

General and Construction Sites In particular, Site Investigation Methods in Rocks and Soils, Case Studies.

PREREQUISITE: CT 151 & CT 163

CT 375: Rock Mechanics, 3 (2, 1, -)

Physical basis of strength in rock. Elastic, plastic, brittle and creep behavior. Measurement of static and dynamic properties in field and laboratory. Application of rock mechanics to civil engineering problems. General characteristics of Local limestone.

PREREQUISITE: CT 151 & CT 222.

CT 379: Selected Topics in Geotechnical Engineering, 3 (2, 1, -)

A Selection Made From: Soil Stabilization Using Conventional Stabilizers, such as Cement, Bituminous Materials & Chemicals. Soil Improvement by: Compaction, Vibroprobes, Preloading etc. Desert Soil Characteristics Including Swelling & Shrinkage, Desiccation, Collapse, Erosion & Cementation. Salt-bearing Soils, Cemented Sands & Wind-Blown Sands. Influence of water Table Fluctuation on Soil Properties. Soil Properties by Field Tests. Use of Geomembranes & Geotextiles.

PREREQUISITE: CT 163

CT 381: Advanced Technologies for Construction, 3 (2, 1, -)

Advanced technologies including microcomputer systems, management information systems, automation technologies, computer aided design, & expert systems & their application in the construction industry. Overview of systems acquisition, communications, & networking.

PREREQUISITE: CT 223 & CT 215

CT 383: Construction Management, 3 (2, 1, -)

The nature of construction industry. Construction administration. Factors affecting the selection of construction equipment. Construction equipment & methods, work improvement in construction management. Cost estimation. Concrete forms. Safety in construction.

PREREQUISITE: CT 200

CT 385: Selected Topics in Construction Engineering, 3 (2, 1, -)

Selection made from: Construction Planning, Scheduling & Control. Construction Contract Documents, Specifications, Agreements & General Conditions. Construction Equipment. Erection Methods, Design & Application of Concrete For work. Construction Materials with Emphasis on Concrete. Value Engineering & Logistics. Selected Case Studies.

PREREQUISITE: MNG 101 & CT 211.

FTR 101: Field Training (1), 5 (-, -, 30)

Training shall concentrate on brick work, using different types of blocks & different techniques. The student shall try to apply such techniques manually if possible. The student shall be trained to use the surveying equipment, which he studied at the institute, to prepare & plan the site.

PREREQUISITE: ITR 001

FTR 102: Field Training (2), 5 (-, -, 30)

The student shall be trained on how to execute reinforced concrete buildings; concrete mix design on site; the use of different mixing methods, such as manual, mechanical & the manner to employ the central mix station technique. Also the student shall be trained to design & construct the shuttering for different concrete elements.

PREREQUISITE: FTR 101

FTR 201: Field Training (3), 5 (-, -, 30)

The student shall be trained to control the work & manage its different stages on site with the following: Communicate with different types of workers; Reviewing quantities, prices & quality control; Training to read drawings & apply it on site, Planning & management of the site to guarantee to finish all works on time.

PREREQUISITE: FTR 102

FTR 202: Field Training (4), 5 (-, -, 30)

The student shall be trained to execute the following: Prepare design calculation sheets; Prepare design drawings & working details to be used on site; Prepare all notes related to the works to guarantee the execution of all works according to project specifications.

PREREQUISITE: FTR 201

DEPARTMENT OF CIVIL ENGINEERING

Chairman : Ahmed Azmy

Staff Members : Ahmed El-Abbasy, Mostafa Abd El-latif, Ibrahim Abd El-Maksoud, Essam Khalifa, Fadia Salem, Mousa Sobh, Ayman Nassar , Mohammed Al-Shaer, Saied Othman, Mostafa Abd El-Aziz, Faten Abd El-Ghaffar, Khalid Abd El-Magid, Yasser Khairy, Sherif Hussien, Rasha El-Gohary.

The Department of Civil Engineering administers a five-year program designed to develop the professional competence of a diverse student body &, by breadth of study, to prepare students for the practical solution of the technical problems of society while considering the ethical, social and economic implications of their work. As one of the oldest professions in history, Civil Engineering encompasses a broad array of specialized fields within the three general disciplines which are: (1) structural & construction engineering, (2) public works including environmental engineering & (3) hydraulics & water resources engineering. The curricula in Civil Engineering provide a balanced program in mathematics, basic sciences, engineering sciences, engineering design & social sciences & humanities.

The department grants its graduating students the degree of Bachelor of Science in Civil Engineering, after completion of 211 credit units, including 44 credit units in the preparatory program, in approximately five years. A Diploma may be earned after completion of 127.5 credit units in a minimum of three years, including the preparatory year.

Graduation Requirements

Engineering students need to complete 44 credits in the preparatory year consisting mainly of basic sciences, languages & introductory technical courses of general engineering nature. The Civil Engineering student is required to complete an additional 83.5 credit units to obtain a diploma or an additional 167 credit units to earn a Bachelor Degree in Civil Engineering.

Facilities & Laboratories

The Department of Civil Engineering maintains several laboratories used by faculty members in carrying out their

teaching duties. These laboratories are:

- Concrete Testing Laboratory
- Material Testing Laboratory
- Soil Mechanics Laboratory
- Structural Engineering Demonstration Laboratory
- Surveying Laboratory
- Hydraulics Laboratory
- Computer Facilities

In the following is a brief description of each of these Laboratories:

Concrete Testing Laboratory

The lab is fitted with equipment for testing concrete mixes & reinforced concrete in fresh & hardened states, as well as, equipment for non-destructive testing of concrete. The lab is also equipped with a 2000 KN compression machine, concrete test hammer, concrete cover meter for locating reinforcement bars, concrete mixers, vibrating tables, an accelerated curing tank, a core drilling machine, gradation sieve sets and other miscellaneous pieces of equipment.

Material Testing Laboratory

The lab is fitted with equipment for testing building materials: Aggregates, cements, steel bars, bricks, stones, etc.

Soil Mechanics Laboratory

This lab contains equipment for soil classification tests, compaction tests, triaxial tests for soils and rocks, direct shear tests, permeability tests, consolidation and swelling tests. Other pieces of equipment are available for measuring bearing capacity and moisture content in addition to an assortment of ovens and measuring scales.



Structural Engineering Laboratory

In this lab, experiments can be performed on small models to demonstrate shear, bending and deformation of beams, bending and deformation of frames, forces and deformation of trusses and buckling of structural elements. The lab is equipped with a beam apparatus, truss apparatus with 5 KN loading capacity, frame apparatus and strut apparatus, in addition to various sensors, strain gauges, data loggers and software packages. The lab serves courses in structural analysis and mechanics.

Surveying Laboratory

This lab offers capabilities for surveying, photogrammetry, remote sensing and land information systems for instruction and research. Equipment includes total stations, electronic theodolites, electronic distance measuring devices, ordinary and precise levels, an electronic data terminal and several supporting miscellaneous equipment.

Hydraulics Laboratory

The lab is equipped with a fourteen meter flume that can be used for open channel flow & demonstration of hydraulic jump, uniform channel flow, energy / depth & depth-discharge relationships, flow over different types of control sections, supercritical and subcritical flows and water surface profiles. The lab also includes several hydraulic benches fitted with various accessories for experimentation with water flow.

Computer Facilities

The department runs a computation facility equipped with numerous IBM compatible desk-top computers as well as printers, plotters and scanners. This facility is made available to the students as well as teaching staff members and is supplied with a broad range of software packages including word processing, computer - aided drafting and design, spread sheets, database as well as specialized technical programs for analysis and design in the various fields of civil engineering.

CIVIL ENGINEERING DEPARTMENT PROGRAM

DIPLOMA STAGE (83.5 UNITS)

I) Compulsory Courses (81.5 Units)

1) Basic Courses: (13 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
MTH 101	Mathematics (C)	MTH 002	3	2	2	-
ENG 199	Mechanics for Civil Eng.	ENG 022	3	2	2	-
MTH 102	Mathematics (D)	MTH 101	3	2	2	-
CT 151	Eng. Geology		2	2	-	1
PHY 106	Physics (C)	PHY 002	2	2	2	-

2) Engineering Courses: (54 units)

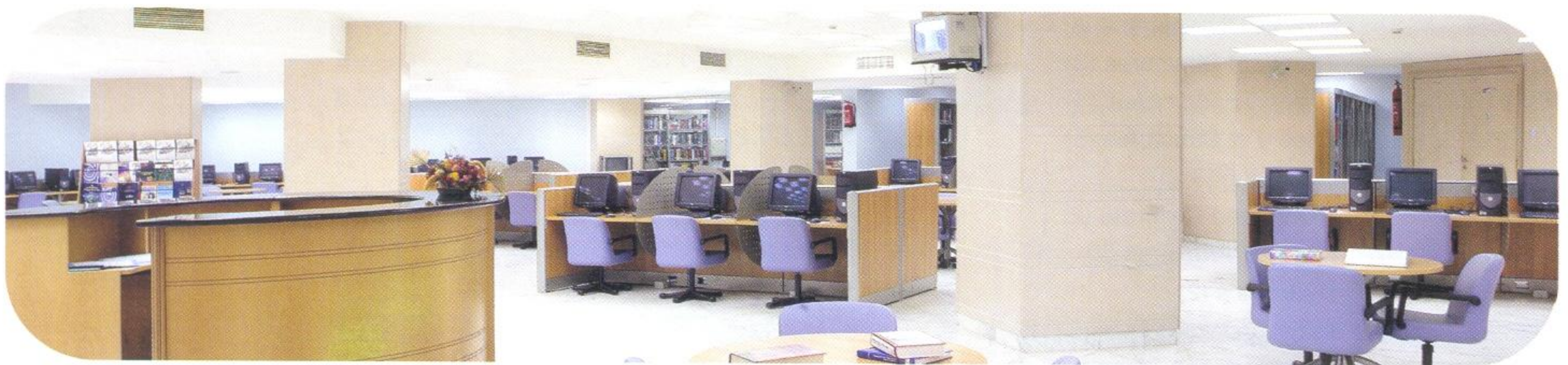
Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
CT 153	Theory of Structures (1)	ENG 199 & MTH 002	3	2	2	-
CT 152	Civil Eng. Drawing (1)	ENG 004	1	-	-	4
CT 155	Surveying (1)	MTH 002	4	3	2	1
CT 112	Theory of Structures (2)	CT 153	3	2	2	-
CT 156	Civil Eng. Drawing (2)	CT 152	1	-	-	4
CT 111	Properties & Testing of Materials (1)		4	3	1	1
CT 114	Properties & Testing of Materials (2)	CT 111	3	3	-	2
CS 199	Computer Programming for Civil Eng.	CS 002	2	1	-	4
CT 191	Mechanical & Electrical Eng.	PHY 106	2	2	-	1
CT 104	Fluid Mechanics	ENG 199 & MTH 002	3	3	1	1
CT 142	Properties & Testing of Materials (3)	CT 153	3	2	2	-
CT 113	Building Construction		2	2	-	1
CT 121	Reinforced Concrete (1)	CT 112 & CT 114 & CT 152	3	3	1	-
CT 122	Metallic Structures (1)	CT 112 & CT 152	3	2	2	-
CT 123	Soil Mechanics (1)	CT 151	3	2	1	1
CT 170	Surveying (2)	CT 155	3	3	-	3
CT 161	Hydraulics (1)	CT 104	3	3	1	1



CT 154	Irrigation & Drainage	CT 161	4	3	-	2
CT 163	Soil Mechanics (2)	CT 123	2	2	-	2
CT 157	Diploma Project	Department Approval	2	1	-	3

3) Humanities and Language Courses: (4.5 units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
LNG 101	English Language (C)	LNG 002	1	-	-	3
ENG 151	Engineering Economy		1	2	-	-
MNG 101	Principles of Management		1	-	2	-
PHE 101	Physical Education & Activities (C)	PHE 002	0.5	-	-	3
PHE 102	Physical Education & Activities (D)	PHE 101	0.5	-	-	3
PHE 103	Physical Education & Activities (E)	PHE 102	0.5	-	-	3



4) Field Training: (10 units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
FTR 101	Field Training (1)	ITR 001	5	-	-	30
FTR 102	Field Training (2)	FTR 101	5	-	-	30

II) Elective Humanities & Language Courses (2 units Required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
HUM 102	Modern Egyptian History		1	2	-	-
HUM 103	Islamic Civilization (I)		1	2	-	-
HUM 104	Arabic Literature		1	2	-	-
LNG 102	Technical English (A)	LNG 101	1	-	-	3
LNG 103	German Language (A)		1	-	-	3
LNG 104	French Language (A)		1	-	-	3

BACHELOR STAGE (83.5 Units)

I) Compulsory Courses (71.5 units)

1) Basic Courses: (5 units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
MTH 103	Numerical Methods	MTH 101	3	2	2	-
MTH 105	Statistical methods	MTH 101	2	2	2	-

2) Engineering & Technology Courses: (54 units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
CT 200	Project Management for Civil Eng.	MNG 101	1	1	-	3
CT 211	Theory of Structures (3)	CT 112	3	2	2	-
CT 212	Theory of Structures (4)	CT 211	2	3	2	-
CT 213	Theory of Structures (5)	CT 212 & CS 199	2	2	1	2
CT 277	Surveying (3)	CT 170	3	3	-	1
CT 221	Reinforced Concrete (2)	CT 121	3	3	-	3
CT 215	Metallic Structures (2)	CT 122 & CT 211	3	3	3	-
CT 262	Hydraulics (2)	CT 161	2	2	1	1
CT 264	Irrigation Works Design (1)	CT 154 & CT 221 & CT 156	2	3	2	-
CT 253	Transportation Planning & Traffic Eng.	MTH 105 & CT 155	3	3	-	2
CT 223	Reinforced Concrete (3)	CT 221 & CT 211	2	2	2	-
CT 251	Inland Navigation & Harbor Eng.	CT 161	3	3	2	-
CT 231	Highway & Airport Eng.	CT 253 & CT 123	3	3	2	1
CT 271	Railway Eng.	CT 253	3	3	2	-
CT 263	Water Supply & Sewerage Systems	CT 262	3	3	2	-
CT 216	Specifications, Bids & Contracts	CT 113 & CT 121	1	-	2	-
CT 224	Reinforced Concrete (4)	CT 223	2	2	2	-
CT 225	Metallic Structures (3)	CT 215	2	2	2	-
CT 265	Irrigation Works Design (2)	CT 264	2	2	2	1
CT 222	Foundation Eng.	CT 163 & CT 121	4	3	3	-
CT 274	Water & Waste Water Treatment	CT 161	2	3	2	-
CT 252	Civil Eng. Project	Department Approval	3	-	-	6

3) Humanities & Language Courses: (2.5 units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
LNG 201	English Language (D)	LNG 101	1	-	-	3
PHE 201	Physical Education & Activities (1)	PHE 103	0.5	-	-	3
PHE 202	Physical Education & Activities (2)	PHE 201	0.5	-	-	3
PHE 203	Physical Education & Activities (3)	PHE 202	0.5	-	-	3

4) Field Training: (10 units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
FTR 201	Field Training (3)	FTR 102	5	-	-	30
FTR 202	Field Training (4)	FTR 201	5	-	-	30

II) Elective Courses (12 units)**1) Basic Courses: (5 units required)**

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
MTH 201	Mathematics (E)	MTH 102	3	2	2	-
MTH 203	Numerical Analysis	MTH 103	3	2	2	-
MTH 204	Statistical Analysis	MTH 101	3	2	2	-
ENG 221	Modeling & Simulation	MTH 101	2	2	-	-

2) Engineering Courses: (4 units required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
CT 254	Technical Report Writing	CT 216 & LNG 201	2	2	1	-
CT 301	Hydraulic Structures	CT 161	2	2	1	-
CT 303	Coastal & Harbor Eng.	CT 161	2	2	1	-
CT 305	Surface & Ground Water Hydrology	CT 262	2	2	1	-
CT 307	Irrigation & Drainage Eng.	CT 154	2	2	1	-
CT 309	Selected Topics in Water Resources	TBA	2	2	1	-
CT 311	Water Pollution Control Processes	CT 274	2	2	1	-
CT 313	Environmental Eng.	CT 274	2	2	1	-
CT 315	Wastewater Reclamation & Reuse	CT 274	2	2	1	-
CT 317	Industrial Wastes	CT 274	2	2	1	-
CT 319	Selected Topics in Environmental Eng.	CT 274	2	2	1	-
CT 321	Airport Eng.	CT 231	2	2	1	-
CT 323	Traffic Eng.	CT 253	2	2	1	-
CT 325	Pavement Design	CT 231	2	2	1	-

CT 327	Transportation Planning	CT 253	2	2	1	-
CT 329	Selected Topics in Transportation Eng.	TBA	2	2	1	-
CT 331	Geodetic Surveying & Theory of Errors	CT 277	2	2	1	-
CT 333	Spherical Astronomy	TBA	2	2	1	-
CT 341	Advanced Strength of Materials	CT 213	2	2	1	-
CT 345	Computer Applications in Structural Eng.	CT 213 & CT 121 & CT 122 & CS 199	2	2	1	-
CT 347	Plastic Structural Analysis	CT 211	2	2	1	-
CT 349	Selected Topics in Structural Analysis	CT 212 & CS 199	2	2	1	-
CT 351	Pre-stressed Concrete	CT 223	2	2	1	-
CT 353	Advanced Reinforced Concrete	CT 223	2	2	1	-
CT 355	Bridge Eng.	CT 224 & CT 225	2	2	1	-
CT 357	Quality Control of Construction Material	MTH 105 & CT 142	2	2	1	-
CT 359	Design of Building Systems	CT 223 & CT 215	2	2	1	-
CT 361	Earthquake Resistant Design	CT 223 & CT 215	2	2	1	-
CT 363	Structural Maintenance & Retrofitting	CT 223 & CT 215	2	2	1	-
CT 364	Selected Topics in Concrete Design	CT 223 & CT 211	2	2	1	-
CT 371	Earth Dams	CT 222	2	2	1	-
CT 373	Geology & Site Investigation	CT 163 & CT 151	2	2	1	-
CT 375	Rock Mechanics	CT 151 & CT 222	2	2	1	-
CT 379	Selected Topics in Geotechnical Eng.	CT 163	2	2	1	-
CT 381	Advanced Technologies for Construction	CT 223 & CT 215	2	2	1	-
CT 383	Construction Management	CT 200	2	2	1	-
CT 385	Selected Topics in Construction Eng.	MNG 101 & CT 211	2	2	1	-

3) Humanities & Language Courses: (3 units required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
MNG 221	Engineering Economy (II)	ENG 151	1	2	-	-
MNG 222	Behavior Discipline		1	2	-	-
MNG 223	Economics of Management		1	2	-	-
HUM 201	History of Egypt Tech. Development		1	-	2	-
HUM 202	English Literature	LNG 201	1	-	-	3
HUM 203	Trade Law		1	2	-	-
HUM 204	Industrial Psychology		1	2	-	-
HUM 205	Islamic Civilization (II)		1	2	-	-
HUM 206	Islamic Studies		1	2	-	-
LNG 202	Technical English (B)	LNG 102	1	-	-	3
LNG 203	German Language (B)	LNG 103	1	-	-	3
LNG 204	French Language (B)	LNG 104	1	-	-	3



CIVIL ENGINEERING COURSES DESCRIPTION

CT 104: Fluid Mechanics, 3 (3, 1, 1)

Properties of Fluids: Statics of Fluids, Equation of One Dimension. Flow over Notches and weirs, Rotary Motion of Fluids, Flow of Viscous Fluids. Surface Resistance; Introduction to the Boundary Layer Theory; Resistance in Pipes and Conduits.

PREREQUISITE: ENG 199 & MTH 002

CT 111: Properties & Testing of Materials (1), 4 (3, 1, 1)

Engineering materials; properties and testing of materials; specifications; building stones; bricks; lime; gypsum; plastering; painting; timber; testing machines; strain gauges; tension test; compression test; bending test; shear test; hardness test; impact; non destructive tests; metallic materials.

CT 112: Theory of Structures (2), 3 (2, 2, -)

Types of structures, supports & loads. Idealization of structures & loads. Geometric stability & determinacy, analysis of determinate trusses, beams, plane frames & arches; reaction computation; axial force, shear force & bending moment diagrams. Internal force releases. Load-shear-moment relationships. Differential equation of elastic curve. Deflections by integration, moment-area, conjugate-beam & virtual work methods. Influence lines of determinate structures.

PREREQUISITE: CT 153

CT 113: Building Construction, 2 (2, -, 1)

Building construction techniques; conventional methods, construction automation, Prefabrication methods. Architectural drawings & details, construction sequences of buildings, foundations, insulation, staircases, roofs, walls, paints, floorings, electrical and Plumbing services.

CT 114: Properties & Testing of Materials (2), 3 (3, -, 2)

Aggregates for concrete: types, properties, grading tests.

Cement: manufacturing, properties, special types of cement, tests. Concrete: constituents, admixtures, proportioning, manufacturing - fresh concrete, hardening, stage-hardening concrete, tests.

PREREQUISITE: CT 111

CT 121: Reinforced Concrete (1), 3 (3, 1, -)

Fundamentals & design theories based on ultimate strength design & elastic concepts. Egyptian & ACI Code requirements. Load factors. Analysis & design of reinforced concrete members subject to flexure, shear & diagonal tension in accordance to strength method. Bond, anchorage & development length. Deflection & crack control.

PREREQUISITE: CT 112 & CT 114 & CT 152

CT 122: Metallic Structures (1), 3 (2, 2, -)

Fundamentals and principles necessary for the design of steel structures. Egyptian and American codes. Steel properties, Loads, Design of Tension members, Design of Bolted Connections, Design of Welded Connections & Design of Compression members. Structural systems including Trusses.

PREREQUISITE: CT 112 & CT 152

CT 123: Soil Mechanics (1), 3 (2, 1, 1)

Soil Formation, Physical properties; Hydraulic properties and permeability, Stress Distribution; Consolidation; Shear strength; Soil Exploration and Soil Testing.

PREREQUISITE: CT 151

CT 142: Properties & Testing of Materials (3), 3 (2, 2, -)

Metals: Hardness, Testing in Impact, Fatigue & Creep, Nondestructive tests, welding: Types, Defects & Testing. Selected topics from: Atomic Arrangements, Structural imperfections, Single phase metals, Binary alloys, & Iron carbon alloys, Heat treatment



of Carbon steels. Cast iron, copper & copper alloys, Experimental Stress Analysis.

PREREQUISITE: CT 153

CT 151: Engineering Geology, 2 (2, -, 1)

Sources and processing for both natural & synthetic aggregates needed for construction, minerals & rock types. Structural geology & influence of geological features on engineering works.

CT 152: Civil Engineering Drawing (1), 1 (-, -, 4)

Metallic Structures: Columns & Bases, Trusses, Built - up Sections, Joints. Concrete Structures: Reinforcement details.

PREREQUISITE: ENG 004

CT 153: Theory of Structures (1), 3 (2, 2, -)

Stress, strain, Hook's law. Modulus of elasticity, modulus of rigidity & Poisson's ratio. Statical determination of axial force, shear force, bending moment & torque in bars, beams & circular shafts. Load-shear-moment relationship in beams. Section Kinematics; strain & stress distribution & their resultants. Normal & shear stress distributions in beams of different shapes. Transformation of stress & strain, Mohr's circle. Spherical & cylindrical pressure vessels. Elastic buckling of columns.

PREREQUISITE: ENG 199 & MTH 002

CT 154: Irrigation & Drainage, 4 (3, -, 2)

Water Resources, Meteorology, Hydrology, Application to Nile Projects, Modern Irrigation Systems. Basin & Perronial Systems of Irrigation. Drainage with Introduction to Underground water.

PREREQUISITE: CT 161

CT 155: Surveying (1), 4 (3, 2, 1)

Introduction to surveying. Different Types of Scales. Mapping Using Linear Measurements. Compass Surveying & Traverse Computations Area Determination. Leveling: instrumentation, method of calculation, cross & longitudinal sections, contouring earth work.

PREREQUISITE: MTH 002

CT 156: Civil Engineering Drawing (2), 1 (-, -, 4)

Civil & Irrigation structures: Earth slopes, Retaining walls, Some Civil & Irrigation Structures, Introduction to Computer aided Drafting.

PREREQUISITE: CT 152

CT 157: Diploma Project, 2 (1, -, 3)

The student selects one of several subjects offered including computer aided drafting, quantity take-off for engineering projects, etc....

PREREQUISITE: DEPARTMENT APPROVAL

CT 161: Hydraulics (1), 3 (3, 1, 1)

Pipelines & pipe systems; hydraulic models & similitude; flow in open channels; hydraulic structures & flow measurements. Hydraulic pumps & turbines.

PREREQUISITE: CT 104

CT 163: Soil Mechanics (2), 2 (2, -, 2)

Soil Compaction: Laboratory & Field Methods, stability of slopes, Seepage through soil, Dewatering, Introduction to Foundation Engineering: Shallow Foundations, Bearing Capacity, & Settlement Analysis.

PREREQUISITE: CT 123

CT 170: Surveying (2), 3 (3, -, 3)

Theodolite: temporary setting up, measuring of horizontal and vertical angles, permanent adjustment of theodolite, errors in measuring horizontal and vertical angles. Indirect Methods for Distance Measurement: stadia Method, tangent Methods, substance bar. Setting out of Horizontal and Vertical Curves.

PREREQUISITE: CT 155

CT 191: Mechanical & Electrical Engineering, 2 (2, -, 1)

Mechanical: Engineering principles of equipment used in civil engineering work, excavation equipment, concrete mixing,

equipment for asphalt making and paving, pumps, rates of operation and methods of control, rates of moving and handling of materials, maintenance methods.

Electrical: Electrical Circuits for Direct and Alternating current, Three phase circuits, Distribution of Electric power, Electric motors and their applications in civil Engineering, Transformers & their use, Electronic Circuits in civil Engineering applications.

PREREQUISITE: PHY 106

CT 200: Project Management for Civil Engineering, 1 (1, -, 3)

Definition of engineering projects, Modeling of projects, tasks and subtasks as activity, networks, Principles and practices of critical path methodology under conditions of certainty (CPM) and uncertainty (PERT). Resource loading & cost crashing concepts with & without resource limitations. Use of computer programs in managing engineering projects.

PREREQUISITE: MNG 101

CT 211: Theory of Structures (3), 3 (2, 2, -)

Analysis of indeterminate structures; trusses, beams, plane frames and arches. Axial force, shear force & bending moment diagrams. Method of consistent deformations, prestrain & support movement effects. Slope deflection method. Reciprocal law. Moment distribution; sway consideration. Analysis of non-prismatic members.

PREREQUISITE: CT 112

CT 212: Theory of Structures (4), 2 (3, 2, -)

Strain due to axial force, bending moment, shear force & torsion. Energy & complementary energy concepts. Virtual work method; linear & nonlinear systems. Castigliano's theorem. Principle of minimum potential energy. Differential equations of beams and beam-columns in static and dynamic equilibrium. Finite difference and Rayleigh-Ritz method of solution; approximate methods of structural analysis; portal and cantilever methods; sketching of deflected shapes. Influence lines of indeterminate structures; trusses and beams, Introduction to Matrix Methods of Analysis.

PREREQUISITE: CT 211

CT 213: Theory of Structures (5), 2 (2, 1, 2)

Matrix Stiffness Analysis, element & structural stiffness assembly, development of computer programs for linear elastic structural analysis.

PREREQUISITE: CT 212 & CS 199

CT 215: Metallic Structures (2), 3 (3, 3, -)

Basic behavior of steel structures, including both the component parts & the completed structures. Allowable stress Design & Plastic Design concepts. Laterally supported & unsupported Beams, Continuous Beams, Composite Design, Beam - Column Elements, Bracing Systems, Connection Detailing & stiffening. Structural systems include Rigid Frames, Floor Systems & Buildings.

PREREQUISITE: CT 122 & CT 211

CT 216: Specifications, Bids & Contracts, 1 (-, 2, -)

Introduction to the legal & contractual aspects of the construction industry. Techniques for coordinating decisions and actions in the design & construction of engineering projects.

Bidding strategies & procedures. Different types of Specifications. Contract documents.

PREREQUISITE: CT 113 & CT 121

CT 221: Reinforced Concrete (2), 3 (3, -, 3)

Design of floor systems, one way, two ways, ribbed, hollow & flat slabs. Design for torsion, combined shear & torsion by the strength method. Design of continuous beams. Moment redistribution for minimum rotation capacity. Design of columns under axial & eccentric loading, short & long columns, Staircases, Footings.

PREREQUISITE: CT 121

CT 222: Foundation Engineering, 4 (3, 3, -)

Types of foundation systems & design criteria, design of shallow foundations & deep foundations, construction methods, effects of construction on nearby structures, special topics & case studies.

PREREQUISITE: CT 163 & CT 121



CT 223: Reinforced Concrete (3), 2 (2, 2, -)

Rectangular and circular tanks & fluids containers, Underground, on the ground & elevated tanks, Design end working drawings of beams, frames, arches, trusses & saw tooth roofs .

PREREQUISITE: CT 221, CT 211

CT 224: Reinforced Concrete (4), 2 (2, 2, -)

Prestressed concrete elements: Introduction, stresses under working loads, ultimate loads & flexural strength, shear, camber & deflection, dimensioning. Tall buildings under lateral loads, lateral load resisting systems. Repair of concrete structures. Special structures.

PREREQUISITE: CT 223

CT 225: Metallic Structures (3), 2 (2, 2, -)

Fundamentals & Principles of Steel Bridges. Egyptian code. Distinctive features, Analysis procedure & Design of the most widely used Bridge Systems. Loads, Deck Systems & Structural Systems. Structural Systems include Truss Bridges, Plate Girder Bridges, Parallel Girder Systems, Stiffened Suspension Bridges & Cable Stayed Bridges. Additional topics include orthotropic plate

decks, grid reinforced decks, bracing systems, structural details & elastomeric bearings.

PREREQUISITE: CT 215

CT 231: Highway & Airport Engineering, 3 (3, 2, 1)

Basic Design Control: Motion of Vehicles, Sight Distances, Alignment, Intersections. Earthwork: Soil Classification, Soil Stabilization, Flexible & Rigid Pavements, Highway Drain. Introduction to Airport Engineering.

PREREQUISITE: CT 253 & CT 123

CT 251: Inland Navigation & Harbor Engineering, 3 (3, 2, -)

Types of Harbors, Studies of the Natural Phenomena, Quays. Hydraulic Model Studies, Planning of Harbors, Light Houses & Guiding Signals. Breakwaters, Spillways, Dry Docks. Inland Navigation.

PREREQUISITE: CT 161

CT 252: Civil Engineering Project, 3 (-, -, 6)

An independent research and/or design project to be carried

out under the supervision of a staff member, running over two semesters in the fifth year. The results must be submitted in the form of a thesis, judged & marked by a jury of at least two staff members.

PREREQUISITE: DEPARTMENT APPROVAL

CT 253: Transportation Planning & Traffic Engineering, 3 (3, -, 2)

Principles of Transportation Planning & Traffic Engineering, Road-User & Vehicle Characteristics. Travel Time, Speed & Volume Studies, Highway Capacity, Pedestrian, Parking & Accident Studies, Traffic Control Devices, Grade Separations & / or Interchanges.

PREREQUISITE: MTH 105 & CT 155

CT 254: Technical Report Writing, 2 (2, 1, -)

Study of basic organization, style & mechanics of technical & administrative reports. Practice in assignments such as technical descriptions, proposals, recommendations, & instruction. Emphasis on planning, organizing, & writing reports; design of visual aids; elements of technical editing & preparation of final drafts.

PREREQUISITE: CT 216 & LNG 201

CT 262: Hydraulics (2), 2 (2, 1, 1)

Fluid flow around immersed objects, unsteady flow in open and closed conduits, engineering applications.

PREREQUISITE: CT 161

CT 263: Water Supply & Sewerage Systems, 3 (3, 2, -)

Quantity of water & wastewater. Design of water supply networks including pumping stations & storage capacity. Design of sanitary & storm sewers, including appurtenances.

PREREQUISITE: CT 262

CT 264: Irrigation Works Design (1), 2 (3, 2, -)

Canals & Drains: Classification, Synoptic Diagrams, Design of cross & Longitudinal Sections. Culverts: Hydraulic & Structural Design.

Small Bridges for Irrigation Works: Hydraulic & Z Structural

Design.

Intermediate & Tail Escapes.

PREREQUISITE: CT 221 & CT 154 & CT 156

CT 265: Irrigation Works Design (2), 2 (2, 2, 1)

Heading Up Structures: Overflow & Standing Wave Weirs, Head & Partial Regulators, Barrages. Navigation Structures: Locks, Gates, Navigation Connections. Crossing Structures: Siphons, Aqueducts, & Tunnels. Storage Structures: Dams (Aswan Dam, High Dam).

PREREQUISITE: CT 264

CT 271: Railway Engineering, 3 (3, 2, -)

Dynamics of Rolling, Track Alignment, Railway Branches. Design and Details of Track Parts. Stations and Yards. Signals, Maintenance, Renewing.

PREREQUISITE: CT 253

CT 274: Water & Wastewater Treatment, 2 (3, 2, -)

Water quality & standards. Water treatment, including clarification, filtration, disinfection & softening. Characteristics of wastewater. Sewage treatment, including solids removal & biological processes.

PREREQUISITE: CT 161

CT 277: Surveying (3), 3 (3, -, 1)

Introduction to Theory of Errors & Error Analysis of Surveying Measurements. Coordinate Systems & Transformations. Coordinate Computations: polar method, intersection, & resection. Modern Methods for Distance Measurements: Electronic Distance Measurement (EDM) & total stations. Setting out of Engineering Projects.

PREREQUISITE: CT 170

CT 301: Hydraulic Structures, 3 (2, 1, -)

Design of inlet & outlet structures for irrigation canals. Cross

structures, culverts, siphons & aqueducts. Energy dissipation below hydraulic structures. Spillways. Design of dams.

PREREQUISITE: CT 161

CT 303: Coastal & Harbor Engineering, 3 (2, 1, -)

Water Waves. Definition, analysis, refraction, diffraction & reflection of waves. Measurements of waves. Coastal currents & tides. Motion of sediment along coasts. Surveying of coastal areas & collection of data. Harbors, type, selection of site & its constituents for various purposes. Breakwaters & jetties, design & maintenance. Wharf design, shipway & dry docks. Shore protection.

PREREQUISITE: CT 161

CT 305: Surface & Ground-Water Hydrology, 3 (2, 1, -)

Review of hydrologic cycle elements. Computation of average precipitation stream flow & stage discharge relationship. Hydrographic. Analysis, infiltration indices, hydrographic of basin out flow. Unit hydrographic. Storage routing, natural channels & reservoirs. Probability concepts in design recurrence interval. Flood frequency analysis & flow direction curves. Ground water, hydraulics of wells, boundary effects, well construction & maintenance.

PREREQUISITE: CT 262

CT 307: Irrigation & Drainage Engineering, 3 (2, 1, -)

Soil water relations. Planning irrigation & drainage schemes. Water requirement. Methods of irrigation. Design of canals & drains, subsurface drainage, introduction to the design of irrigation structures.

PREREQUISITE: CT 154

CT 309: Selected Topics in Water Resources, 3 (2, 1, -)

Selected Topics among the Following: Unsteady Closed Conduit Flow, Non-uniform Open Channel Flow, Hydraulic Machinery (pumps & turbines), Mechanic of Sediment Transport, Turbulent Jets & Diffusion Processes, Saturated & Unsaturated Flow through Porous Media, Hydraulic structures.

PREREQUISITE: TBA.

CT 311: Water Pollution Control Processes, 3 (2, 1, -)

Fundamental theories of water pollution control. Processes & their application to water & wastewater treatment; gas transfer, sedimentation, coagulation & flocculation, filtration, aerobic & biological oxidation processes.

PREREQUISITE: CT 274

CT 313: Environmental Engineering, 3 (2, 1, -)

Introduction to pollution problems & impact of development on the Environment. Liquid waste disposal: overland, in streams, lake & sea Solid wastes: management, characteristics, storage, collection, disposal, & recycling. Air pollution: sources, pollutants, effects & control. Noise pollution: sources, effect & control.

PREREQUISITE: CT 274

CT 315: Wastewater Reclamation & Reuse, 3 (2, 1, -)

Wastewater reuse as an essential part of water resources management. Characteristics of municipal secondary effluents & quality standards for reuse. Reclaimed Wastewater use in agricultural, landscaping, recreational & industrial developments. Industrial wastes: characteristics, reclamation & recycling. Combining of treatment units to achieve the required water quality standards.

PREREQUISITE: CT 274

CT 317: Industrial Wastes, 3 (2, 1, -)

Quality & quantity of water supplies to, & Wastes from industries. Methods of treatment & disposal of industrial, wastes most common in the area.

PREREQUISITE: CT 274

CT 319: Selected Topics In Environmental Eng., 3 (2, 1, -)

Water Purification Processes in Natural Systems, Planning, Feasibility Assessment & Site Selection, Basic Process Responses & Interactions, Response of water bodies to Pollution, Sources, Characteristics & Treatment of industrial waste waters. Water Stabilization, Characterization & Methods of Solid waste Disposal, Hazardous Waste Disposal.

PREREQUISITE: CT 274

Strip Methods, Elastic Plastic Analysis, & Analysis of Structures Subjected to Cyclic & Dynamic Loading, Analysis of Multistory Buildings.

PREREQUISITE: CT 212 & CS 199

CT 351: Prestressed Concrete, 3 (2, 1, -)

Birth of Prestressing, Concepts, Methods, Materials & Stresses. Losses. Analysis of Sections. Design of Simple Slabs & Beams for Flexure, Shear and Bond; End Zone & Anchor Zone Stresses. End Block Design, Continuity, Cap Cabling, Cable Profile, Circular Prestressing, Tanks, Design of Poles, Piles, Columns.

PREREQUISITE: CT 223

CT 353: Advanced Reinforced Concrete, 3 (2, 1, -)

Design of members subjected to axial load & biaxial bending, deep flexural members, brackets & corbels. Design for torsion. Design of retaining walls, basement walls, load bearing walls, & shear walls. Yield line analysis of slabs.

PREREQUISITE: CT 223

CT 355: Bridge Engineering, 3 (2, 1, -)

Types and components of bridges. Loads on bridges. Fundamental behavior and practical design of shallow superstructures, with emphasis on slab-on-girder deck systems. Design of composite sections. Bridge substructures. Bridge rating. Use of relevant codes.

PREREQUISITE: CT 224 & CT 225

CT 357: Quality Control of Construction Materials, 3 (2, 1, -)

Construction material specifications & test procedures. Sampling methods, data collection & statistical data distributions. Quality control charts. Development of quality assurance specifications & acceptance plans. Applications on field data.

PREREQUISITE: MTH 105 & CT 142

CT 359: Design of Building Systems, 3 (2, 1, -)

Types, functions & components of building systems; idealization. Initiation of analysis-design process. Estimation of

gravity, wind & earthquake loads. Load pattern combinations. Live load reduction. Force redistribution in R.C. buildings. Design & detailing requirements. Computer application. Group term project.

PREREQUISITE: CT 223 & CT 215

CT 361: Earthquake Resistant Design, 3 (2, 1, -)

Seismicity, Code forces, distribution of shear & moments, dynamic effects, ductility; Seismic design in steel, concrete & masonry. Seismic analysis methods.

PREREQUISITE: CT 223 & CT 215

CT 363: Structural Maintenance & Retrofitting, 3 (2, 1, -)

Repair of concrete structures, causes & positions of cracks, materials used in repair, strengthening of structures & foundation, repair & strengthening of steel structures, seismic retrofitting.

PREREQUISITE: CT 223 & CT 215

CT 364: Selected Topics in Concrete Design & Technology, 3 (2, 1, -)

Design of Special Concrete Mixes, Curing Methods, Admixtures, Fiber-reinforced Concrete, Polymer Concrete. Hot & cold weather Concreting, Concrete Construction in Hot Weather with Special Reference to Middle Eastern Countries. Concrete Deterioration, Maintenance & Repairs. Precast Concrete, Concrete Production & Quality Control.

PREREQUISITE: CT 211 & CT 223

CT 371: Earth Dams, 3 (2, 1, -)

The principles of design & stability analysis. The choice of type of dam. Dam & highway fills. Compaction & water content control. Stress distribution & deformation within the dam & the foundation strata. The circular arc method of stability analysis. Steady seepage & rapid draw down .

PREREQUISITE: CT 222

CT 373: Geology & Site Investigation, 3 (2, 1, -)

Geologic Information Pertinent to Civil Engineering in