Ministry of Higher Education
Higher Institute for Engineering and Technology at Manzala
Civil Eng. Dept.

First Year
First Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	BS 110	Engineering Mathematics (3)	2	2	4	50	-	75	125	3
2	BS 111	Physics (3)	2	2	4	30	20	75	125	3
3	CIV 111	CivilEngineering Drawing	2	3	5	50	-	100	150	3
4	CIV 112	Theory of Structures (1)	2	2	4	50	-	75	125	3
5	CIV 113	Plane Surveying	2	3	5	30	20	75	125	3
6	BS 100	English for Engineering(2)	-	2	2	15	-	35	50	2
7	BS 8XX	Human tics (1)	2	-	2	15	-	35	50	2
Total			12	14	26				750	

Second Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	BS 120	Engineering Mathematics (4)	2	2	4	50	-	75	125	3
2	CIV 121	Fluid Mechanics	2	2	4	30	20	75	125	3
3	CIV 122	Properties and strength of materials (1)	2	2	4	30	20	75	125	3
4	CIV 123	Mechanics of Solids	2	2	4	50	-	75	125	3
5	CIV 124	Theory of Structures (2)	2	2	4	50	-	75	125	3
6	CIV 125	Topographic Surveying and Geodesy	3	2	5	30	20	75	125	3
Total			13	12	25				750	

Lee. Lecture T: Tutorial L: Laboratory O:Oral

Ministry of Higher Education
Higher Institute for Engineering and Technology at Manzala
Civil Eng. Dept.

BS: Basic Science Department CIV: Civil Engineering Department

Second Year
First Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	CIV 211	Propreties and Strength of Materials (2)	2	2	4	30	20	75	125	3
2	CIV 212	Theory of Structures (3)	2	2	4	50	-	75	125	3
3	CIV 213	Hydrology&Irrigation and Drainage Systems	3	2	5	60	-	90	150	3
4	CIV 214	Computational Methods in Civil Engineering	2	2	4	50	-	75	125	3
5	CIV 215	Theory of Elasticity	2	2	4	50	-	75	125	3
6	CIV 216	Engineering Geology	2	2	4	40	-	60	100	3
Total			13	12	25				750	

Second Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	CIV 221	Water Structures	3	2	5	60	-	90	150	3
2	CIV 222	Steel Structures Design (1)	3	2	5	60	-	90	150	3
3	CIV 223	Soil Mechanics and Foundations (1)	2	2	4	40	10	75	125	3
4	CIV 224	Reinforced Concrete (1)	3	2	5	60	-	90	150	3
5	CIV 225	Basics of Construction and Buildings Works	2	2	4	50	-	75	125	3
6	BS 8XX	Humanities (2)	2	-	2	15	-	35	50	2
Total			15	10	25				750	

Lee. Lecture T: Tutorial L: Laboratory O:Oral
BS: Basic Science Department CIV: Civil Engineering Department

Ministry of Higher Education
Higher Institute for Engineering and Technology at Manzala
Civil Eng. Dept.

Third Year
First Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	CIV 311	Engineering Projects Evaluation	2	2	4	25	-	75	100	2
2	CIV 31 2	Reinforced Concrete (2)	3	2	5	50	-	75	125	3
3	CIV 313	Construction and Building Engineering	2	2	4	50	-	75	125	3
4	CIV314	Engineering Hydraulic	2	2	4	20	20	60	100	3
5	CIV 315	Soil Mechanics and Foundations (2)	2	2	4	40	10	75	125	3
6	CIV31XE or MEC311E	Elective (1) from list (1)	2	2	4	40	-	60	100	3
7	BS 8XX	Humanities (3)	2	-	2	15	-	35	50	2
Total			15	12	27				725	

Second Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	CIV 321	Construction Estimating and Tendering for Structures	2	2	4	40	—	60	100	3
2	CIV 322	Probabilistic Methods in Structural Engineering	2	2	4	40	-	60	100	3
3	CIV 323	Legislations & Specifications &Building and Housing Laws	2	-	2	25	-	50	75	2
4	CIV 324	Steel Structures Design (2)	2	2	4	50	-	75	125	3
5	CIV 325	Reinforced Concrete (3)	3	2	5	60	-	90	150	3
6	CIV 326	Construction Project Management (1)	2	2	4	40	-	60	100	3
7	CIV31XE or MEC321E or ARC321	Elective 2 from list 2	2	2	4	40	-	60	100	3
Total			15	12	27				750	

Lee. Lecture T: Tutorial L: Laboratory O:Oral

Third Year
(Elective Courses)

LIST 1

C1V 311E : urban Engineering
CIV 312E : Site Preparation
CIV 313E : Safety engineering in buildings
CIV 314E : Tunneling and underground Excavation
CIV 315E : Railway Engineering
MEC 311E : Solar energy in Building Design

LIST (2)

CIV 321E : Computers Networks for Buildings
CIV 322E : Reliability of Structures,
MEC 321E : Air Conditioning systems for Building
ARC 321 : Elighting Systems for buildings
CIV 323E : Construction Contracting

Ministry of Higher Education
Higher Institute for Engineering and Technology at Manzala
Civil Eng. Dept.

Fourth Year
First Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	CIV 411	Sanitary and Environmental Engineering	2	2	4	60	-	90	150	3
2	CIV 412	Construction Project Management (2)	3	2		60	-	90	150	3
3	CIV 413	Planning maintenance and Protection of Buildings	3	2	5	60	-	90	150	3
4	CIV41XE	Elective 3 from list (3)	2	2	4	50	-	75	125	3
5	CIV 423	Harbor Engineering	2	2	4	50	-	75	125	3
6	CIV 415	Project (1)	-	2	2	50	-	-	50	continuous
Total			12	12	24				750	

Second Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	CIV421	Financial Management of Construction Project	2	2	4	50	-	75	125	3
2	ELC 421	Electrical and Thermal loads in Buildings	2	2	4	50	-	75	125	3
3	CIV 422	Transportation Engineering and Planning	2	2	4	40	-	60	100	3
4	CIV 424	Coastal Engineering	2	2	4	50	_	75	125	3
5	CIV 42XE	Elective 4 from list 4	2	2	4	50	-	75	125	3
6	CIV 425	Project (2)	-	4	4	50		100	150	Presentation & Discussion
Total			10	14	24				750	

Lee. Lecture T: Tutorial L: Laboratory O:Oral
BS: Basic Science Department CIV: Civil Engineering Department

Ministry of Higher Education
Higher Institute for Engineering
and Technology
at Manzala
Civil Eng. Dept.

Fourth Year
(Elective Courses)
LIST (3)

CIV 411E : River Engineering
CIV 412E : Pre-fabrteated Concrete Frames
CIV 413E : Bridge Engineering
CIV 414E : Photogrammetry and Remote Sensing
CIV 415E : Modern Structure Materials
CIV 416E : Foundation Engineering
CIV 417E : Design of Marine Platforms
CIV 418E : Pavement Design

LIST (4)

CIV 421E : Design of BricksBuilding
CIV 422E : Design of Shell structures
CIV 423E : Design of Reinforced Concrete Structures
CIV 424E : Land Transportation Engineering
CIV 425E : Professional Issues in Design and Egyptian Code for Structures
CIV 426E : Hybrid and Composite structures
CIV 427E : Engineering of roads and airports

COURSES CONTENTS

BS 110 **Engineering Mathematics(3)** **(2 +2)**

Partial differentiation applications - maximum values for functions of more than one variable - vectorial analysis - vectorial differential operations - multiple integrals and applications - coordinates and orthogonal curves - Gauss and Stocke's theorems -infinite series and function behavior- separable, homogeneous and exact equations -Second order ordinary differential equations- constant coefficient equations -complementary function and particular solution and its meanings - Laplace transformation and applications in solving differential equations.

BS 111 **Physics (3)** **(2 +2)**

Heat- radiation- optics - electro optical effects - electromagnetic theory - waves and particles - the wave theorem for light propagation - interference,diffraction and polarization of light - laser principles - principles of modern physics.

CIV 111 **Civil Engineering Drawing** **(2 +3)**

Cross sections for canals and drains-Road crossing- Pitching- Retaining walls: Brick walls&P.C. Walls &R.C. walls- bridges - Culverts - Regulators - weirs - Syphons -Aqueducts - R.C. Structures: Slabs & Beams & Columns &Foundations -Steel Structures: plate angle connections& Column beam connection&Bridge connection&column foundation.

CIV112 **Theory of Structures (1)** **(2 +2)**

Introduction to structural analysis- Types of loads-Reactions, shears and moments- Analysis of statically determinate beams- Analysis of statically determinate frames- Analysis of statically determinate arches- Analysis of statically determinate trusses.

CIV 113 **Plane Surveying** **(2 +3)**

Introduction - methods of measurements and setting-up - shape of earth - surveying branches -- instruments and methods of linear measurments - simple surveying techniques - chain surveying - - surveying using compass - - common parts of surveying instruments - plane table - verniers - maps and its arrangements - leveling and contour lines - areas and volumes - land leveling - surveying using theodolites -introduction to theory of errors.

BS 120 **Engineering Mathematics (4)** **(2 +2)**

Special functions - Fourier's series - periodical functions and Euler's Laws - Fourier integrations - solution of differential equations using series - solution of DE using variable separation method -- compound variable functions -analytical functions- derivation – linear integration - Green and Kochy theorem and applications - series.

CIV121 **Fluid Mechanics** **(2+2)**

Dimensions and Units - Properties of fluids - Hydrostatic forces -Stability of floating bodies - Kinematics of fluid motion - Dynamics of flow - Bernoulli equation-Time of emptying of tanks - Flow through orifices and over weirs - Laminar and turbulent flows - flow throughpipes - Pipes networks.

CIV122 **Properties and strength of materials (1)** **(2 +2)**

General classification of engineering materials - Engineering materials properties - Mechanical properties of metals - Engineering materials tests - Standard specifications - Elements of quality systems - Test Machines - Static: Tension & compression &deflection and shear - Building stones - aggregates - cement - Water mixing — Gypsum - Lime - Wood.

CIV 123 Mechanics of Solids (2 +2)

Properties of plan areas - Normal stresses in structural elements - Unsymmetrical bending - Mohr's circle - Compound stresses - shear Stress& shear center & torsion in structural analysis - Principal Stresses.

CIV 124 Theory of Structures (2) (2 +2)

Influence lines for statically determinate structures - Analysis of statically indeterminate structures: method of virtual work & Elastic load method & Strain energy method &Three moments equation.

CIV 125 Topographic Surveying and geodesy (3+2)

Surveying using theodolite - electronic distance measurements - traverse networks -alignment of simple and compound horizontal and vertical curves - shape of the earth and coordinate systems - theory of errord - photogrammetry and remote sensing.

CIV 211 Properties and Strength of Materials (2) (2 +2)

Concrete principals -Design of concrete mixes - Curing - Quality control - Proerties of fresh concrete: consistency & workability & Segregation & Bleeding - Properties of hardened concrete: Compression & tension & shear & bond stresses Permeability and creep of concrete - Special concretes - admixtures for concrete.

CIV 212 Theory of Structures (3) (2 +2)

Introduction to plastic analysis -- approximate analysis of building frames-Using matrices in analysis of statically indeterminate structures with slope deflection & moment distribution methods - Influence line for statically indeterminate strucuresof structures.

CIV 213 Hydrology& Irrigation and Drainage Systems (3 +2)

Hydrology cycle - Hydrologic Measurements : Evaporation & Transpiration &Infiltration& Surface Runoff &Precipitation& Hydrograph - Floods - Yearly and long run storage - Ground water and well hydraulics - estimating of irrigation water requirements - Planning and design of irrigation and drainage networks - surface irrigation - Sprinkler irrigation - Drip irrigation — surface drainage - Tile drainage.

CIV 214 Computational Methods in civil Engineering (2 +2)

Application of numerical methods in civil engineering - Finite elements method -Programming concepts and techniques - Modern programming languages.

CIV 215 Theory of Elasticity (2 +2)

Stress , Srain and Displacement - Equilibrium and compatibility - Use of Airy stress function in rectangular and polar coordinates - Asymptotic fields at discontinuities -Forces and dislocations - Contact and crack problems -Rotating and accelerating bodies - Galerkin and Papovich solutions - Neuber solutions - Thermoelasticity -Axisymetric torsion.

CIV 216 Engineering Geology (2 +2)

Earth layers - Rocks - Geological formations — Geological maps - Geological survey.

CIV 221 Water Structures (3 +2)

Retaining walls - R. C. Bridges - Culverts - Syphons - Aqueduct - Hydraulic design –of control structures aprons – Weirs – Regulators.

CIV 222 Steel Structures Design (1) (3 +2)

Design of steel structures; Tension and compression members; Beams; Beam-columns; Built-up members; Plate girders; Connection; Design practice; Tutorial design workshops.

CIV 223 Soil Mechanics and foundation (1) (2 +2)

Classification of soil - Compressibility of soil - Shear strength of soil Soil settlement Bearing capacity of soil Stability of slopes Retaining walls - Earth pressure - Design of isolated footing and strip -Design of combined footing.

CIV 224 Reinforced Concrete (1) (3 +2)

Introduction of reinforced concrete - Design by working stress. method - Design of sections subject to normal forces - Design of sections subject to shear forces - Design of sections subject to moments - Design of solid slabs - Design of beams -Design of columns.

CIV 225 Basics of Construction and Building works (2 +2)

Principles of architecture theories - Construction , finishing and maintenance works for buildings - stages of building construction - Types of joints in buildings -Door and windows carpentering - separating walls - complex wooden constructions- Sanitary works - architecture panels details.

CIV 311 Engineering project Evaluation (2 +2)

Simple and compound interest-uniform series and long run periods-Increased series as arithmetic and geometric series-repeated series every time period for long time-uniform value and present value-Internal Rate of Return and Payback period - Cost Benefit Ratio- Capital Regulation and sensitivity analysis-Inflation-Evaluation and depreciation of financial assets-evaluation of equipments rent and economic life-Break even analysis-Bid Evaluation.

CIV 312 Reinforced Concrete (2) (3 +2)

Hollow blocks slabs - Flat slabs - paneled beams - Frames - Trusses - Arches.

CIV 313 Construction and Building Engineering (2 +2)

Design concepts of various types of buildings, analysis and design of each component of building including foundation, frame, shear wall, slab, wall and others, in which emphasis is placed on reinforced concrete building.

CIV 314 Engineering Hydraulic (2 +2)

Manning and Chezy equations - Velocity distribution in open channels - Design of open channel cross sections - Specific energy - Hydraulic jump - Gradually varied flow - Water surface profiles - Similarity and dimension analysis - Characteristics of centrifugal and axial-flow pumps.

CIV 315 Solid Mechanics and Foundations 2 (2 +2)

Raft foundations - Types of piles and methods of execution - Design of piles - Bearing capacity of piles - Analysis of piles group - piles settlement - Design a cap of piles - Piles testing - Soil hydraulic - theory of seepage - Caissons.

CIV 321 Construction Estimating and Tendering for Structures (2 +2)

Quantities estimating-Price analysisfor construction works- cost elements-Bill of Rates- method of construction items accounting- Bill of Quantities and Invoices-Excavation and filling items-General and special conditions for tenders and contracts-Formulation of specification.

CIV 322 Probabilistic Methods in Structural Engineering (2 +2)

Analysis and specification of structural performance using probabilities and statistical methodology - Material properties variability - Uncertainty in live-Earthquake & wind loading and response - Reliability of structural systems - Application of computer, simulation - New code formulas with a probabilistic basis.

CIV 323 Legislations & Specifications & Building and Housing Laws (2 +0)

Introduction to law - Contracts - Laws governing contracts - Contract Management -Study of some laws related to civil engineering (building,housing,urban planning, traffic,environmental,professional organizations such as syndicates,etc.)- organizing the constructions,contracts and specifications.

CIV 324 Steel structure Design (2) (2 +2)

Steel frames design -riveted and bolted connections -high strength bolted connections -welded connections -base connections -roof trusses -rigid frames design.

CIV 325 Reinforced Concrete (3) (3 +2)

Wind and earthquakes loads - Design of tanks resting on soil - Design of Sections under bending without cracking - Design of circular tanks - Design of Rectangular tanks - Design of shell structures - Design of prestressed Concrete.

CIV 326 Construction project Management (1) (2 +2)

Managing and organizing construction project-Planning construction project-scheduling construction project-Critical Path Method&Program Evaluation and Review technique(PERT)-Line of balance for scheduling repetitive constructionwork-Resource Smoothing-Resource Scheduling-Contract Strategy and contractor selection.

CIV 411 Sanitary and Environmental Engineering (2 +2)

Preliminary design studies for potable water supply projects - water pollution and waste water hazards on health - study and design of potable water treatment techniques and networking systems - study and design of different waste water treatment methods - study of sludge treatment and disposal methods.

CIV 412 Construction project Management (2) (3 +2)

Direct cost: Operational estimating & Unit rate estimating - Indirect cost - Markup: net profit&Risk allowance&Financial charges - Pricing policy - Strategies of competition in bids - Time/Cost relationship - Cost Control – Updating construction schedules- Law of tenders.

CIV413 Planning Maintenance and protection of Buildings (3 +2)

Review on of deterioration of building materials. Concept of life cycle cost-Protection methods against deterioration and corrosion of building materials.Typesof defects and damages.Non-destructive tests.Partially destructive tests. Load tests.Materials for repair and selection.Methods and techniques of repair. Rehabilitationand retrofitting..

CIV 421 Financial Management of Construction project (2 +2)

Forecasting of expense and income-Cash Flow curves- Revenue and income curves-Cost and expense curves- factors that minimize negative cash flow- Risk and Uncertainties- Risk sources of construction project- Responses for dealing with risks-Risk analysis- Random Numbers- Providing for residual risks.

ELC 421 Electrical and Thermal Loads in Buildings (2 +2)

Concepts and criteria of electrical system design -- Electrical devices and their specifications-Symbols and circuit diagrams-Standard electrical codes and practices-Load characteristics and calculations- Power distribution and wiring design-infrastructure system design: lighting, heating, air conditioning, grounding and safety-case studies of electrical system design in commercial, industrial and residential buildings.

CIV 422 Transportation Engineering and Planning (2 +2)

Characteristics of transportation supply and demand, measuring and estimating demand, social and environmental impacts, planning of transportation systems,characteristics of transportation modes, interaction between modes, mode interfaces, transportation technology, economics, public policy, implementation and management.

CIV 423 Harbor Engineering (2 +2)

Introduction – Wind – Wave– Wave Forecasting – Wave Theory – Tide – Currents – Port Planning – Design of Breakwaters – Coastal structures design.

CIV 424 Coastal Engineering (2 +2)

Wave characteristics – Effect of waves on Coastal Structures – Design of Breakwaters and Seawalls – Design of Dry Dock – Design of Slipway.

CIV415 +CIV425 Project (1) & project (2) (0+2)(0+4)

The overall objective of the project is to provide the student with the opportunity to collect the information which studying in the school years. The project represents a real engineering position and encourages the spirit of work within a team. He trains the application to follow a geometrical method based on scientific principles. Among the projects presented in the section - Upon completion of the project, the student will submit a detailed report on the project.

Ministry of Higher Education
Higher Institute for Engineering and Technology at Manzala
Civil Eng. Dept.

Elective Courses

Third year

CIV 311E Urban Engineering (2 +2)

Urban land use planning; Population dynamics; Urban transportation planning; Mass transit systems; Welfare economics; Economics of public goods; Public infrastructure financing; Urban environmental issues.

CIV 312E Site Preparation (2 +2)

Surface/Subsurface exploration; Concept of land use mapping and terrain evaluation; Site location and site investigation for roadways and tunnels; Groundwater exploration; Dam and reservoir site investigation; Waste disposal site location and geotechnical aspect of landfill sites.

CIV 313E Safety Engineering in buildings (2 +2)

Principles and practice regarding safety in building. Accidental prevention and safety control. Fire control.Fire resistance of building materials, safety provisions for fire and other hazards in building.Safety standards and codes.Governmental regulations and inspection procedures.

MEC 311E Solar Energy in Building Design (2 +2)

Solar heating of buildings including the solar radiation calculations - Methods of collecting solar energy and its conversions - economic analysis for solar systems - different designs and the best utilization of it during the year

CIV 314E Tunneling and underground Excavation (2 +2)

Introduction to tunnels -numerical methods in tunnel constructions- computer software packages and its applications in tunnels.

Tunneling and excavations in hard rock - basic rock mechanics, shape, size and orientation of an opening,elastic deformation and the Kirsch solution, rockmass classification, support design and ground reaction curve,drill and blast method, NATM tunneling method.Tunneling in soft ground - problems of urban tunneling.,deformation and surface settlement, load on liners, face stability, methods of soft ground tunneling including EPB and slurry shield methods. Selection of methods of attack for excavation of tunnels and deep vertical sided openings.Tunneling procedures based on behavioral characteristics of soil and rock , study of tunnel boring machines, shielded and
drill-and-blast operations, linings, soil linear interaction. Deep excavation procedures related to support of excavation systems, methods of installation and dewatering.

CIV 315E Railway Engineering (2 +2)

Engineering principles for railways planning-railways components and specifications -design of different parts of railways types of stations-types of signals-maintenance -planning of the railways lines- transportation economy - management and insurance.

CIV 321E Computers Networks for Buildings (2 +2)

Basic knowledge of data communication: data transmission technology, transmission media, signal interference, etc. Network topology: logical aspect and physical aspect. Local area network technology.Networking equipment: repeaters, signal transceivers converters, switches/hubs, connectors/interfacing equipment, etc.

CIV 322E Reliability of Structures (2 +2)

Fundamental concepts related to structural reliability,safety measures,load models, resistance models, system reliability, optimum safety levels, and optimization of design codes.

MEC 321E Air Conditioning systems for Buildings (2 +2)

Psychrometry and process of air.Cooling load estimation.Refrigeration cycles.Water chiller systems.Air handling system.Cooling towers.Equipment selection.Installation, operation and maintenance of air conditioning systems.

ARC 321 E lighting Systems for Buildings (2 +2)

Principles of lighting, lighting design for buildings which includes artificial lighting, point, line and area light sources, types and properties of luminaries, polar curves, design methods and calculations, glare index, lighting design standard, luminaire heat recovery system and lighting energy management, hybrid lighting, daylighting of buildings, effect of climate on lighting.

CIV 323E Construction Contracting (2 +2)

Construction contracting for contractors, architects,owners. Organization and administration, industry structure , construction contracts,bonds,insurance. Planning, estimating, and control , quantity takeoff and pricing, labor and equipment estimates, estimating excavation and concrete , proposal preparation, scheduling, accounting and cost control. Students use contract documents to prepare detailed estimate.

Ministry of Higher Education
Higher Institute for Engineering and Technology at Manzala
Civil Eng. Dept.

Elective Courses

Fourth year

CIV 411E River Engineering (2 +2)

Classifications of rivers, data collection method; Velocity and flow rate measurement, design of hydraulic structures: dike, spillway, dam, gate, pumping station, sheet pile, countermeasure on sediment control: corrosion, deposition, scour, bill of quantity and cost estimation, operation and maintenance.

CIV 412E Pre-Fabricated Concrete Frames (2 +2)

Prefabricated concrete performance - design of concrete supported to shear stress - design of columns - roofs and building frame - design project using the computer -detailed report.

CIV 413E Bridge Engineering (2 +2)

Different types of bridges - different methods in bridges construction -load calculations and its different effects - methods of bridges design using the standard specifications codes - using commercial computer packages for bridge design. Planning of bridge projects; Design, analysis and construction of various types of bridges including reinforced and prestressed concrete bridges, steel bridges, composite bridges, and cable-supported bridges.

CIV 414E Photogrammetry and Remote Sensing (2 +2)

Basic concepts of photogrammetry; Cameras and photography; Mathematical and geometric principles relevant to photography; Rectification and orientation; Ortho-photography; Mosaic; Applications of photogrammetry; Basic concepts of Remote Sensing; Sensor and platform; Digital imagery; Image enhancement; Rectification and classification.

CIV 415E Modern Structure Materials (2 +2)

General introduction for the technological development of material science - general classification of the modern materials in the structure field - compound materials and their applications - carbon fibers and its use in structures - insulating materials -antifire materials.

CIV 416E Foundation Engineering (2 +2)

Exploration of the site and work methods of the probes - On-site tests - Report - Geodesy - Deserts from the site - Table blinds..

CIV 417E Design of Marine Platforms (2 +2)

Marine platform (definition - types) , loads affecting the marine platforms - tide and wind forces - design of fixed marine platforms.

CIV 418E Pavement Design (2 +2)

Characteristics of pavement loads, stress analysis in pavements, design practices, construction, rehabilitation and maintenance, optimization of the design of rigid and flexible pavements systems,empirical and mechanistic stochastic structural subsystems, utility theory,serviceability concept, cost studies, traffic delay and maintenance optimization systems.

CIV 421E Design of Bricks Buildings (2 +2)

Brick propertied and industry - propertied and industry of lime for bricks buildings -normal stresses and shear stresses in bricks buildings.

CIV 422E Design of Shell structures (2 +2)

Forces and stresses affecting the shell structures -analysis of shell structures-design of shell structures.

CIV 423E Reinforced Concrete Structures (2 +2)

Analysis and design of concrete structural systems including two-way floor systems.slender columns,members subjected to torsion, structural walls and connections.Applications of computer-aided design programs.Use of design code provisions.Design projects.

CIV 424E Land Transportation Engineering (2 +2)

Principles of highway and railway planning, design and operations, design of location and route layout, sections and intersections, drainage and earthwork and pavements, finance and economics, construction and maintenance.

CIV 425E Professional Issues in Design and Egyptian Code for Structures (2 +2)

Multidisciplinary team design experience including consideration of codes-Regulations - alternate solutions- economic factors-Sustainability-Constructability – reliability - Aesthetics in solution of a civil or environmental engineering problem - Professional and ethics in the practice of engineering.

CIV 426E Hybrid and Composite structures (2 +2)

Behavior and design of hybrid and composite structural members, connections and systems,including composite frame construction, structural walls systems and braced frames, design of advanced fiber cementitious materials and applications in new and deficient structural systems, fiber reinforced polymers (FRP) for structural repair and retrofit.

CIV 427E Engineering of roads and airports (2 +2)

Structural design of roads - Properties and soil tests in roads and airports - Properties of paving materials - Analysis of stresses in paving layers - Design thickness of layers

Paving – Methods of road construction - engineering design of roads - components of the road sector – design Horizontal curves - Design of curved curves - Design of intersections - Design of airports - Components

Airports - Design of air corridors.