2B. Common Courses' Descriptions

2B.1. University Requirements

2B.1.1. University Compulsory

CSC 101	Introduction to Computers	2 CH (2,0,0)
Course Contents	Computer Systems: Introduction, Computer devices: Input, Output, CPU, Auxiliary units, Programs, Processing programs, Applied programs. Manipulating problems and their solution (Algorithms), Applied programs.	
Prerequisite (s)	None	
Textbook	1. Cay S. Horstmann; "C++ for Everyone"; Wiley. 2. Williams; "Using Information Technology"; McGraw hill.	
Lab./Computer work/Project	N/A	

ENG ELE	English Elementary	0 CH (2,0,0)
Course Contents	**ENG A1:** A beginner's English language course that focuses on communicating through the use of frequently used words (hello, goodbye), collocations (talk to, talk about) and expressions (Nice to meet you) while at the same time encouraging writing and listening skills through much practice. Grammar and vocabulary are introduced through reading and listening and further practiced through writing and speaking.	
Prerequisite (s)	Placement into ENG ELE	
Textbook	English Unlimited A1 (Starter) – By Adrian Doff – Cambridge University Press, 2012**.**	
Lab./Computer work/Project	N/A	

ENG KET	English KET	2 CH (2,0,0)
Course Contents	ENG A2: A second tier English language course that focuses on all four skills (Reading, Writing, Listening, and Speaking) through the development of language production and reception. The course further builds upon the foundation of the previous course to reinforce language learning. Vocabulary is drawn from the reading and listening and strengthened with the use of grammar, writing, and speaking. More emphasis is given to fluency to achieve better communication.	
Prerequisite (s)	ENG ELE or placement into ENG KET	

Textbook	English Unlimited A2 – By Alex Tilbury, Theresa Clementson, Leslie Anne Hendra and David Rea – Cambridge University Press, 2012.
Lab./Computer work/Project	N/A

ENG PET	**English PET**	**2 CH (2,0,0)**
Course Contents	**ENG B1:** A third tier English language course that is based on the lexical approach to language learning. This focuses on communication by improving fluency and accuracy through the development of interaction, through speaking and writing. Vocabulary from different topics (e.g. Work and studies), Talking about food and functions (have an interview, plan a meal) provide the reference by which language is introduced and enforced within clear everyday contexts. Writing is developed by looking at a range of texts, by understanding the rules of writing, and by developing confidence through planning and discussions.	
Prerequisite (s)	ENG KET	
Textbook	English Unlimited B1 – By Alex Tilbury, Theresa Clementson, Leslie Anne Hendra and David Rea – Cambridge University Press, 2012.	
Lab./Computer work/Project	N/A	

GEN201	**Practical Training 1**	**0 CH (0,0,0)**
GEN301	**Practical Training 2**	**0 CH (0,0,0)**
GEN401	**Practical Training 3**	**1 CH (0,0,0)**
Course Contents	Practical training is a part of all the educational programs of the Faculty. The overall duration of the training is 240 hours, divided over 3 modules (80 hours each), and should be carried out during two or three summer semesters at one or more engineering facilities (inside or outside Egypt). The training program shall be related to the specialization of the educational program in which the student is registered and must be approved by the scientific department offering the program. The student is eligible to register the first training module after completing the courses of Level Two (or a minimum of 50 CH). The student may practice at most one on-campus training module (80 hours) offered by the Faculty. After completing each module, the student shall submit a report and conduct a presentation to be evaluated by the scientific department. The three training modules are equivalent to 1 CH.	
Prerequisite (s)	Completion of Level 2 (50 CH minimum)	
Textbook	None	
Lab./Computer work/Project	As advised	

PSC 110	Human Rights	2 CH (2,0,0)
Course Contents	This course offers philosophical, legal, and political perspectives on human rights. After a short historical introduction to international human rights, it surveys international human rights treaties, courts, and institutions. Next it turns to topics in human rights theory, covering some contemporary philosophical theories of human rights. The final section explores some human rights problems and controversies such as economic and social rights, group rights, and cultural relativism	
Prerequisite (s)	None	
Textbook	Rhona K. M. Smith.; "International Human Rights"; Oxford.	
Lab./Computer work/Project	N/A	

2B.1.2. University Elective Courses

BSA H01	Administration of Small Projects	2 CH (2,0,0)
Course Contents	The advantages and disadvantages of the small business model, Management and leadership of staff, Recruitment and selection of staff, Decision-making, Delegation of responsibility, Developing the capability of staff, How to document your business starting with the business plan, Taxation for a small business, Communication skills necessary within a small business, Analysis and interpretation of financial statements, How to increase your sales and marketing skills and strategies to develop the business profitability, Developing policies and procedures for the smooth running of the business, Government help for small business .	
Prerequisite (s)	None	
Textbook		
Lab./Computer work/Project	N/A	

ENV 101	Environmental Science	2 CH (2,0,0)
Course Contents	Introduction to environmental science, Survey of environmental issues related to health and disease, Natural resources management, nuclear waste disposal, water resources, Hydrology, energy use and conservation, Land reclamation, Global climate change, and industrial pollution, Environmental legislations.	
Prerequisite (s)	None	
Textbook		
Lab./Computer work/Project	N/A	

HUM H09	Specific Computer Applications	2 CH (2,0,0)
Course Contents	Computer systems, computer process, computer science, software engineer, professional and ethical responsibility, emergent system properties, measurements of system performance & productivity, organizations, people and computer systems, software models, CASE, computer project management, risk managements, concepts of IS, valuable information, classification of information systems, information technology, computer applications in engineering fields & industries.	
Prerequisite (s)	None	
Textbook		
Lab./Computer work/Project	N/A	

PSC 101	Psychology	2 CH (2,0,0)
Course Contents	Definition of psychology, Physiological bases of behavior, Sensation, attention, and perception, Memory, Learning, and training, Manual control, Process control and automation, Psycho physiological correlation with behavior, Biofeedback, Experimental psychology.	
Prerequisite (s)	None	
Textbook	Robert S. Feldman.; "Understanding Psychology"; McGraw Hill.	
Lab./Computer work/Project	N/A	

SCT 101	Scientific Thinking	2 CH (2,0,0)
Course Contents	Scientific thinking is the process of thinking logically, critically and creatively about real, as opposed to imaginary, problems. Students will develop an understanding of the scientific thinking process from a psychological perspective and will develop skill in scientific thinking. Topics will include the psychology of thought, logical operations and fallacies, convergent and divergent thinking, the relationship between language and thought, valid and invalid arguments, logic and probability, decision making and hypothesis testing in the science of psychology.	
Prerequisite (s)	None	
Textbook	Kenneth Hoover.; "The Elements of Social Scientific Thinking"; Cengage.	
Lab./Computer work/Project	N/A	

SOC 101	Sociology	2 CH (2,0,0)
Course Contents	A scientific approach to the analysis of culture, socialization, social organization, the development of society, study of social processes, human groups, social institutions, and the effects of group relations on human behavior.	
Prerequisite (s)	None	
Textbook	Richard T. Schaefer.; "Sociology"; McGraw Hill.	
Lab./Computer work/Project	N/A	

2B.2. Faculty Requirements Course Descriptions

EED160	Computer Programming	2 CH (1,0,2)
Course Contents	Structured program development: problem solving decision structure, repetition structures. Top-down and stepwise refinement. Subprograms: Procedures and functions. Structured data types: arrays, structures and classes. Recursion.	
Prerequisite (s)	CSC 101	
Textbook	1. Paul Deitel; "C++ How to Program"; Pearson. 2. Frank L. Friedman; "Problem Solving, Abstraction and Design Using C++"; Prentice Hall.	
Lab./Computer	N/A	

EMP111	Differentiation with Applications and Algebra	3 CH (2,2,0)
Course Contents	**Calculus**: Derivatives with all rules, Trigonometric functions and their derivatives, Definitions, properties, derivatives of transcendental functions. Hyperbolic and inverse hyperbolic functions. Application of derivatives: Extreme of functions and Curve sketching, Differentials and linear Approximation, Chain Rule and Implicit differentiation, Indeterminate forms and L'Hopital's rule, Derivatives in parametric functions. **Algebra**: Definitions and properties of determinant and matrices; System of Linear equations, Eigen values and Eigenvectors of a matrix with applications, Gauss elimination method. Theory of nonlinear equations Numerical methods: Iteration methods, Newton's and modified Newton's method, Secant method.	
Prerequisite (s)	None	
Textbook	1. Robert Smith, Roland Minton; "Calculus: Early Transcendental Functions"; McGraw Hill. 2. Howard Anton , IrlBivens , Stephen Davis; "Calculus: Early Transcendentals"; Wiley. 3. Maorice D. Weir; "Thomas' Calculus"; Pearson.	
Lab./Computer work/Project	N/A	

EMP112	Integration with Applications and Analytical Geometry	3 CH (2,2,0)
Course Contents	**Calculus**: Indefinite integrals and Change of variables. Definitions, properties and evaluation of definite integrals. Techniques of integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integral of rational functions, Quadratic expressions and substitutions, Integration by reduction. Applications of definite integral: Area, Volume, Arc length in parametric, Surface area of solid revolution, Integrals in parametric functions, Polar coordinates and their applications. **Analytical Geometry**: Definitions and properties of conic sections, Translation and rotation of axes, Planes and lines in space, Cylindrical and spherical coordinates, Surface of second degree.	
Prerequisite (s)	MTH111	

Textbook	1. Robert Smith, Roland Minton; "Calculus: Early Transcendental Functions"; McGraw Hill. 2. Howard Anton , IrlBivens , Stephen Davis; "Calculus: Early Transcendentals"; Wiley. 3. Maorice D. Weir; "Thomas' Calculus"; Pearson.
Lab./Computer work/Project	N/A

EMP121	**Properties of Matter and Thermodynamics**	**4 CH (3,2,1)**
Course Contents	**Properties of Matter:** Units and dimensions, Energy of a system, Elastic Properties of materials, Hydrostatics, Hydrodynamics and viscosity, applications of hydrodynamics. **Waves:** types, properties, and applications. **Heat and thermodynamics:** Temperature, thermal expansion of solids and liquids, Heat and internal energy, specific heat and calorimetry, latent heat, work and heat in thermodynamic processes, first law of thermodynamics including some applications, energy transfer mechanisms.	
Prerequisite (s)	None	
Textbook	1- David Halliday, Jearl Walker, "Extended Principles of Physics", John Wiley. 2- Raymond A. Serway, John W. Jewett, jr., "Physics for Scientists and Engineers", Cengage.	
Lab./Computer work/Project	Exp. 1: Fine measurements. Exp. 2: Hook's law. Exp. 3: Coefficient of viscosity. Exp. 4: Modulus of Elasticity. Exp. 5: Specific heat of solid bodies. Exp. 6: Measurement of thermal conductivity "Lee's disk method".	

EMP122	**Electricity and Magnetism**	**4 CH (3,2,1)**
Course Contents	**Electricity:** Electric fields, Electric flux, Gauss's Law and its application to various charge distributions, Electric Potential, Capacitance and dielectrics, Electric current and resistance, Direct-current circuits. **Magnetism:** Magnetic field, Magnetic force, Biot-savart Law, Ampere's Law, Magnetic flux, Electromagnetic induction, Maxwell's equation in integral form and their physical meaning for electromagnetism.	
Prerequisite (s)	None	
Textbook	David Halliday, Jearl Walker, "Extended Principles of Physics", John Wiley.	
Lab./Computer work/Project	Exp. 1: Ohm's law. Exp. 2: Meter Bridge. Exp. 3: Series and Parallel Connections. Exp. 4: R-C Circuit. Exp. 5: Magnetic field of paired coils in Helmholtz arrangement. Exp. 6: Transformers.	

EMP130	Engineering Mechanics	4 CH (4,2,0)
Course Contents	**Statics:** Applications on space vectors, Resultant of forces, Moment of a force, Equivalent couples, Equivalent systems, Equations of equilibrium of a rigid body, Friction, Types of supports, Equilibrium of plane systems (Trusses and frames), Equilibrium of space systems acting on rigid bodies, The mass center of a system of particles and laminas of different shapes, The mass moment of inertia of system of particles and laminas. **Dynamics:** Kinematics of Particles: Introduction and kinematics of rectilinear motion, Curvilinear motion and relative motion, Tangential & normal, radial & transverse accelerations. Kinetics of Particles: Newton's second law, Angular Momentum, Principle of work and kinetic energy, Conservation of energy, Principle of impulse and momentum, Direct and central impact, Systems of particles. Introduction to dynamics of rigid Bodies.	
Prerequisite (s)	None	
Textbook	1. Ferdinand P. Beer; "Vector Mechanics for Engineers Statics"; McGraw Hill. 2. Ferdinand P. Beer; "Vector Mechanics for Engineers Dynamics"; McGraw Hill. 3. J L Meriam; "Engineering Mechanics - Statics"; Wiley. 4. J L Meriam; "Engineering Mechanics - Dynamics"; Wiley.	
Lab./Computer work/Project	N/A	

EMP140	Engineering Graphics	4 CH (2,6,0)
Course Contents	Techniques and skills of engineering drawing, Normal and auxiliary projections. Solid geometry. Intersections between planes and solids. Development, Sectioning, drawing and joining of steel Frames, Fasteners, Assembly drawing of some mechanical parts, Computer applications, Introduction to civil and architectural drawing.	
Prerequisite (s)	None	
Textbook	Frederick E.; "Engineering Graphics"; Pearson.	
Lab./Computer work/Project	The student will practice the drawing of the mentioned topics during the semester.	

EMP150	General Chemistry	2 CH (2,1,0)
Course Contents	Gases, Mass balance and heat balance in combustion processes of fuels, Solutions, Dynamic equilibrium in physical and chemical processes, Electrochemistry and corrosion, Water treatment, Building materials, Environmental engineering Selected chemical industries: fertilizers, dyes, polymers, sugar, petrochemicals, semi-conductors, Oil and fats, Industrial systems.	
Prerequisite (s)	None	
Textbook	1. Raymond Chang; "Chemistry"; McGraw Hill. 2. Raymond Chang; "General Chemistry"; McGraw Hill.	
Lab./Computer	N/A	

GENx11	Communication and Presentation skills	2 CH (2,1,0)
Course Contents	Report importance, Types and requirements of technical reports, Report writing methodology, Requirements of technical language skills, Techniques of report organization, The use of computer in report presentation, Standard specifications of parts and components to insure production and performance security. Basics of scientific and engineering communication, including defining an audience, working with collaborators, searching the literature, organizing and drafting documents, developing graphics, and documenting sources. The documents covered include memos, letters, proposals, progress reports, other types of reports, journal articles, oral presentations, instructions, and CVs and resumes. Real examples from actual documents and situations.	
Prerequisite (s)	None	
Textbook	1. MIT Guide for science and engineering communication, second edition, Zimmerman and Paradise, MIT press. 2. Leo Finkelstein, "Pocket Book of Technical Writing for Engineers and Scientists", McGraw Hill. 3. Joyce Kupsh, "Report Writing: A Survival Guide", Xlibris Corporation.	
Lab./Computer work/Project	N/A	

GENx12	Engineering Ethics and Legislations	2 CH (2,0,0)
Course Contents	Laws and legislations concerning engineering works. It concerns Engineers Syndicate, Contractors, Industrial safety and, security fire conditions. Lifts conditions, environmental protection against pollution, insurance against fire, accidents, and other hazards; Law of investment; relation between owner and tenant. Job laws, Industry union laws, and Engineering Ethics.	
Prerequisite (s)	None	
Textbook	C. Harris, M. Pritchard, M. Rabins, "Engineering Ethics: Concepts and Cases"; Wadsworth.	
Lab./Computer work/Project	N/A	

MEC161	Production Technology	2 CH (1,0,3)
Course Contents	Standards, measurement, and gauging. Measuring equipment. Hand Processes. Marking out. Sheet-Metal Operations. Cutting tools and cutting fluids. Drilling, turning, surface grinding, milling, joining methods (fasteners, riveting, soldering, brazing, and welding), primary forming processes (sand casting, rolling, extrusion, drawing and forging), and presswork.	
Prerequisite (s)	None	
Textbook	Bruce J. Black.; "Workshop Processes, Practices and Materials"; Elsevier.	
Lab./Computer work/Project	Exp. 1: Turning and Drilling Exp. 2: Milling and Surface Grinding	

	Exp. 3: Welding Exp. 4: Wood Processes Exp. 5: Sheet Metal Works Exp. 6: Sand Casting **Project:** A group project where students manufacture an item using the processes described in the course. The item to be manufactured has to be approved by the course instructor. The project will be presented during the lab time and a project report will be handed in with the presentation.

6B. SCM Program Course Descriptions

6B.1 University and Faculty Requirements' Courses

Refer to Section#2.

6B.2 SCM Specialty Requirements' Courses

SCMxxx COURSES

SCM201	Civil Engineering Drawing 1	2 CH (0,4,0)
Course Contents	Introduction: characteristics of civil engineering projects, legend, scales and sizes of drawings, types of projections, views, cross sections and details, Earthwork drawings: geometric surfaces, hatching, use of contour lines for irregular surfaces, applications related to canals, drains, roadways, earth reservoirs, landscape, Retaining walls and floors: shaping, projection, hatching, typical cross sections, Applications on drawing complete structures: half-earth-removed views, pitching and protection works.	
Prerequisite (s)	EMP140	
Textbook	"Textbook of Engineering Drawing", Reddy, K. Venkata, 2010	
Lab./Computer	--	

SCM202	Civil Engineering Drawing 2	2 CH (0,4,0)
Course Contents	Drawing of steel structures: views, sections, details, reverts, welding, hatching, applications on drawing steel joints and members, Drawing of reinforced concrete structures: views and cross sections, concrete dimensions, reinforcement details, Advanced applications on drawing of civil engineering projects.	
Prerequisite (s)	SCM201	
Textbook	"Textbook of Engineering Drawing", Reddy, K. Venkata, 2010	
Lab./Computer	--	

SCM211	Structural Analysis 1	2 CH (2,1,0)
Course Contents	Types of structures, Loads, Supports, Desemesterination of reactions, Internal forces, Analysis of beams, Frames and plane trusses.	
Prerequisite (s)	EMP130	
Textbook	"Structural Analysis", R.C. Hibbeler, Prentice Hall, Singapore,2005	
Lab./Computer	--	

SCM212	Structural Analysis 2	2 CH (2,1,0)
Course Contents	Analysis of beams subjected to moving loads, Introduction to space structures, Influence lines for statically determent structures.	
Prerequisite (s)	SCM211	
Textbook	"Structural Analysis", R.C. Hibbeler, Prentice Hall, Singapore,2005	
Lab./Computer	--	

SCM221	Strength and Technology of materials 1	3 CH (2,2,1)
Course Contents	Engineering materials, Standardization, Standard specifications, Codes, Total quality concept, Technical inspection and quality control, Principles of materials science, concrete technology: constituent materials for reinforced concrete (aggregates, cement, mixing water, admixtures, steel reinforcement), Concrete manufacturing, Mechanics of engineering materials: loads, stresses, strains, elastic constants, failure criteria, Mechanical properties, Testing machines, Strain gages, Calibration, Strength and behavior of materials under static loading (tension, compression, bending, shear, torsion, hardness), Miscellaneous conventional and Non-conventional construction materials and products.	
Prerequisite (s)	--	
Textbook	"Materials for Civil and Construction Engineering", John P. Prentice Hall, 2005	
Lab./Computer work/Project	Exp.1: Tensile strength of steel	

SCM231	Planimetric Surveying	2 CH (2,0,1)
Course Contents	Distance measurements and their corrections, Surveying operations using distance measurements, Area computations, Angle measurements using theodolites, Traverse, Coordinate computation and transformation of coordinates	
Prerequisite (s)	EMP112	
Textbook	"Surveying" ,Stanley Raymond, Pearon, Prentice Hall, 1998	
Lab./Computer work/Project	Exp.1: Distance measurement Exp.2:HL. angular measurements	

SCM232	Topographic Surveying	2 CH (2,0,1)
Course Contents	Tachometry, Mapping, Engineering projects layout, Accuracy of surveying measurements, Probability theory. Leveling, Grid leveling, Contour maps, Profiles, Cross sections, Volume computations, total station	
Prerequisite (s)	SCM 231	
Textbook	"Surveying" ,Stanley Raymond, Pearon, Prentice Hall, 1998	
Lab./Computer work/Project	Exp.1: VL. angular measurements Exp.2: Leveling measurements	

SCM313	Structural Mechanics 1	2 CH (2,1,0)
Course Contents	Properties of plane areas, Stresses and strains in sections due to axial forces and bending moments, Shear stresses in symmetrical solid and hollow sections, Torsional shear stresses in circular and non-circular sections, Combined stresses, Principal stresses.	
Prerequisite (s)	SCM 212	
Textbook	"Structural Analysis", R.C. Hibbeler, Prentice Hall, Singapore,2005	
Lab./Computer work/Project	--	

SCM314	Structural Mechanics 2	2 CH (2,1,0)
Course Contents	Determination of deformations: Differential equations, double integration method, conjugate beam method, virtual work method. Analysis of statically indeterminate structures: method of consistent deformations, three moment equation method, method of moment distribution (with & without sway).	
Prerequisite (s)	SCM 212	
Textbook	"Structural Analysis", R.C. Hibbeler, Prentice Hall, Singapore,2005	
Lab./Computer work/Project	--	

SCM315	Structural Mechanics 3	2 CH (2,1,0)
Course Contents	Slope deflection method, Matrix analysis of structures, definition of flexibility and stiffness method, Applications of stiffness method on plane beams, frames, trusses and space trusses. Introduction to finite element method.	
Prerequisite (s)	SCM 314	
Textbook	"Structural Analysis", R.C. Hibbeler, Prentice Hall, Singapore,2005	
Lab./Computer	--	

SCM322	Strength and Technology of Materials 2	3 CH (2,2,1)
Course Contents	Concrete technology: mix design, properties of fresh and hardened concrete, dimensional changes, concrete manufacturing under severe weathering conditions, durability of concrete in aggressive environments, types and repair of cracks, fire resistance, repairing materials	
Prerequisite (s)	SCM 221	
Textbook	"Concrete Technology", A.M.Neville&J.J.Brooks	
Lab./Computer work/Project	Exp.1:Test of aggregates properties Exp.2:Test of fresh concrete properties Exp.3:Test of hardened concrete properties Exp.4:Test of concrete mix	

SCM341	Hydraulics	3 CH (2,3,0)
Course Contents	Open channel flow: types of flow, conservation laws of mass and energy, specific energy concept, flow resistance in channels, sketching and calculations of water surface profile for gradually varied flow, design of cross sections in open channels, momentum equation and specific force concept, design of stilling basins downstream of gates and pipe outlets, physical models, Introduction to river engineering and sediment transport, Pumps: types and characteristics of pumps, pumps and pipeline systems, Hydraulics of groundwater: types of aquifers, groundwater flow.	
Prerequisite (s)	MEC241	
Textbook	"Fundamentals of Hydraulic Engineering Systems", Water Hwang, Prentice Hall, 2008	
Lab./Computer	--	

SCM342	Irrigation and Drainage Engineering.	3 CH (2,2,0)
Course Contents	Definitions of irrigation and drainage, Different sources of water for irrigation and its quality, Soil water plant relationship, Estimation of crop consumptive use, Introduction to the design of different irrigation systems: surface irrigation, sprinkler irrigation, drip irrigation, Introduction to the design of agricultural drainage system: tile drainage, surface drainage, and vertical drainage.	
Prerequisite (s)	MEC241	
Textbook	"Irrigation and Drainage Engineering", ElSaieMoh. Yasser, FattohEhab, 2004	
Lab./Computer	--	

SCM351	Reinforced Concrete 1	3 CH (2,3,0)
Course Contents	Methods of design, Codes, Structural systems, Load distribution, Design using limit states method, Sections subjected to bending moments, Sections subjected to shear and torsion, Reinforcement details for beams, Limit state of deflection.	
Prerequisite (s)	SCM 313	
Textbook	"Design of reinforced concrete structures Vol. 1", Dr. MashhourGhoniem, 2008	
Lab./Computer work/Project	--	

SCM352	Reinforced Concrete 2	3 CH (2,3,0)
Course Contents	Design of sections under axial and eccentric forces, Design and reinforcement details of concrete columns, Structural systems for large span concrete structures, Design and reinforcement details of Frames, Polygons, Bearings and connections, Real hinges	
Prerequisite (s)	SCM 351	
Textbook	"Design of reinforced concrete structures Vol. 2", Dr. MashhourGhoniem, 2008	
Lab./Computer work/Project	--	

SCM361	Metallic Structures 1	3 CH (2,3,0)
Course Contents	Introduction to steel structures, Design of tension members, Design of compression members, Design of beams. Design of crane girders. Design of hinged connections (bolted & welded).	
Prerequisite (s)	SCM 313	
Textbook	" Steel Structure Design " Allowable Stress Design ", Abdel-Reheem Khalil Dessouki, 2009	
Lab./Computer work/Project	--	

SCM381	Fundamentals of Construction Project Management	3 CH (2,3,0)
Course Contents	Introduction to structure engineering project management, Introduction to the construction environment, Construction project phases, Selecting the special services for managing and executing the construction project, Construction projects organization, Construction management approaches, Introduction to CPM method, Labor productivity, Material management, Equipment optimum use, Project control, Constructability, Safety in construction, Application with emphasizing on civil engineering projects.	
Prerequisite (s)	--	
Textbook	"Construction Management Fundamentals", Schexnayder, and Mayo, Mcgraw Hill, 2008	
Lab./Computer work/Project	--	

SCM382	Engineering Economics and Finance	2 CH (2,1,0)
Course Contents	Economic principles, Nominal and effective rate of interest, Discrete and continuous payments, Present value, Source and cost of capitals, Rate of return, Cost benefit ratio, Breakeven point, Inflation, Principles of project evaluation, Construction Economy, Principle of finance, payback period.	
Prerequisite (s)	--	
Textbook	"Engineering Economy" latest ed. Blank, and Tarquin, McGraw Hill, 2012	
Lab./Computer work/Project	--	

SCM400	Graduation Project-1	1 CH (0,2,0)
Course Contents	An engineering assignment requiring the student to demonstrate initiative and assume responsibility, The student will select a project at the end of the ninth semester, Students can propose their own project, A faculty member will provide supervision, A project report is required at the end of the tenth semester.	
Prerequisite (s)	As Advised	
Textbook	--	
Lab./Computer work/Project	--	

SCM401	Graduation Project-2	4 CH (2,4,0)
Course Contents	Continuation to the bachelor project started in SCM400	
Prerequisite (s)	SCM 400	
Textbook	--	
Lab./Computer work/Project	--	

SCM443	Environmental and Sanitary Engineering	3 CH (2,3,0)
Course Contents	Definitions, Fields of environmental and sanitary engineering, Biosphere and environmental cycles, Issues of environmental pollution, Water supply engineering: Water demands, sources of water supply, collection works, purification works, distribution works, Sanitary drainage: sources of wastewaters, sewerage systems, hydraulic design, network accessories, sewage treatment systems.	
Prerequisite (s)	SCM 341	
Textbook	"The Civil Engineering Handbook ", 2nd Edition, Wai-Fah Chen, CRC, 2002	
Lab./Computer work/Project	--	

SCM453	Reinforced Concrete 3	3 CH (2,3,0)
Course Contents	Design and reinforcement details: solid slabs, ribbed slabs, paneled beams slab, flat slabs (beam less slabs), Stairs	
Prerequisite (s)	SCM 351	
Textbook	"Design of reinforced concrete structures Vol. 2", Dr. MashhourGhoniem, 2008	
Lab./Computer work/Project	--	

SCM462	Metallic Structures 2	3 CH (2,3,0)
Course Contents	Design of rigid and semi-rigid connections (welded and bolted). Design of beam-columns, Design columns of combined sections columns. Design of columns bases. Design of rigid frames. Design of wind bracings. Design of splices	
Prerequisite (s)	SCM 361	
Textbook	" Steel Structure Design " Allowable Stress Design ", Abdel-Reheem Khalil Dessouki, 2009	
Lab./Computer work/Project	--	

SCM472	Soil Mechanics	3 CH (2,1,1)
Course Contents	Soil compaction, Permeability, stresses distribution in soil, Compressibility of soil, Theory of consolidation, shear strength of soil, Slope stability.	
Prerequisite (s)	EMP371	
Textbook	"Soil Mechanics and Foundation Engineering", K.R. Arora , 2004	
Lab./Computer work/Project	Exp.1: Test of soil compaction Exp.2: Test of permeability Exp.3: Test of consolidation	

SCM473	Foundations	3 CH (2,3,0)
Course Contents	Bearing capacity of soil, Design of shallow foundations, Lateral earth pressure, Design of retaining walls, Types of deep foundations, Pile capacity, Design of pile foundations.	
Prerequisite (s)	SCM 472	
Textbook	"Soil Mechanics and Foundation Engineering", K.R. Arora , 2004	
Lab./Computer work/Project	--	

SCM483	Project Planning and Control	3 CH (2,3,0)
Course Contents	Network planning concepts: critical path, precedence diagram, project evaluation and review techniques, Bar charts, Network analysis, Line of balance, Cash flow-Project monitoring and Control, Updating, Time cost tradeoff..	
Prerequisite (s)	SCM 381	
Textbook	"Construction planning, equipment and Methods", Robert Peurifoy, Mcraw-Hill, 2011	
Lab./Computer	--	

SCM485	Construction Engineering Contracts	3 CH (2,3,0)
Course Contents	Introduction to Law and Contracts, Contract Principles and Construction Projects, Contract Types, Contract Documents, Tendering and Competitive Bidding, Egyptian Code for Project management, Delays and Claims, FIDIC.	
Prerequisite (s)	SCM 483	
Textbook	"Construction Management Jump Start" 2nd edition, Jacson, Barbara J., 2010	
Lab./Computer	--	

SCM491	Transport Planning and Traffic Engineering	3 CH (2,2,0)
Course Contents	Transport planning: introduction to transport sciences, Definitions, Time horizons of transport planning, Elements of urban transport planning procedures, Data base, Introduction to travel demand forecasting models, Introduction to traffic management and public transport improvements, Introduction to evaluation of strategic transport plans and traffic management schemes, Traffic engineering: vehicle, user and road characteristics, Studies of traffic stream characteristics (speed, volume, trip time & delay), Fundamentals of traffic flow: speed, volume and density relationships,, Highway capacities, Traffic control devices	
Prerequisite (s)	--	
Textbook	"Traffic Engineering", Mcshene W., Prentice Hall	
Lab./Computer work/Project	--	

SCM492	Highway and Airport Engineering	3 CH (2,3,0)
Course Contents	Introduction to highway and airport planning, Classification of highways, Design controls and criteria, Design of elements in the longitudinal direction, Design of cross sections, Design of At-Grade intersections, Grade separations and interchanges, Types of pavements, Calculation of stresses in flexible and rigid pavements, Types and characteristics of paving materials and mixtures, Equivalent axel loads, Design of flexible and rigid pavement, Introduction to pavement Repair..	
Prerequisite (s)	--	
Textbook	"The Handbook of Highway Engineering", T.F. Fwa, Taylor & Francis, 2006	
Lab./Computer	--	

SCMx16	Structural Mechanics 4 (Elective)	3 CH (2,2,0)
Course Contents	Elastic buckling of columns and beam columns, Introduction to plastic analysis of beams and frames, Approximate analysis of indeterminate plan structures, Membrane stresses in shells of revolution and cylindrical shells.	
Prerequisite (s)	SCM 314	
Textbook	"Structural Analysis", R.C. Hibbeler, Prentice Hall, Singapore,2005	
Lab./Computer work/Project	--	

SCMx17	Structural Dynamics & Earthquake Engineering (Elective)	3 CH (2,2,0)
Course Contents	Un-damped and damped free vibration analysis of SDOF systems, Response of SDOF system to harmonic loading, Free vibration analysis of MDOF systems, The nature of earthquake ground motion, Seismicity of the world and of Egypt, Causes of earthquakes, basic glossary and terminology, Seismic waves, Quantification of earthquakes, Damage mechanism, Characteristics of earthquake ground motions, Philosophy of design, Response spectrum analysis	

Prerequisite (s)	SCM 415
Textbook	"Structural Dynamics, Theory and Computations", MarioPaz , 2008
Lab./Computer work/Project	--

SCMx23	Advanced Technology of Construction Materials (Elective)	3 CH (2,2,0)
Course Contents	Introduction, Fabrication and Application of advanced materials, Proprieties of fibers and polymers, Stiffness, strength characteristics and failure criteria of advanced materials, Strengthening of RC elements using advanced materials	
Prerequisite (s)	SCM 322	
Textbook	"Mechanics of Advanced Composite Materials", Gibson	
Lab./Computer work/Project	--	

SCMx24	Inspection and Repair of Structures (Elective)	2 CH (2,1,0)
Course Contents	Types & causes of cracks, Inspection & assessment of existing structures, Repair & Strengthening philosophy, Repair materials, Strengthening & Repair techniques	
Prerequisite (s)	--	
Textbook	"Repair And Rehabilitation Of Concrete Structures", Poonam I. Modi, PHI Learning Pvt Ltd (2016)	
Lab./Computer work/Project	--	

SCMx33	Geographic information systems GIS (Elective)	2 CH (2,1,0)
Course Contents	Earth surface, Geodetic coordinate Systems, Geodetic networks, Fundamentals of satellite geodesy, Global positioning system GPS, Map projections Basics, Fundamentals and structure of Geographic information systems GIS.	
Prerequisite (s)	SCM 232	
Textbook	"Geoinformation : Remote Sensing, Photogrammetry & Geographic Information Systems", G.Koneeny, Publisher: CRC, 2014	
Lab./Computer work/Project	--	

SCMx34	Photogrammetry & Setting out (Elective)	2 CH (2,1,0)
Course Contents	Photogrammetry: Aerial cameras, Vertical photograph, Tilted photograph, Rectification, Photo coordinates refinement, Flight planning, vertical & horizontal curves, setting out of projects.	

Prerequisite (s)	--
Textbook	"Geoinformation : Remote Sensing, Photogrammetry & Geographic Information Systems", G.Koneeny, Publisher: CRC, 2014
Lab./Computer work/Project	--

SCMx54	Reinforced Concrete 4 (Elective)	3 CH (2,2,0)
Course Contents	Cracking limits, Water rectangular and cylindrical tanks (elevated, rested, underground), Deep beams, Swimming pools	
Prerequisite (s)	--	
Textbook	" Design of reinforced concrete structures" Vol. 3", Dr. MashhourGhoniem, 2008	
Lab./Computer work/Project	--	

SCMx55	Reinforced Concrete 5 (Elective)	3 CH (2,2,0)
Course Contents	Calculating lateral loads (wind, seismic), Internal forces due to lateral loads, Lateral loads resisting structural systems, Design and detailing of shear walls, core, moment resisting frames, Introduction to pre-stressed concrete, Design and detailing of determinate structures.	
Prerequisite (s)	--	
Textbook	" Design of reinforced concrete structures" Vol. 3", Dr. MashhourGhoniem, 2008	
Lab./Computer work/Project	--	

SCMx63	Metallic Structures 3 (Elective)	3 CH (2,2,0)
Course Contents	High-rise steel buildings: structural systems, design loads (dead, live, wind and seismic), Static analysis, Floor systems, Cold formed steel members, Design of composite structures (beams and columns).	
Prerequisite (s)	--	
Textbook	" Steel Structure Design " Allowable Stress Design ", Abdel-Reheem Khalil Dessouki, 2009	
Lab./Computer work/Project	--	

SCMx64	Metallic Bridges (Elective)	2 CH (2,1,0)
Course Contents	Structural systems for bridges, Floors types, Design loads, Design of plate girders: buckling considerations, fatigue effects, cross-section design, construction details, Design of composite beams, Design of multiple main girders bridges.	

Prerequisite (s)	--
Textbook	" Steel Structure Design " Allowable Stress Design ", Abdel-Reheem Khalil Dessouki, 2009
Lab./Computer work/Project	--

SCM484	Quantity Surveying and Cost Estimation	3 CH (2,2,0)
Course Contents	Approximate estimates, Detailed estimates: quantity survey, labor cost, equipment cost, subcontractor cost, purchasing orders, indirect costs, Bid calculation, Unit cost estimate, Cost planning, Traditional Cost Estimation methods, Cost loading.	
Prerequisite (s)	SCM 382	
Textbook	"Construction Management Jump Start" 2nd edition, Jacson, Barbara J., 2010	
Lab./Computer work/Project	--	

SCMx86	Construction Project Risk Management (Elective)	2 CH (2,1,0)
Course Contents	Introduction to Risks and Uncertainty, Why and what is risk management, Planning project risk management, Risk identification, Qualitative risk analysis, Qualitative risk analysis, Risk response, risk monitoring, Project cost and schedule estimates	
Prerequisite (s)	SCM 483	
Textbook	"Construction Management Jump Start" 2nd edition, Jacson, Barbara J., 2010	
Lab./Computer work/Project	--	

SCMx87	Value Engineering in Construction Projects (Elective)	2 CH (2,1,0)
Course Contents	Introduction and Summary, Opportunities for VE Application, Introduction to the VE Methodology, The VE Methodology in Detail, Information Phase, Function Analysis Phase, Creative Phase, Evaluation Phase, Development Phase and Presentation Phase Implementation Phase, Case Studies	
Prerequisite (s)	--	
Textbook	"Construction Management Jump Start" 2nd edition, Jacson, Barbara J., 2010	
Lab./Computer work/Project	--	

SCMx88	Construction Technology (Elective)	2 CH (2,1,0)
Course Contents	Introduction to construction methods, Earth work equipment, Foundation technology, Temporary structures, Precast concrete, Prestressed concrete, Steel structure fabrication and erection, Scaffolding, Safety equipment	

Prerequisite (s)	--
Textbook	"Construction Methods and Management",Stephens W. Nunnally
Lab./Computer work/Project	--

SCM489	Resource Management	3 CH (2,2,0)
Course Contents	Resource management, Inventory management, Labor management, Work Study, Construction operation analysis, Depreciation and replacement	
Prerequisite (s)	--	
Textbook	"Construction Management Jump Start" 2nd edition, Jacson, Barbara J., 2010	
Lab./Computer work/Project	--	

COURSES From Other Departments ARC, EED, EMP, MEC

ARC349	Building Construction	2 CH (2,1,0)
Course Contents	Building construction techniques: phases of buildings construction, wall bearing construction, skeleton construction (RC, Steel), Wall techniques: stone and brick, architectural finishing techniques: arches, design of stairs cases, floorings and plastering, Water and heat proofing techniques, Architectural drawings and symbols techniques.	
Prerequisite (s)	--	
Textbook	"Building Construction Handbook", 10th Ed., Routledge, 2014	
Lab./Computer		

EED204	Electrical Installations and Construction Equipment	2 CH (2,1,0)
Course Contents	Electrical installations: introduction to electric circuits, electrical installations in residential and industrial buildings (lighting, power, telephone, TV, air conditioning, lifts), Acoustic precautions, Alarm systems (Fire, Security, Gas), Electrical design for signaling systems in roads and railways, Electrical print reading. Construction equipment, assessment and selection of construction equipment, earth moving equipment, equipment for concrete production and handling, Steel installations equipment	
Prerequisite (s)	EMP122	

Textbook	"Building Construction Handbook", 10th Ed., Routledge, 2014
Lab./Computer work/Project	--

EMP211	**Ordinary Differential Equations (Math .3)**	**4 CH (3,2,0)**
Course Contents	Functions of several variables: limits, continuity and partial derivatives, Chainrule, Tangent planes and normal lines, Extrema and constrained extrema, Ordinary differential equations: equations of first order (separable, homogenous, exact, linear and Bernoulli), Orthogonal trajectories, Equations reducible to first order, High order linear equations, The variation of parameters and operation method, Euler's equation, System of linear differential equations, Series and tests of convergence, Taylor and Maclaurin expansion, Multiple integrals: double integral in Cartesian and Polar coordinates, Triple integrals and Jacobians, Line integral, Green's theorem.	
Prerequisite (s)	EMP112	
Textbook	"Advanced Engineering Mathematics", Warren S.Wright, Dennis G.Zill, Jones &Bartlett Learning, 2009	
Lab./Computer work/Project	--	

EMP212	**Transformations and Numerical Analysis (Math.4)**	**4 CH (3,2,0)**
Course Contents	Laplace transformation: definitions, properties and theorems, Inverse transform, Solution of ordinary differential and integral equations by Laplace transform, Heaviside function and related theorems, Periodic functions and Dirac delta functions, Applications, Vector analysis: scalar and vector fields, Directional derivative, gradient, divergence and curl, Gauss's and Stokes's theorems, Fourier series: usual and arbitrary period, Fourier series of odd and even functions, Definitions and properties of Fourier transform with applications, Partial differential equations: definitions, types- D'fflambert solution of wave problem, Separation of variables for heat, wave, Laplace's equations in different systems of coordinates.	
Prerequisite (s)	EMP112	
Textbook	"Advanced Engineering Mathematics", Warren S.Wright, Dennis G.Zill, Jones &Bartlett Learning, 2009	
Lab./Computer work/Project	--	

EMP312	**Probability & Statistics (Math 6)**	**3 CH (2,2,0)**
Course Contents	Probability: Definitions and concepts, Conditional probability, Statistical independence and Baye's theorem, Discrete and continuous random variables, Distribution functions, Probability distributions functions: Normal distribution, Binomial distribution, Poisson distribution. Joint distributions and moments. Applied Statistics: Reviewing methods of data presentation and analysis and the important statistical measures, Sampling methods, Sample and population measures (point estimate), Tests of hypothesis and confidence intervals, Correlation analysis, Regression analysis.	

Prerequisite (s)	EMP211
Textbook	"Elementary statistics, step by step approach", Biuman,2000
Lab./Computer work/Project	--

EMP371	Geology	3 CH (2,2,1)
Course Contents	Introduction to geology, classification and properties of minerals and rocks, Geological features (Faults, folds, joints), Introduction to soil mechanics, Soil classification, Rock and soil laboratory tests, Site investigations and field tests	
Prerequisite (s)	--	
Textbook	A Geology for Engineers - 7th Edition - F.G.H. Blyth –Michaelde Freitas	
Lab./Computer work/Project	Exp.1: UCS of Rock Exp.2: Grain size analysis Exp.3: Consistency limits	

MEC260	Dynamics of Rigid Bodies	3 CH (2,2,0)
Course Contents	Kinematics of Rigid bodies; Types of planar motion of rigid body (R.B.), Angular velocity and velocity relation, Angular acceleration and acceleration relation, Equations of General planar motion of a R.B., Translational motion, Motion about a fixed axis, and General motion. Instantaneous center, Relative velocity and Relative acceleration. Kinetics of rigid bodies; Newtons laws, friction and elastic forces, equations of motion. Principle of work and energy, Conservative forces and principle of conservation of mechanical energy, Linear and angular impulse, Principles of impulse and momentum, Impulsive forces, impact, Introduction to free and forces vibrations.	
Prerequisite (s)	EMP130	
Textbook	F. Beer and E. Johnston ; “Vector Mechanics for Engineers - Dynamics" McGraw-Hill, New York, USA.	
Lab./Computer	**N/A**	

MEC241	Fluid Mechanics	3 CH (2,2,1)
Course Contents	Basic properties of fluids and fundamental concepts; Statics of fluids; Hydrostatic forces and buoyancy; Fluid kinematics; Characterization of fluid flow; Basic equations: conservation of mass; momentum and energy; Bernoulli's equation; Energy Equation Applications; Momentum equation. Laminar and Turbulent flow in ducts and pipes and their applications. External flow; Lift and Drag forces. Basics of dimensional analysis and dynamic similarity.	
Prerequisite (s)	EMP130	
Textbook	"Fluid Mechanics Fundamentals and Applications", Yunus A. Çengel, John M. Cimbala, 2008	
Lab./Computer		