**		**Course title**		**Elective IRH3– Environmental Hydraulics**		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Introduction to environmental hydraulics. Phenomena and processes. Introduction about surface and groundwater flow and transport processes. Numerical approaches for the solution of flow and transport problems in natural systems. The general transport equation – application to special cases (river flows, coastal areas; point sources, distributed sources(Applications of remote sensing in Environmental Provlems Applications and a case study (Nile Delta, North Coast, Red Sea, Egyptian deserts, or desalination plants impacts…etc)								

Course Code		IRH-425 –E2		Course title		Elective IRH3- Coastal Engineering		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Coastal Zone Planning -Ocean Waves along the Coast Wave statistics, wave refraction, wave diffraction, wave shoaling, wind and wave generation Tides and tidal currents - Sand migration, coastal erosion and erosion control - Erosion around structures due to waves and currents - Propeller erosion and protection methods								

Course Code		IRH-425 –E3		Course title		Elective IRH3- Inland Navigation		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Introduction - Types and Catageores of Inland Navigation- - Design of Navigable channel Hydrodynamics of ship movement in inland canals - Revetments types and design Navigation Aids - Application and case study								

Course Code		IRH-425 –E4		Course title		Elective IRH3- Dam Engineering		
Hours	Tutorial/ Practical	1	Lectures	2	Contact hours	3	Credit hours	3
Course grades	Practical/Oral	0	Semester Work	40	Written exam	60	Total	100
Introduction to Dam Engineering - Reservoir Planning & Flood Routing - Dams classification Gravity Dams - Earth & Rock fill Dams - Arch Dams Spillways -Dams Safety: Instrumentations & Surveillance								

Course Code		STE+PWE+IRH-426		Course title		Graduation project		
Hours	Tutorial/ Practical	4/0	Lectures	2	Contact hours	8	Credit hours	-
Course grades	Practical/Oral	0	Semester Work	50	Written exam	100	Total	150

Data processing and analysis - Main professional and practical part- Conclusions and recommendations - Writing the project document

9 Electronics and Communication Engineering Program

Program Name	**Electronics and Communication Engineering**
Department	**Electronics and Communication Engineering**
Program Type	**Single**
No of Semesters	**10**
No of Contact Hour	**275**
Lecture	**143**
Tutorial and Practical	**132**
Equivalent Credit Hours	**162**

Attributes of the Graduates

The graduates of the engineering programs should be able to:

1. Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
2. Design a system, component and process to meet the required needs within realistic constraints.
3. Design and conduct experiments as well as analyze and interpret data.
4. Identify, formulate and solve fundamental engineering problems.
5. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
6. Work effectively within multi-disciplinary teams.
7. Communicate effectively.
8. Consider the impacts of engineering solutions on society and environment.
9. Demonstrate knowledge of contemporary engineering issues.
10. Display professional and ethical responsibilities; and contextual understanding.
11. Engage in self- and life- long learning.
12. Integrates knowledge based on digital electronics and logic design, fundamentals of communication engineering, electronic circuits, signals and systems, power electronics, applied electromagnetic theory, integrated circuits, VLSI, control systems and computer architecture.

13. Manipulate with the electronic circuits, all the way from the discrete components level, circuits' analysis and design, to the troubleshooting with emphasis on electronic power devices.
14. Apply control theory and measurement principals for industrial variables, signal conversion, conditioning and processing.
15. Deal with the computer's hardware, software, operating systems and interfacing.
16. Design, operate and maintain digital and analog communication, mobile communication, coding, and decoding systems.
17. Planning and analyzing communication networks
18. Adapt to new telecommunication technologies.
19. Deal with high frequency techniques.


Courses distribution based requirement according the Reference Framework and NARSE

Code	Course Name	Contact Hrs.	Equivalent Credit Hr.	Requirements				Semester	Academic Year
				University	Faculty	Department			
						Major	Minor		
BAS 1011	Mathematics (1)	5	3					First	Preparatory Year
BAS 1012	Physics (1)	6	4						
BAS 1013	Mechanics (1)	4	2						
PDE+BAS 1014	Engineering drawing and projection	5	3						
BAS 1015	Chemistry	5	3						
BAS 1016	English	4	2						
BAS 1021	Mathematics (2)	5	3					Second	
BAS 1022	Physics(2)	6	4						
BAS 1023	Mechanics(2)	4	2						
PDE 1024	Engineering drawing	4	3						
PDE 1025	Production engineering	4	2						
CAC 1026	Introduction to computer programming	4	2						
BAS1027	Introduction to Engineering Specialties	2	2						
BAS-9111	Mathematics-3	5	3					First	First Year
ECE-9112	Electric Circuits	7	4						
ECE-9113	Solid State Electronics	5	3						
CAC-9114	Fundamentals of Software Engineering	4	3						
PME-9115	Engineering Thermodynamic	4	2						
ECE-9116	Technical Report Writing	3	2						
BAS-9121	Mathematics-4	5	3					Second	
ECE-9122	Electronic Devices	5	3						
ECE-9123	Logic Circuits	4	2						
ECE-9124	Measurements and Instruments -1	5	3						
ECE-9125	Signals and Systems	4	2						
ECE-9126	Operation Research Comm. . Eng.	4	2						
BAS - 9211	Mathematics-5	5	3					First	Second Year
ECE -9212	Linear Systems and Networks	5	4						
CAC – 9213	Digital Design	4	2						
CAC - 9214	Automatic Control Systems	4	2						
ECE - 9215	Electromagnetic Fields	5	3						
ECE – 9216	Communication Skills	4	4						

ECE– 9217	Summer Training(1)	2	0						
ECE-9221	Analog Communications	4	2					Second	
ECE-9222	Electronic Circuits -1	4	3						
ECE-9223	Computer Applications	4	3						
CAC-9224	Computer Architecture	2	2						
ECE-9225	Measurement and Instrument-2	4	2						
ELE-9226	Electrical Power and Machine Systems	3	2						
BAS-9227	Discrete Mathematics	4	2						
ECE - 9311	Digital Communications	5	3					First	Third Year
ECE – 9312	Electronic Circuits -2	5	3						
PDE – 9313	Quality Control Systems	4	2						
ECE – 9314	Microwave Electronics	5	4						
ECE – 9315	Digital Signal Processing	5	3						
ECE - 9316	Communication Net -1	3	3						
ECE – 9321	Wireless Communications	4	2					Second	
ECE -9322	Electronic Circuits -3	5	4						
ECE -9323	Opto Electronics	4	2						
ECE -9324	Electromagnetic Waves	5	3						
ECE -9325	Embedded Systems	5	3						
ECE -9326	Elective Course -1	4	2						
ECE -9411	Mobile Communications	4	2					First	Fourth Year
ECE -9412	Integrated Circuits	5	3						
ECE -9413	Antenna and Wave Propagation	5	4						
ECE -9414	Communication Net -2	4	2						
ECE -9415	Elective Course -2	4	2						
ECE -9416	Graduation Project -1	4	2						
ECE – 9417	Summer Training(2)	2	0						
ECE -9421	Optical Communications	6	4					Second	
ECE -9422	Information Theory and Coding	4	2						
ECE -9423	RF Circuits Design	4	2						
ECE -9424	Project Managements	2	2						
ECE -9425	Elective Course -3	4	2						
ECE -9426	Graduation Project -2	6	2						
No Of hours		275	163	18	80	96	81		
Percentage				6.5	29	34.9	29.4		
Min		250	160	6.0	22.0	30	20		
Max		280	180	10.	30.0	35	30		

Program courses and subject area:

PreparatoryYear-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial Practical		Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1011	Mathematics (1)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1012	Physics (1)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1013	Mechanics (1)	2	2	0	**4**	2	3	35	0	90	**125**			3		1		
PDE+BAS 1014	Engineering drawing and projection	2	0	3	**5**	3	3	50	0	100	**150**					5		
BAS 1015	Chemistry	2	0	3	**5**	3	3	35	10	80	**125**			3		2		
BAS 1016	English	1	0	3	**4**	2	2	10	0	40	**50**	4						
Total		13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0

Preparatory Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS 1021	Mathematics (2)	3	2	0	**5**	3	3	50	0	100	**150**			5		0		
BAS 1022	Physics(2)	3	0	3	**6**	4	3	40	10	100	**150**			4		2		
BAS 1023	Mechanics(2)	2	2	0	**4**	2	2	30	0	70	**100**			3		1		
PDE 1024	Engineering drawing	1	0	3	**4**	2	3	30	0	70	**100**					4		
PDE 1025	Production engineering	1	0	3	**4**	2	2	30		70	**100**				2	2		
CAC 1026	Introduction to computer programming	1	0	3	**4**	2	2	20	10	70	**100**					4		
BAS1027	Engineering Entrance	2	0	0	**2**	2	2	0	0	50	**50**	2	0	0	0	0	0	0
Total		13	4	12	29	17	17	200	20	530	750	2	0	12	2	13	0	

First Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS-9111	Mathematics-3	3	2	0	**5**	**3**	3	40	0	110	**150**			**5**				
ECE-9112	Electric Circuits	3	2	2	**7**	**4**	3	40	10	100	**150**				**4**	**3**		
ECE-9113	Solid State Electronics	3	2	0	**5**	**3**	3	40	10	100	**150**					**5**		
CAC-9114	Fundamentals of Software Engineering	2	0	2	**4**	**3**	3	20	10	70	**100**		**2**			**2**		
PME-9115	Engineering Thermodynamic	2	2	0	**4**	**2**	3	35	0	90	**125**			**2**	**2**			
ECE-9116	Technical Report Writing	2	1	0	**3**	**2**	2	25		50	**75**	3						
Total		15	9	4	**28**	**17**	17	200	30	520	**750**	3	**2**	**7**	**6**	**10**		

First Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS-9121	Mathematics-4	3	2	0	**5**	3	2	40	0	10	**150**			**5**				
ECE-9122	Electronic Devices	3	1	1	**5**	3	3	30	20	100	**150**					**3**	**2**	
ECE-9123	Logic Circuits	2	2	0	**4**	2	3	25	15	60	**100**			**2**		**2**		
ECE-9124	Measurements and Instruments -1	2	2	1	**5**	3	3	40	10	100	**150**				**2**	**3**		
ECE-9125	Signals and Systems	2	2	0	**4**	2	3	30	10	60	**100**					**4**		
ECE-9126	Operation Research Comm. . Eng.	**2**	**2**	0	**4**	2	2	30	10	60	**100**	**4**						
Total		14	10	3	**27**	15	16	195	60	490	**750**	**4**		**7**	**2**	**12**	**2**	**0**

Second Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
BAS - 9211	Mathematics-5	3	2	0	**5**	3	3	40	0	110	**150**			5				
ECE -9212	Linear Systems and Networks	3	1	1	**5**	4	3	35	15	100	**150**						4	1
CAC – 9213	Digital Design	2	2		**4**	2	3	20	10	70	**100**					2	2	
CSE - 9214	Automatic Control Systems	2	2		**4**	2	3	20	10	70	**100**				2	2		
ECE - 9215	Electromagnetic Fields	3	2	0	**5**	3	3	40	10	100	**150**					3	2	
ECE– 9216	Communication Skills	4	0	0	**4**	4	2	25	0	50	**75**	4						
ECE– 9217	Summer Training(1)		2		2	0	0		50		**50**							2
Total		17	11	1	**29**	18	17	180	95	500	**775**	4	0	5	2	7	8	3

Second Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
ECE-9221	Analog Communications	2	2	0	**4**	2	3	30	0	70	**100**						4	
ECE-9222	Electronic Circuits -1	2	1	1	**4**	3	3	35	15	100	**150**					2	2	
ECE-9223	Computer Applications	2	0	2	**4**	3	3	25	15	60	**100**		2					2
CAC-9224	Computer Architecture	2	0	0	**2**	2	2	25		50	**75**				2			
ECE-9225	Measurement and Instrument-2	2	2	0	**4**	2	3	20	20	60	**100**				2	2		
ELE-9226	Electrical Power and Machine Systems	2	1	0	**3**	2	3	30	0	70	**100**					3		
BAS-9227	Discrete Mathematics	2	2	0	**4**	2	3	30	0	70	**100**			4				
Total		14	8	3	**25**	16	20	195	50	480	**725**	0	2	4	4	7	6	2

Third Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
ECE - 9311	Digital Communications	3	2	0	**5**	3	3	40	10	100	**150**						**5**	
ECE – 9312	Electronic Circuits -2	3	2	0	**5**	3	3	30	20	100	**150**					**2**	**3**	
PDE – 9313	Quality Control Systems	2	2	0	**4**	2	2	25	0	50	**75**	**4**						
ECE – 9314	Microwave Electronics	3	1	1	**5**	4	3	40	10	100	**150**					**2**	**3**	
ECE – 9315	Digital Signal Processing	3	2	0	**5**	3	3	40	10	100	**150**					**5**		
ECE - 9316	Communication Net -1	2	0	1	**3**	3	3	20	10	70	**100**						**3**	
Total		17	7	3	**27**	18	17	195	60	520	**775**	**4**	**0**	**0**	**0**	**9**	**14**	**0**

Third Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
ECE – 9321	Wireless Communications	2	2	0	**4**	2	3	25	10	90	**125**						**4**	
ECE -9322	Electronic Circuits -3	3	1	1	**5**	4	3	35	15	100	**150**						**5**	
ECE -9323	Opto Electronics	2	2	0	**4**	2	3	25	5	70	**100**					**2**	**2**	
ECE -9324	Electromagnetic Waves	3	2	0	**5**	3	3	35	0	90	**125**					**2**	**3**	
ECE -9325	Embedded Systems	2	2	1	**5**	3	3	20	15	90	**125**					**2**		**3**
ECE -9326	Elective Course -1	2	2	0	**4**	2	3	30	0	70	**100**					**2**	**2**	
Total		14	9	4	**27**	16	18	170	45	510	**725**	**0**	**0**	**0**	**0**	**8**	**16**	**3**

Fourth Year-First Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
ECE -9411	Mobile Communications	2	2	0	**4**	2	3	30		70	**100**						4	
ECE -9412	Integrated Circuits	3	2	0	**5**	3	3	40	10	100	**150**						5	
ECE -9413	Antenna and Wave Propagation	3	1	1	**5**	4	3	40	10	100	**150**						5	
ECE -9414	Communication Net -2	2	2	0	**4**	2	3	30	0	70	**100**						4	
ECE -9415	Elective Course -2	2	2	0	**4**	2	3	30	0	70	**100**					4		
ECE -9416	Graduation Project -1	2	2	0	**4**	2	0	50	50	0	**100**						2	2
ECE – 9417	Summer Training(2)		2		2	0	0		50		**50**							2
Total		14	13	1	**28**	15	15	220	120	410	**750**	0	0	0	0	4	20	4

Fourth Year-Second Semester:

Code	Course Name	Teaching Hours				Equivalent Credit Hour	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration.	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
ECE -9421	Optical Communications	4	2	0	**6**	4	3	40	10	100	**150**						6	
ECE -9422	Information Theory and Coding	2	2	0	**4**	2	3	35		90	**125**						4	
ECE -9423	RF Circuits Design	2	2	0	**4**	2	3	35		90	**125**					2	2	
ECE -9424	Project Managements	2	0	0	**2**	2	2	25	0	50	**75**		2					
ECE -9425	Elective Course -3	2	2	0	**4**	2	3	35		90	**125**					2	2	
ECE -9426	Graduation Project -2		2	4	**6**	2		50	100		**150**						2	4
Total		12	10	4	**26**	14	14	220	110	420	**750**	0	2	0	0	4	16	4

Total teaching hours and subject's distribution over the subject areas according the Reference Framework and NARSE

Semester		Teaching Hours				Equivalent Credit Hours	Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Tutorial	Practical	Total Hours			Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Business Administration	Math. & B. Sc.	Engineering Culture	B. Eng. Sc.	App. Eng. & Des.	Proj. & Practice
Preparatory year/ 1st semester		13	4	12	29	17	17	220	20	510	750	4	0	15	0	10	0	0
Preparatory year/ 2ndsemester		13	4	12	29	17	17	200	20	530	750	2	0	12	2	13	0	
First year/1st semester		15	9	4	**28**	**17**	17	200	30	520	**750**	3	**2**	**7**	**6**	**10**		
First year/ 2nd semester		14	10	3	**27**	15	16	195	65	490	**750**	**4**		**7**	**2**	**12**	**2**	**0**
Second year/1st semester		17	11	1	**29**	18	17	180	95	500	**775**	4	0	5	2	7	8	3
Second year/ 2nd semester		14	8	3	**25**	16	20	195	50	480	**725**	0	2	4	4	7	6	2
Third year/1st semester		17	7	3	**27**	18	17	195	60	520	**775**	**4**	**0**	**0**	**0**	**9**	**14**	**0**
Third year/ 2nd semester		14	9	4	**27**	16	18	170	45	510	**725**	**0**	**0**	**0**	**0**	**8**	**16**	**6**
Fourth year/1st semester		14	13	1	**28**	15	15	220	120	410	**750**	0	0	0	0	4	20	4
Fourth year/ 2nd semester		12	10	4	**26**	14	14	220	110	420	**750**	0	2	0	0	4	16	4
Total of Five Years		143	85	47	275	162	176	1995	615	4890	**7500**	21	6	50	16	84	82	16
% of Five Years												**7.5**	**2.18**	**18.18**	**5.82**	**30.54**	**29.82**	**5.82**
% NARS And Reference framework	**minimum**				250	160						8.00	2.00	18.00	4.00	25.00	25.00	4.00
	maximum				280	180						12.00	4.00	22.00	6.00	30.00	30.00	6.00

المتطلبات	عدد المقررات	عدد Teaching Hours الدراسيه	الهدف
Human & Social Science	6	21	تهدف هذه المتطلبات الى امداد الطالب بالمفاهيم المهمة فى التفكير والبحث والاتصال.
Business Administration	3	6	ان يكون الطالب على درايه بطرق سريان العمل والتخطيط داخل المصانع والشركات.
Mathematics & Basic Science	13	50	تهدف هذه المقررات الى الإرتقاء بمهارة الطالب فى بناء الخلفية العلمية الصلبة للعلوم الأساسية.
Engineering Culture	7	16	الارتقاء بخلفية الطالب عن المجالات الهندسية المختلفة.
Basic Engineering Science	32	84	تهدف هذه المقررات الى بناء الخلفية الأساسية فى تخصص الهندسة الكهربية.
Applied Engineering & Design	25	82	تهدف هذه المقررات الى بناء الخلفية الدقيقة فى تخصص الهندسة الكهربية (هندسة القوى والآلات الكهربية) وكيفية تطبيقها Practical.ا
Project &Training	7	16	التاكد من ان الطالب قادرا على تطبيق المهارات والمعارف التي حصل عليها خلال دراسته الجامعية في ظل توفير النصح والإرشاد والتوجيهات من المشرف على المشروع .

Mathematics-3				Course Name		BAS-9111		7
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	40	Term Work		شفوي/Practical	Marking

Ordinary Differential Equations (ODE)

Homogeneous higher order ODE – Nonhomogeneous higher order ODE with constant coefficients (undetermined coefficients method and variation of parameters method for finding the particular solution) – Cauchy-Euler ODE (homogeneous and nonhomogeneous) – System of ODE– Laplace transform – Inverse Laplace transform –Applications of Laplace transform – Series solution of ODE.

Functions of Several Variables

Differentiation of integration – Vector calculus –Multiple integrals (double and triple) and their applications –Line integral – Green's theorem – Surface integral – Divergence (Gauss) and Stokes' theorems –Mathematical modeling using partial differential equations.

Electric Circuits				Course Name		ECE-9112		Code
4	Equivalent Credit Hr	7	Contact Hours	3	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي /Practical	Marking

Circuit Variables; Voltage, Current, Power and Energy; Circuit Elements; Passive elements; resistance, capacitance inductance and mutual inductance Sources; independent current and voltage sources; controlled sources, source transformations; Circuit Equations; Kirchhoff's Laws; writing circuit equations; circuit topology; circuit analysis; Resistive Circuits; simple circuits, star-delta and delta-star transformations; the Mesh-Current Method; The Node-Voltage Method; The application of SPICE; The Operational Amplifier; Response of First-Order RL and RC Circuits; Sinusoidal Steady-State Analysis Sinusoidal Steady-State Power Calculations; Superposition; Thevenin and Norton Equivalents; Maximum Power Transfer; The principle of impedance matching; Three-Phase Circuits; Balanced Three-Phase Voltages; phase sequence; Three-Phase loads balanced and unbalanced; Resonance in electric circuits; Series and parallel resonance.

Solid State Electronics				Course Name		ECE-9113		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي /Practical	Marking

Crystals in solids, properties; fundamental characteristics of metals, semiconductors and insulators; Principles of Quantum Mechanics; Quantum theory of solid: Energy bandgap, direct and indirect semiconductor, effective mass; Electron and hole properties in semiconductors, mobility, doping of semiconductors, drift current, concept of hole, EK diagram, density of states, Fermi Dirac; Semiconductors in equilibrium: carrier concentration, Law of Mass Action. doping, electric conductivity, Fermi Dirac levels, ionization; Non-equilibrium excess carrier in semiconductors; PN Junction: Operation, Laws of barrier potential and depletion layer widths, band diagram under equilibrium, forward bias, reverse bias; Metal-Semiconductor Junction,; Emerging Technologies and novel devices.

Fundamentals of software Engineering				Course Name		CAC-9114		Code
3	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
70			Written Exam	20	Term Work	10	شفوي /Practical	Marking
Introduction for the theoretical and historical motivation behind modern error control coding, Introduction to linear block codes, generator matrix and parity check matrix; Properties of linear block codes: syndrome, error detection, error correction; Convolutional codes; Reed-Solomon codes trellis-coded modulation; Decoding of convolutional codes-I: Viterbi algorithm; Decoding of convolutional codes-II:BCJR algorithm; Some simple linear block codes: Repetition codes, Single parity check codes, Hamming codes, Reed Muller codes; Bounds on size of codes: Hamming bound, Singleton bound, Plotkin bound, Gilbert-Varshamov bound; Low density parity check codes; Decoding of low density parity check codes: Belief propagation algorithm; Applications of linear block codes								

Engineering Thermodynamic				Course Name		PME-9115		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
90			Written Exam	35	Term Work		شفوي /Practical	Marking
Fundamental Concepts (Fluid properties, work, heat, temperature, properties of a gas from the ideal gas law). First Law of Thermodynamics (The equivalence of work and heat, concepts of thermodynamic systems and boundaries, internal energy, enthalpy). Applications to non-flow and steady flow processes, an introduction to thermodynamic cycles, Bernoulli's equation. Second Law of Thermodynamics, entropy and the concept of reversibility and the Carnot cycle. General Thermodynamic relations (Maxwell), Application of thermodynamic principles to simple engine cycles (Otto, Diesel & Joule). Properties of vapours with specific reference to the use of the steam tables. Application to simple Rankine and refrigeration cycles. Properties of mixtures with specific reference to the measurement of humidity. Dimensional Analysis. Buckingham's theorem and								

derivation of some basic dimensional groups (e.g. Reynolds number and skin friction coefficient). Heat Transfer: use of the basic laws for simple problems in conduction, convection and radiation

Technical Report Writing				Course Name		ECE-9116		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture		Practical	Teaching Hours
50			Written Exam	25	Term Work		شفوي /Practical	Marking

In this course, students will develop the scientific and technical reading and writing skills they need to understand and construct research articles. The course will be divided into two parts. In part one of the course, students will learn the principles of writing research papers in science and engineering. First, they will learn what research is, and how the process of research is revealed in the structure of research papers. Next, they will look at software tools and corpora (collections of language samples) that can assist them in the writing of research papers. At the end of the section, students will create their own corpus of research papers and will use throughout the remainder of the course. In Part two of the course, students will write a full research paper in their field of specialization, working separately on the title, abstract, introduction, materials/methods, results, and discussion in each unit. For each part of the research paper, students will first analyze the sample texts in their corpus and then present their findings to other members of the class. This will help all students to understand which elements are common to all science and engineering disciplines, and which are unique to individual disciplines. Next, they will apply what they have learned in their own writing, slowly constructing a full-research paper by the end of the course.

Mathematics 4				Course Name		BAS-9121		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
110			Written Exam	40	Term Work		شفوي /Practical	Marking

<u>Partial Differential Equations (PDE)</u>
Special functions (Gamma, Beta, Bessel and Legendre) – Fourier series – Fourier integral – Fourier transform – Partial differential equations (PDE)– Separation of variables method (heat equation, wave equation and Laplace equation) – Traveling wave solutions to PDE.
<u>Complex Analysis</u>
Complex Numbers – Functions of complex variable – Complex derivative – Analytic functions – Harmonic functions and their applications – Elementary functions – Complex integration – Cauchy theorems and their applications – Taylor and Laurent series – Residue theorem and its applications – Conformal mapping.

فرقة : الاولى القسم : اتصالات الفصل الدراسي :الثاني

Electronic Devices				Course Name		ECE-9122		Code
4	Equivalent Credit Hr	5	Contact Hours	3	Lecture	1	Practical	Teaching Hours
100			Written Exam	30	Term Work	20	شفوي /Practical	Marking

Diodes, The Ideal Diode, Terminal Characteristics of Junction Diodes, Modeling the Diode, Forward Characteristics, Operation in the Reverse Breakdown Region ,Zener Diodes, Schottky Barrier Diode , Diode SPICE Model . Diode Circuit Analysis using different models, Multiple-Diode Circuits, Analysis of Diodes Operating in the Breakdown Region, Voltage Regulation. Switching Behavior of the Diode; Special Diode Types. Photo Diodes, Solar Cells, Light-Emitting Diodes, FIELD-EFFECT TRANSISTORS; haracteristics of the MOS Capacitor Accumulation, Depletion and Inversion Regions; The NMOS Transistor; Triode Region Characteristics. On Resistance Saturation of the i -v Characteristics, Mathematical Model in the Saturation (Pinch-Off) Region, Transconductance; Channel-Length Modulation; Depletion-Mode MOSFETS Body Effect PMOS Transistors MOSFET Circuit Symbols MOSFET Modeling in SPICE, The Junction Field-Effect Transistor; BIPOLAR JUNCTION TRANSISTORS: Physical Structure of the Bipolar Transistor The Transport Model for the npn Transistor Forward Characteristics Reverse Characteristics, The Complete Transport Model Equations for Arbitrary Bias Equivalent Circuit Representations for the Transport Models, The Operating Regions of the Bipolar Transistor, Biasing, PNPN and other Devices; Thyristors. TRIAC, DIAC,Gate turn off devices ,UnijunctionTransistor.Diode Circuit Applications: Rectifier Circuits, Half-Wave and Full-Wave Rectifier Circuits Ripple Voltage and Conduction Interval, Diode Current, Surge Current ,Peak-Inverse-Voltage (PIV) ,Diode Power Dissipation; Power Generation from Solar Cells.

Logic Circuits				Course Name		ECE-9123		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
60			Written Exam	25	Term Work	15	شفوي /Practical	Marking

Number system; Basic logic gates; Boolean algebra; Simplification of logic functions: Karnaugh maps; NAND and NOR gates networks; multiple output networks; MSI combinational logic circuits: Multiplexers, Decoders, Adders, Comparators; combinational logic circuits design with programmable logic devices. ROM; Flip-Flops; Design and analysis of sequential networks, counters and registers. The laboratory experiments will provide students with hands-on experience of designing, implementing and testing digital logic circuits using small and medium scale integrated

circuits.

Measurements and Instruments-1				Course Name		ECE-9124		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture	1	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي /Practical	Marking
The course specific objectives are to develop an understanding of: voltage, current, resistance, capacitance, and inductance; voltage and current supplies, and diodes; techniques for analyzing simple circuits when driven by initial conditions or direct or alternating power sources; important basic circuit concepts such as transfer function, loading effects and frequency response; operational amplifiers and circuits using operational amplifiers; filters, transducers and D/A and A/D converters; the concept of a measurement channel and possible sources of error when performing electronic measurements.								

Signals and Systems				Course Name		ECE-9125		Code
3	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
60			Written Exam	30	Term Work	10	شفوي /Practical	Marking
Continuous-time and discrete-time signals; Linear time invariant systems;Time Domain Analysis; Convolution (continuous); Stability; Fourier Series; Fourier Transformation; Sampling; Discrete (and Fast) Fourier Transforms; Circular Convolution (discrete); Laplace transform; Analog Filters; Z Transform.								

Operation Research for Comm. Eng.				Course Name		UNC-9126		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
60			Written Exam	30	Term Work	10	شفوي /Practical	Marking
Operational research provides tools and theories to solve real-world problems by finding the optimal solutions to the models subject to constraints of time, labor, resource, material, and business rules. With Operations Research, people make intelligent decisions to develop and manage their processes and businesses. Operations Research is composed of the following areas: (1) Linear programming, (2) Nonlinear programming, (3) Dynamic programming, (4) Stochastic modeling and simulation, (5)								

Network programming, (6) Computer simulation, (7) Queuing, (8) Time-series analysis, and (9) Applications in engineering, science, economics, and management.

Mathematics-5				Course Name		BAS-9211		Code
3	Equivalent Credit Hr	5	Contact Hours	2	Lecture		Practical	Teaching Hours
110			Written Exam	40	Term Work		شفوي /Practical	Marking

Numerical Methods

Curve fitting – Interpolation – Numerical integration – Numerical solution of algebraic and transcendental equations – Iterative methods for solving system of linear algebraic equations – Numerical differentiation – Numerical solution of ordinary differential equations – Numerical solution of partial differential equations– Finite difference method.

Applied Probability and Statistics

Introduction to probability – Discrete random variables – Special discrete distributions – Continuous random variables – Special continuous distributions – Multiple random variables – Sampling distribution and estimation theory – Test of hypotheses – Correlation theory – Analysis of time series.

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Linear Systems and Networks				Course Name		ECE-9212		Code
4	Equivalent Credit Hr	5	Contact Hours	3	Lecture	1	Practical	Teaching Hours
100			Written Exam	35	Term Work	15	شفوي /Practical	Marking

Linear systems and Networks, The Laplace Transform in Circuit Analysis (Introduction to the Laplace Transform, Circuit Elements in the s Domain, Circuit Analysis in the s Domain Network Functions; Properties of network functions. Amplitude and frequenc scaling; Stability of network functions), Sinusoidal Steady-State Response, Introduction to Frequency Selective Circuits: (Low-Pass, High-Pass, Bandpass and Bandreject Filters; Bode Diagrams Real, First-Order Poles and Zeros Complex Poles and Zeros), State Variables Analysis, Two Port Networks: (Analysis of Two-Port Networks; admittance, impedance, hybrid, inverse hybrid, transmission and inverse transmission parameters; Network models; Conversion Among Parameter Sets; Reciprocity And Symmetry; Network Models Of Two-Ports ;Interconnected Two-Ports; Terminated Two-Port Networks ;Impedance Converters and impedance inverters; Matching Two-Ports ;The Scattering Parameters), Analysis of Multi-Terminal Linear Active Networks (The Indefinite Admittance Matrix ; Network Functions of a Multi-pole ; Circuits Containing Operational Amplifiers; Analysis of Passive Ladder Networks.)

Digital Design				Course Name		CAC-9213		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
70			Written Exam	20	Term Work	10	شفوي /Practical	Marking

Overview and Introduction to the course, ROMs, Introduction to Programmable Logic Devices: SPLDs, CPLDs, and FPGAs, Introduction to Hardware Description Languages, VHDL data types, and operators, Combinational Logic Design Using VHDL, Analysis of clocked sequential circuits. Derivation of state graphs and tables, Reduction of state tables, state assignment, Sequential circuit design, VHDL for Sequential Logic Design, State Machine Design with SM Chart, VHDL for digital system design, Serial Adder with accumulator, Parallel Multiplier.

Automatic Control Systems				Course Name		CAC-9214		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
70			Written Exam	20	Term Work	10	شفوي /Practical	Marking

determine relations between models of linear dynamic systems in form of differential equations, state space models, transient responses, transfer functions and frequency responses, analyze linear systems with respect to stability, steady state properties, controllability and observability, and fastness and damping, evaluate closed loop systems with respect to stability, as well as robustness against and sensitivity for model errors and disturbances, interpret and apply graphical methods and tools like block diagrams, root locus, Bode and Nyquist diagrams, understand the function of simple controllers (PID controllers, lead-lag filters, state feedback) and controller structures (feedforward and cascade control), design simple controllers from given specifications, and understand and design observers for estimating the states in state space models. Modelling and mathematical description of dynamic systems in the time and frequency domain: Impulse response, step response, transfer function, Bode and Nyquist diagrams, state space description. Estimation of states using observers. Methods for stability analysis including the Nyquist criterion. Control strategies: PID controller, lead-lag design, state space feedback. Robustness of feedback systems. Specification and synthesis of control systems. Laboratory work: Computer aided design, simulation and analysis using the program package MATLAB.

Electromagnetic Fields				Course Name		ECE-9215		Code
3	Equivalent	5	Contact	3	Lecture		Practical	Teaching

	Credit Hr		Hours					Hours
100			Written Exam	40	Term Work	10	شفوي /Practical	Marking

Review of Vector Algebra and Calculus, Coulomb's Law and the Electric Field Intensity, Electric Flux and Flux Density Gauss's Law, Electrostatic potential, Conductors, Dielectrics, and Capacitance, Boundary conditions for electrostatic fields, Uniqueness, Method of Images, Simple Boundary value problems, Conformal Mapping Technique, Electrostatic Energy, The Steady Magnetic Field, Biot-Savart law, The Vector magnetic potential, Magnetic materials, Boundary Conditions, Inductance, Magnetic energy, Magnetic Forces, and Torque: Lorentz force, Time Varying Fields and Maxwell's Equations: Introduction

Communication Skills				Course Name		ECE-9216		Code
4	Equivalent Credit Hr	4	Contact Hours	4	Lecture		Practical	Teaching Hours
50			Written Exam	25	Term Work		شفوي /Practical	Marking

Communication skills will enable students to learn skills needed for traveling, negotiations, survey taking, and problem solving, as well as be introduced to skills involved in making a presentation at a conference. Additionally, students will learn to start and continue a conversation naturally, using a number of communication strategies such as asking follow-up questions and giving extended answers. They will also learn about turn taking and how to control the flow of a conversation by adding information. Finally, writing skills will be practiced with a short essay using the Online Homework Submission and Evaluation System. Upon completion of this course, students should be able to: introduce themselves and talk about familiar, everyday conversation topics, ask for opinions and either agree or disagree politely, discuss various personal and ethical problems and solutions, write an essay and submit it online, and conduct one cycle of academic research

Summer Training (1)				Course Name		ECE – 9217		Code
0	Equivalent Credit Hr	2	Contact Hours		Lecture	2	Practical	Teaching Hours
			Written Exam		Term Work	50	شفوي /Practical	Marking

Students promoted to the 2nd year are to carry out professional training inside the faculty, or in specialized training centers

Analog Communications				Course Name		ECE-9221		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي /Practical	Marking

Introduction, Some Mathematical Background, Amplitude Modulation (DSB-SC), Generation of DSB-SC using time-varying and nonlinear operation Methods, Demodulation of DSB-SC, Pilot carrier system, Amplitude Modulation Large Carrier (DSB-LC), Carrier and Sideband power in A.M, Generation of DSB-LC using Nonlinear Method, Demodulation of DSB-LC, Envelope Detection, AM Receiver, TRF Receiver, Super heterodyne Receiver, FDM. Amplitude Modulation Single-Side Band (SSB), Generation of SSB Signals, Demodulation of SSB, Angle Modulation (F.M and P.M), Narrow Band F.M, Comparison between N.B. F.M and A.M, Wide Band F.M, Average Power in Angle Modulation, Generation of Wide Band F.M using Direct and Indirect Methods, Demodulation of F.M. Signals (Direct and Indirect), Phase Modulation and Demodulation, Pulse Modulation, Pulse Amplitude Modulation, Natural Sampling, Flat-Top Sampling, Time-Division Multiplexing, Pulse shaping and ISI, PWM and PPM, Signal to Noise Ratio in PAM,

Electronic Circuits-1				Course Name		ECE-9222		Code
3	Equivalent Credit Hr	4	Contact Hours	2	Lecture	1	Practical	Teaching Hours
100			Written Exam	35	Term Work	15	شفوي /Practical	Marking

1)Diode Circuit Applications, Rectifier Circuits, Half-Wave and Full-Wave Rectifier Circuits Ripple Voltage and Conduction Interval , Diode Current, Surge Current ,Peak-Inverse-Voltage (PIV) ,Diode Power Dissipation Clipping and Clamping Circuits, Power Generation from Solar Cells , AMPLIFICATION, Circuit MODELS FOR AMPLIFIERS-Impedance level transformation VOLTAGE GAIN, current gain Power gain. Frequency Response of Amplifiers, SINGLE-TRANSISTOR AMPLIFIERS SMALL-SIGNAL MODELING AND LINEAR AMPLIFICATION-The BJT Amplifier The MOSFET Amplifier Coupling and Bypass Capacitors Circuit Analysis Using dc and ac Equivalent circuits, Multistage ac-Coupled Amplifiers , Tuned Amplifiers, Current Source Circuits .Current Mirror Circuits . Differential Amplifiers, Operational amplifiers-

Computer Applications				Course Name		ECE-9223		Code
3	Equivalent Credit Hr	4	Contact Hours	2	Lecture	2	Practical	Teaching Hours
60			Written Exam	25	Term Work	15	شفوي /Practical	Marking

Introduction to Computer Applications is designed to familiarize students with computers and their applications. It will also emphasize the use of computers and technology throughout their college and future careers. Students will learn fundamental concepts of computer hardware and software and become familiar with a variety of computer applications, including programming skills and readymade toolboxes using famous programing platforms.

Computer Architecture				Course Name		CAC-9224		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
50			Written Exam	25	Term Work		شفوي /Practical	Marking

General Purpose Machine User view, assembly programmer view, computer architect view and logic designer view, Real machines, RISC versus CISC, CISC Processor example, Instruction set Architecture- address, address instruction set machine, address instruction set machine, address instruction set machine, Processor Design- SRC: An Example of RISC Architecture, syntax instruction formats, addressing modes, Register transfer and logic circuits, Data path Implementation,

Logic design for 1- bus system, ALU Design, Register file design, The Control Unit design, Micro programmed Control unit design 2 and 3 bus architecture design, machine exception and reset, Pipeline, Pipelining hazards.

Measurement and Instrument-2				Course Name		ECE-9225		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
60			Written Exam	20	Term Work	20	شفوي /Practical	درجات

Ac signal sources, Oscillators, Selection of an Oscillator, Barkhausen criteria. Audio frequency oscillator (Wien bridge oscillator, Phase shift oscillator), Radio frequency oscillator (Colpitts oscillator, Hartley oscillators), Crystal oscillator. Signal Generator, Sweep frequency generator, Pulse and Square wave generator, Function Generator, Attenuators. Harmonic analysis, Frequency spectrum of waveform, Harmonic distortion. Harmonic Analyzing Instruments, Harmonic distortion analyzer. Wave analyzer, spectrum analyzer. Transducers, classification of transducers, Selecting of Transducer, Strain gauge transducer, Displacement Transducer, Capacitive Transducer, Inductive Transducers, Piezoelectric Transducer, Temperature Transducers, Photoelectric Transducers. Data acquisition system, Signal conditioning circuit. Digital to Analog and Analog to Digital converters. Data acquisition system and computerized control.

Electrical power and Machine Systems				Course Name		ELE-9226		Code
2	Equivalent Credit Hr	3	Contact Hours	2	Lecture		Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي /Practical	Marking

Generation distribution and Transmission of Electric Power, protection systems, Secondary stations, Stations devices, Transmission lines, Transmission/distribution system parameters: overhead lines, resistance, inductance, capacitance; underground cables, resistance, inductance and capacitance, Steady and transient models of short and long transmission lines, Transformers, Principles of electrical machines AC and DC machines - speed control linear motors, induction motors, synchronize motors, Special motors - Transformers AC and DC distribution systems

Discrete Mathematics				Course Name		BAS-9227		Code
3	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours

70	Written Exam	30	Term Work		شفوي /Practical	Marking

Logic and methods of proof- Number theory and application to cryptography- Introduction to algorithms- Big O notations and algorithm complexity- Advanced counting techniques- Relations- Application to data base models- Graphs- Shortest path algorithms- Trees- Minimum spanning tree algorithm- Modeling computations.

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Digital Communications				Course Name		ECE-9311		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي /Practical	Marking

Introduction to Digital Communications, Coded Pulse Modulation, PCM generation, Uniform Quantization, Quantization Noise Instantaneous Companding (Law, A Law, Adaptive Quantizer); Differential Pulse Code Modulation (DPCM), DPCM with One; Tap and N-Tap predictors, DPCM with adaptive Quantization and Adaptive; Predictor, Linear Delta Modulation, Adaptive Delta Modulation, SNR of Linear Delta Modulation, Hard ware Realization of Linear and Adaptive Delta Modulation.; Detection of Baseband PCM signals, The Matched Filter, Probability of Error using Matched Filter and Decision Detectors, Error Analysis of PCM Repeaters.; Information Theory, Information Measure, Information Transmission Rate, Channel Capacity; Channel Coding for Error Detection and Correction, Linear Block Codes, Coding and Decoding, Interlaced Coding, Convolution Coding and Decoding, the Code Tree , Automatic Repeat Request(ARQ); Digital Modulation, Amplitude Shift Keying(ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), Differential Phase Shift Keying (DFSK), Quadrature PSK, Eight Phase Shift Keying (8-PSK), Bandwidth Consideration of Digital Modulation Schemes; Satellite Communication, Orbital Satellite, Geostationary Satellites, Orbital patterns, Look Angles, Orbital Spacing and Frequency Allocation, Radiation Patterns(Footprints), Satellite System Link models, Satellite System Parameters, Satellite System Link Equations, Link Budget.

Electronic Circuits -2				Course Name		ECE-9312		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
100			Written Exam 30		Term Work 20		شفوي /Practical	Marking

Cascode Stages and Current Mirrors: Cascode as a current source,scascode as an amplifier, BJT current mirror, MOS current mirror, MOS&BJT current steering circuits.Differential amplifiers:

Differential signals vs single ended signals,differential pair, BJT differential pair, qualitative analysis, large signalanalysis, small signal analysis, MOS differential pair, qualitative analysis,large signal analysis, small signal analysis, cascode differential pair,common mode gain, common mode rejection, differential pair with activeload.Frequency Response: Relation between transfer function andfrequency response, transfer function poles and zeros, estimation of lowfrequency and high frequency poles and zeros, bode plot, high frequencymodel of BJTs and MOSFETs, Miler's theorem, frequency response ofcascode stages, frequency response of differential amplifiers.Feedback: loop gain, negative feedback properties as gaindesensitization, bandwidth extension, modification of input output impedances, types of amplifiers, sense and return techniques, polarity offeedback, feedback topologies, and stability of feedback systems as phasemargin and frequency compensation.

Quality Control Systems				Course Name		PRI-9313		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
50			Written Exam	25	Term Work		شفوي /Practical	Marking

The course studies cover three groups of topics: Introduction: Importance of quality in the management of company. Concepts of quality management. Quality dimensions of goods and services. Quality management evolution and works of quality gurus. Quality policy and quality organizations: International and national quality organizations. National quality policy. International, regional and national standardization. System of assessment of quality conformity. Management systems and quality management principles for excellence: Quality management systems. Quality control methods. Quality audit and certification of management systems. Sustainable development. Environment management systems. Occupational health and safety management system. Eco-labelling. Total quality management.

Microwave Electronics				Course Name		ECE-9314		Code
4	Equivalent Credit Hr	5	Contact Hours	3	Lecture	1	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي /Practical	Marking

Introduction: Limitations of conventional tubes, O and M type classification of microwave tubes, reentrantcavity, velocity modulation; O type tubes; Two cavity Klystron: Construction and principle of operation, velocity modulation and bunching process Applegate diagram; Reflex Klystron: Construction and principle of operation, velocity modulation and bunching process, Applegate diagram, Oscillating modes, o/p characteristics, efficiency, electronic & mechanical tuning; M-type tubes-bMagnetron: Construction and Principle of operation of 8 cavity cylindrical travelling wave magnetron, hull cutoff condition, modes of resonance, PI mode operation, o/p characteristics, Applications; Slow wave devices: Advantages of slow wave devices, Helix TWT: Construction and

principle of operation, Applications; Microwave Solid State Devices: Microwave bipolar transistor, FET, MESFET, Varactor Diode, PIN Diode, Shottky Barrier Diode, Tunnel Diode, TEDs, Gunn Diodes, IMPATT diode and TRAPATT diode. Structural details, Principle of operation, various modes, specifications, and applications of all these devices; Theory of lasers Oscillator: Fabry-Perot resonator, Pumping mechanisms. Semiconductor Lasers.

Digital Signal Processing				Course Name		ECE-9315		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي /Practical	Marking
Sampling and Reconstruction of continuous time signals, Characterization and properties of discrete time signals and systems, Computation of the discrete time Fourier transform and its properties, Computation of the discrete Fourier transform and its properties, Fast Fourier transform algorithms, The Z-transform and its properties, Transform analysis of linear time invariant systems, Implementation of structures for discrete time systems, Digital filter design techniques, Homomorphic filtering, Applications of DSP in speech and image processing.								

Communication Net-1				Course Name		ECE-9316		Code
3	Equivalent Credit Hr	3	Contact Hours	2	Lecture	1	Practical	Teaching Hours
70			Written Exam	20	Term Work	10	شفوي /Practical	Marking
This course introduces the underlying concepts behind networking using the Internet and its protocols. The course covers the network stack from the application layer to the physical layer. Review of the OSI model and TCP/IP. Introduction to queueing systems and network calculus. Routing, flow control, and media aCACss. Traffic modeling. Packet radio networks. Design philosophy of wireless networking standards and protocols. Emerging wireless technologies								

Wireless Communications				Course Name		ECE-9321		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
90			Written Exam	25	Term Work	10	شفوي /Practical	Marking
Path Loss and Shadowing: Radio propagation; Transmit and receive Signal models; Path loss models, shadowing fading, Combined Shadowing and path loss models; Statistical Multipath Channel Models: Time varying channel impulse response; Narrowband fading models; wideband fading models; Diversity: Diversity system model; selection combining; Threshold combining; maximal ration combining; equal-gain combining; transmitter; Multiple antenna systems: Multi-input multi-output								

(MIMO) system models; MIMO cahnnel capacity; beam forming; smart antennas; massive MIMO; Multi carrier modulation: Orthogonal Frequency division multiplexing(OFDM); single carrier frequency division multiple ACACss (SC-FDMA); filter bank multi-carrier modulation(FBMC); Wireless Channel Propagation: multipath interference, small and large scale fading, Doppler shift and spread; Spread Spectrum systems: DSSS Modulation, demodulation, advantages, and disadvantages. FHSS Modulation, demodulation, advantages, and disadvantages. THSS Modulation, demodulation, advantages, and disadvantages. Hybrid systems. Spreading and Scrambling Codes; Multicarrier systems: Data Transmission using Multiple Carriers, Multicarrier Modulation with Overlapping Sub-channels, Mitigation of Subcarrier Fading, Discrete Implementation of Multicarrier, Challenges in Multicarrier Systems; MIMO OFDM: Multiple Input Multiple Output Orthogonal Frequency Multiple ACACss; Channel Capacity : Capacity in AWGN, Capacity of Flat-Fading Channels, Channel and System Model, Channel Distribution Information (CDI) Known , Channel Side Information at Receiver , Channel Side Information at Transmitter and Receiver, Capacity with Receiver Diversity, Capacity Comparisons, Capacity of Frequency-Selective Fading Channels, Time-Invariant Channels, Time-Varying Channels; Diversity: Realization of Independent Fading Paths, Receiver Diversity, Transmitter Diversity, Moment Generating Functions in Diversity Analysis.

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Electronic Circuits-3				Course Name		ECE-9322		Code
4	Equivalent Credit Hr	5	Contact Hours	3	Lecture	1	Practical	Teaching Hours
100			Written Exam	35	Term Work	15	شفوي /Practical	Marking
Analog Electronics: Power Amplifiers Class-A Amplifiers Efficiency of Class-A Amplifiers Class-B Push-Pull Amplifiers Class-AB Amplifiers Nonlinear Distortion ,Thermal considerations; Feedback amplifiers, Effect of FB on ;Nonlinear Distortion and Noise, Input and Output Impedances, Gain and Frequency Response, Feedback Networks, Phase Locked Loops (PLL); Oscillators; The Barkhausen Criteria for Oscillation ,Phase Shift Oscillators, Wien Bridge Oscillators, LC Oscillators and Crystal Oscillators, wave generators								

Opto- Electronics				Course Name		ECE-9323		Code
3	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
70			Written Exam	25	Term Work	5	شفوي /Practical	Marking
Optoelectronics: Wave Nature of Light, Dielectric Waveguides and Optical Fibers, Light-Emitting Diodes, Stimulated Emission Devices: Optical Amplifiers and Lasers, Photodetectors and Image Sensors, Polarization and Modulation of Light.								

Electromagnetic Waves				Course Name		ECE-9324		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture		Practical	Teaching Hours
90			Written Exam	30	Term Work	5	شفوي /Practical	Marking

Review of Maxwell's equations, boundary conditions, the wave equation, energy and power; Uniform Plane waves, Waves in unbounded lossless media , Polarization of plane waves, Phase velocity and group velocity, Doppler effect, Waves in Lossy media; Reflection, Refraction, and Diffraction; Electromagnetic Theorems: Reciprocity, Uniqueness; Wave propagation on a transmission line; Smith Chart, impedance mismatches and reflections; TEM, TE and TM electromagnetic waves, parallel-plate waveguide; Rectangular waveguide and cylindrical waveguide; Planar transmission lines: Striplines and Microstrip Lines; Microwave Network Analysis, Three and Four Port Networks; Impedance Matching and Tuning; Microwave Resonators; Microwave Passive Components: Power Dividers, Directional Couplers

Embedded Systems				Course Name		ECE-9325		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
90			Written Exam	20	Term Work	15	شفوي /Practical	Marking

Introduction to embedded systems. Basis of discrete control theory with practical examples. Transfer functions and block diagrams. Control system specifications: sampling time, delay time, phase margin, gain margin, bandwidth etc. Commonly employed compensators. Logic-based control. Embedded system architecture. Processor examples: AVR, ARM, DSP. Peripherals on chips. Real-time operating systems. Software for embedded systems design.

Elective Course-1				Course Name		ECE-9326		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي /Practical	Marking

1. <u>Digital Image processing: ECE-9326</u>

Description:

Introduction to image processing and computer vision, Image processing basics, MATLAB basics, The Image Processing Toolbox, Image sensing and acquisition, Arithmetic and logic operations, Geometric operations, Image enhancement in the spatial domain, Frequency domain filtering , Image restoration, Morphological image processing, Edge detection , Image segmentation, Color image

processing, Feature extraction and representation, Visual pattern recognition.

2.Digital VLSI Circuit Design: ECE-9326

Introduction: VLSI Components; VLSI Design Considerations; VLSI Design Parameters VLSI Design Styles: Full-Custom; ASIC; Programmable Logic Design(PLD); System-on-Chip(SoC); VLSI Design Flow: Top-Down Design; Bottom-up Design; Design Domain; Static MOS inverters: NMOS,CMOS,Pseudo NMOS; Dynamic MOS inverters; Domino; NORA CMOS; Programmable Logic Design: PROM,PLA,PAL,and GAL; Field Programmable Gate Array(FPGA): FPGA Design Flow; FPGA structure; Programming Technology; Commercial Available FPGA; System Design using: Mentor Graphis Tools and Xilinx ISE Tools

3.Error Control Coding: ECE-9326

Introduction for the theoretical and historical motivation behind modern error control coding, Introduction to linear block codes, generator matrix and parity check matrix; Properties of linear block codes: syndrome, error detection, error correction; Convolutional codes; Reed-Solomon codes trellis-coded modulation; Decoding of convolutional codes-I: Viterbi algorithm; Decoding of convolutional codes-II:BCJR algorithm; Some simple linear block codes: Repetition codes, Single parity check codes, Hamming codes, Reed Muller codes; Bounds on size of codes: Hamming bound, Singleton bound, Plotkin bound, Gilbert-Varshamov bound; Low density parity check codes; Decoding of low density parity check codes: Belief propagation algorithm; Applications of linear block codes

4.Biomedical Electronics: ECE-9326

Introduction to Biological Instrumentations, Biological Signals Types and Functions, Biological Systems, Biological Sensors and Transducers, Biological Amplifiers, Design of Biomedical Instrumentation, Electrocardiogram analysis and its circuits, Electroencephalogram, Electromyogram, Fluorescence Microscopy, Medical Image Modalities, Statistics of Medical Signals, Medical Signal and Image Analysis, Applied Project: Biomedical System design.

Mobile Communications				Course Name		ECE-9411		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي /Practical	Marking

Global System for Mobile Communications (GSM) (Introduction to cellular Fundamentals, GSM architecture, GSM Air Interface, GSM channel and time slots ; General Packet Radio Service (GPRS) and EDGE : GPRS and EDGE architecture, GPRS and EDGE air interface, Frequency bands and channel; Universal Mobile Telecommunications System (UMTS) and HighSpeed Packet ACACss (HSPA): Fundamentals of CDMA and UMTS, UMTS network architecture, Introduction to HSPA and HSPA+; Overview on Current and feature wireless communication systems: Mobile generations, Wi-Fi, Wi-Max, LTE, Li-Fi,….; Principles of wireless communications: basic concepts of cellular communications, cellular systems planning and optimization. System capacity; GSM network protocols, planning, and optimization, architecture, air interface, signal processing and transmission;

WCDMA system, WCDMA modulation and demodulation, WCDMA air links, Link protocol, types of codes in WCDMA, power control in WCDMA, handoff, WCDMA capacity; LTE network protocols, planning, and optimization, architecture, air interface, signal processing and transmission; Mobile Propagation (Path loss) models and empirical models.

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Integrated Circuits				Course Name		ECE-9412		Code
3	Equivalent Credit Hr	5	Contact Hours	3	Lecture	2	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي /Practical	Marking
Introduction; IC Overview: History of IC; IC Evolution; Why CMOS; CMOS Trends; New CMOS Structure: FinFET Transistor; Silicon-on-Insulator (SOI);NAND Flash Cell; Solid State Drive (SSD);IC Fabrication; Design Rules and Layout; MOS Scaling and Short Channel Effects(SCEs); 8-Analog and Digital MOS Switch; 9-Designing for Low Power; 10-BiCMOS Circuits								

Antenna and Wave Propagation				Course Name		ECE-9413		Code
4	Equivalent Credit Hr	5	Contact Hours	3	Lecture	1	Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي /Practical	Marking
Basic Antenna Parameters (Radiation Pattern, Radiated Power, Directivity, Gain,; Efficiency, Radiation Resistance, Band Width, Polarization, Antenna Noise Temperature); Dipole, Monopole antennas, Loop antennas; Traveling wave antennas (Long wire, V and Rhombic antennas); Broadband Antennas, Helical, Yagi-Uda, Log-periodic antennas; Antenna Arrays; Overview of Aperture antennas: Horn and Reflector antennas; Overview of Microstrip antennas; Basic propagation modes, free space, ground reflection and diffraction; Ground wave propagation. Sky wave propagation; Atmospheric effects on radio wave propagation; Space (terrestrial) wave propagation; Propagation models in mobile radio systems. Channel modelling, statistical modelling, empirical modelling, multipath fading; Basic diversity combining techniques.								

Communication Net-2				Course Name		ECE- 9414		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي /Practical	Marking
The Communication Network Engineering course offers education and research programs with an objective to further the development of commonplace mobile phones and networks for faster, more efficient and safer communications. The course's education and research themes include wired/wireless signal transmission, computer network design, construction and operation, information								

processing, security and other telecommunication systems technologies. The course provides students with opportunities to acquire basic knowledge of communication networks through education and research subjects such as communication engineering, communication protocols, and information processing. Education and research programs on the Internet, mobile systems, and security are designed for students to learn the basics of communication system design and network configuration. The course trains students to develop skills to be active, and to develop solutions to various problems, in related industries and research areas, using the overall depth of knowledge gained through these education and research programs.

Elective Course-2				Course Name		ECE-9415		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
70			Written Exam	30	Term Work		شفوي /Practical	Marking

1. Satellite Communications: ECE-9415

This course deals with the fundamental and practical aspects of satellite communications systems with an emphasis on modern systems and their link budgets; historical perspective of how satellite systems are designed and deployed; Orbital aspects of satellite communication: orbital mechanics, constellations, look angle determination, orbital effects in communications system performance, spacecraft subsystems; Satellite link design: basic transmission theory, down-link design, up-link design, noise power budget, design applications (INMARSAT, DBS TV); Modulation and multiplexing techniques for satellite links: Analog telephone transmission and multiplexing, analog TV transmission SNR calculations, Digital transmission and reception, TDM, BER & SER calculations; Multiple aCACss: FDMA, TDMA, CDMA.

2. Multimedia Processing: ECE-9415

This is an optional graduate-level class that covers the fundamentals of image processing, computer vision, machine learning, and multimedia computing. The students learn about the basics of image, video, and audio formation and processing, the basics of multimedia compression and representation. The students will be exposed to dealing with image and video data through programming assignments using Java and Matlab.

3. Electronics for Instrumentations: ECE-9415

Electronic indicating, display, recording and analysis instruments, signal generators, frequency synthesizer, counters, elements of design, grounding and shielding, electronic circuits manufacturing technology, metrology, standards in quality management, instrumentation in hazardous area, industrial communication techniques.

4. Nano Photonic: ECE-9415

Introduction: Photonics and Optoelectronics: why nano?, Nano photonic overview; Materials for Nano photonics: Quantum effect for electronic confinement: quantum dots, Nanoparticles: from

semiconductor to organic, Microcavity effect for photonic confinement: photonic crystals; Building Blocks for Nano photonics : Nanolasers, Nanodetectors, Nano sensors, Nana channels; System Integration for Nano photonics: Photonic crystal nano-PIC, Silicon PIC, Other approaches.

5.Computer Vision: ECE-9415

Introduction to computer vision; fundamentals of image formation; camera imaging geometry, Image statistics, edges, and texture; Image motion estimation and tracking; Stereo, image classification, scene understanding, and deep learning with neural networks; depth recovery from stereo, camera calibration, image stabilization, Optical flow (image motion): affine flow, regression, dense flow; Robust statistics; Segmentation and grouping; automated alignment, tracking, boundary detection, and recognition. Bayesian inference; Principal component analysis and eigen-models of object.

Graduation Project-1				Course Name		ECE-9416		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
			Written Exam	50	Term Work	50	شفوي /Practical	Marking
Prepare and submit technical proposal for the senior design (“Capstone”) project to be executed. Discuss issues relating to the engineering profession, including such topics as: intellectual property, sources of technical information, engineering codes and standards, professional organization, professional registration.								

Summer Training (2)				Course Name		EE -9417		Code
0	Equivalent Credit Hr	2	Contact Hours		Lecture	2	Practical	Teaching Hours
			Written Exam		Term Work	50	شفوي /Practical	Marking
Students promoted to the 3rd and 4th year are to carry out field training in specialized training sectors. Students trained outside the country should be approved by relevant Department Councils, The student will not be able to obtain his/her B.Sc. Graduation Certificate until Professional and Field Training are both accomplished suCACssfully. The executive regulation of students’ training is issued by the University Council based on advices from Scientific Departments, and the Council of Education and Students’ Affairs.								

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Optical Communications				Course Name		ECE-9421		Code
4	Equivalent Credit Hr	6	Contact Hours	2	Lecture		Practical	Teaching Hours
100			Written Exam	40	Term Work	10	شفوي /Practical	Marking

Optical Fiber Transmission; Lasers; Optical Modulators and Modulation Schemes; Optical Receivers; Optical Amplifiers; Transmission System Design; Performance Analysis; Channel Multiplexing Techniques; Nonlinear Effects in Fibers; Digital Signal Processing;

Information Theory and Coding				Course Name		ECE-9422		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture	1	Practical	Teaching Hours
90			Written Exam	35	Term Work		شفوي /Practical	Marking

Review of probability and random processes; Information and uncertainty, Entropy; Source coding, Shannon first theorem; Discrete memory less channels, Mutual information; Shannon second theorem, Channel capacity; Rate distortion theory, Differential Entropy, Gaussian Channel; Geometric representation of signals in the signal space; Block codes, Syndrome decoding; Cyclic codes; Hamming codes, BCH codes, Reed Solomon codes; Convolutional codes; Maximum likelihood decoding.

RF Circuits Design				Course Name		ECE-9423		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
90			Written Exam	35	Term Work		شفوي /Practical	Marking

This course will cover the design and analysis of radio frequency integrated circuits (RFICs) for communications. We will begin with an overview of RF and wireless technology, and cover some fundamental concepts in RF design such as nonlinearity, sensitivity, and dynamic range. Matching and impedance transformation networks will be discussed, as well as S-parameters. Following this we will discuss transceiver architectures (Heterodyne, Direct Conversion, etc.), and review modulation and up-conversion concepts. The latter half of the course will be devoted to a detailed examination of each of the blocks in the transceiver architectures discussed: Low Noise Amplifiers, Mixers, Oscillators, Frequency Synthesizers, and Power Amplifiers.

Project Managements				Course Name		UNC-9424		Code
2	Equivalent Credit Hr	2	Contact Hours	2	Lecture		Practical	Teaching Hours
50			Written Exam	25	Term Work		شفوي /Practical	Marking

Overview of Project Management; Project Management Growth: Concepts and Definitions; Organizational Structures [used in Project Management]; Organizing and Staffing the Project Office

and Team; Management Functions [in a Project Environment]; Management of Your Time And Stress; Conflicts; Special Topics [in Project Management]; The Variables for SuCACss; Working With Executives; Planning; Network Scheduling Technique; Project Graphics; Pricing and Estimating; Cost Control; Trade-Off Analysis in a Project Environment; Risk Management; Learning Curves; Contract Management; Quality Management.

Elective Course-3				Course Name		ECE-9425		Code
2	Equivalent Credit Hr	4	Contact Hours	2	Lecture		Practical	Teaching Hours
90			Written Exam	35	Term Work		شفوي /Practical	Marking

1. Robotic Design: ECE-9425

Introduction to robotics; Major design components; actuators, sensors and drives; Control Components; Embedded Robot Controller, I/O Interface, and PWM Amplifier; Controller Software and Sensor Inputs; Sensors; Implement Basic Sensor-based Controls; Plan Strategy for De-mining Task ;Kinematics; Refine De-mining Operations; Differential Motion; Rescue Robot; Hybrid Position-force Control; Compliance, End-effecter Design; Non-holonomic Systems; Legged Robots, Multi-fingered Hands; Navigation; Computer-based design, analysis and hands-on project assignment; Tele-robotics and Virtual Reality.

2. Broadband Wireless Communications: ECE-9425

Introduction to broadband wireless communication techniques; Wireless channel characteristics and modeling; Modern diversity techniques (e.g., time diversity, space diversity, frequency diversity); Error control coding and decoding; Equalization; Antenna arrays; Multiple-input/multiple output channel modeling in the angular domain and statistical models; Smart antennas techniques; Multiple-input/multiple-output communications systems; Spatial multiplexing; Space-time processing and coding; Multiuser detection and receiver designs; Multiple aCACss and interference management; Cooperative relaying; Opportunistic communications; Multiuser water-filling.

3. Selected Topics in Microwave Engineering: ECE-9425

Any selected topics and issues related to the field of microwave engineering

4. Analog VLSI Circuit Design:ECE-9425

Basic and advanced aspects of analog integrated circuit design; General purpose operational amplifiers and oscillators, and including frequency response, noise, feedback, and stability. The course will enhance students understanding of the trade-offs involved in analog circuit design, and switched capacitor circuits design. Introduce ‘real-world’ design issues like robustness for process, voltage and temperature variations. Use design project to let the student step through the different stages of an analog integrated circuit (block) design; Basic hand-calculations and computer aided analysis using SPICE (simulation program with integrated circuit emphasis), or Cadence, will be used to refine a design

Graduation Project-2				Course Name		ECE-9426		Code
2	Equivalent	6	Contact		Lecture	4	Practical	Teaching

	Credit Hr		Hours					Hours
			Written Exam	50	Term Work	100	شفوي /Practical	Marking

Continuation and completion of the project based on the proposal approved in the first semester. Progress of the project is monitored by the instructor with demonstrations and presentations at given due dates of the regularly scheduled course. An oral presentation and demonstration of the project by the student team must be given and a written report submitted at the end of the course. SuCACssful projects are approved for the presentation at the Senior Design Project Workshop in the presence of students, faculty and industry representatives.