Preparatory Year

Preparatory Year
FIRST TERM

PME0101 Engineering Mathematics (1) a (4+2)

Algebra : Mathematical System (System – ring – field) – Boolean algebra – Introduction to linear algebra (algebra of vectors – linear dependence and independence – algebra of matrices) – Theory of linear algebraic equation Systems – Gauss elimination method – Algebra of complex numbers – Theory of partial fractions – Numerical computation of roots of Function (definition – theorems) – Transcendental functions algebraic equations (Newton method – Chord method)

Derivative : (trigonometric – inverse trigonometric – exponential – logarithmic – hyperbolic and inverse hyperbolic) Limits (definitions – theorems) – Continuity (definitions – First Derivative for transcendental functions – High order derivatives – Applications of divertive (minimum – maximum – limits – curves tracing – Point of inflection) – Other applications (Indeterminate forms – Taylor and Maclaurin expansion – Applications in approximations and error estimation – Introduction to partial derivative .

PME0102 Engineering Physics (1) a (4+2)

Some basic subjects in physics : physical measurements , measures standards of basic quantities , dimensional analysis , units systems , elastic properties of solids, deformation types, stress and strain, elasticity modulus , gravitation , Newton's low of gravitation and applications , potential energy , planets motion and Kepler's laws , static fluids , hydrostatic pressure , Pascal's law , Archimedes's principle , ideal fluids dynamics, continuity equation, Bernoulli's equations and its applications, viscosity , oscillations, simple harmonic motion and some applications , energy of practical moving with simple harmonic motion, simple harmonic motion and uniform circular motion, practical experiments .

Electrostatics : electric charge and Coloumb's law, conductors and prosperities of electric charges, electrostatic field, electric field lines, continuous charge distribution , obtaining electric field from electrical potential, electrostatic potential energy, potential of a charged conductor, dielectrics and capacitances, dialectics and their polarization, electric capacitances , Gauss' law in dielectrics, displacement vector, energy stored in the electric field, practical experiments .

PME0003 Engineering Mechanics (2+2)

Applications on space vectors – Resultant of a group of forces – Moments – Equivalent couples – Equivalent groups – Equations of Equilibrium for the rigid body – Types of supports – Equilibrium of a rigid body under the effect of a group of forces and space couples – Centre of masses (a group of particles – areas) – Moment of inertia (paralled axes – principle axes – areas) .

MPD0001 Engineering Drawing and Projection (2+3)

Definition – Engineering tools and how to use them-Line types and dimensions – Engineering Operations – Bodies – Orthogonal projection – Third view finding – Definition of descriptive geometry – Point representation – Straight line representation position problems – Measurement problems – Auxiliary projection .

PME0104 Engineering Chemistry (3+2)

Gaseous state (state equations of idea and real gases – Diffusion of gases – Critical state and liquefaction of gases – humidity and air conditioning) – Solutions (types of solutions, their properties and governing laws – antifreezes – Eng. Applications) – Fertilizers (types of fertilizers and their manufacture) – Chemical thermodynamics (basic laws of thermodynamics – Combustion – material and heat balance in Chemical processes and in fuel combustion – equilibrium – renewable energy sources – rocket propellants Eng. – applications) – Electrochemistry and its applications – Cement (manufacture – types – hydration reactions – setting and hardening – shrinkage in concrete) – Technology of potable and industrial water treatment and water pollution – Air pollution and its control – Pollution by solid wastes and its control – Corrosion (types of corrosion – defense against corrosion – industrial case studies) .

CCE0101 Computer Technology (2+2)

Computer Architecture – Computer Systems – Operating systems – File Systems – Computer network – Internet – Logic design programming – Problem solving methods – Programming languages – Object oriented of programming in solving of engineering problems – Database systems and information technology – Decision support systems – Computer Graphics – Multimedia systems .

Preparatory Year
SECOND TERM

PME0201 Engineering Mathematics (1) b (4+2)

Analytic Geometry : General equation of second degree – Condition to represent pair of straight lines – Circle – Coaxial circles – Conic sections (parabola – ellipse – hyperbola) – Translation and rotation of axes and standard forms of conic sections – Space coordinates (Cartesian – cylindrical – Spherical) – Straight line equations – plane – Sphere – Surface of solid of revolution .

Integration : Indefinite integral (theorems – integrals for elementary functions) – Methods of integration (tables – substitution – parts – partial fractions and reductions) – Definite Integral (Newton definite integral – properties – theorems) – Improper integrals – Mean value theorem for definite integrals – Application – Methods of integral (arc and center of gravity) – Elementary methods for numerical integration (trapezoidal rule and Simpson's rule) .

PME0202 Engineering Physics (1) b (4+3)

Principles of heat and thermodynamics : temperature, heat , and the first law of thermodynamics, the Zeroth law of thermodynamics, temperature measuring, thermal expansion, heat, heat absorption in solids and liquids, the first law of thermodynamics, mechanisms of heat transfer, kinetic theory of gases, ideal gases , translational kinetic energy, distribution of molecular speeds, molecular specific heat , degrees of freedom and its relation with the specific heat entropy and the second law of thermodynamics, some of the singular processes, reversible and irreversible processes, entropy changes, the second law of thermodynamics, Carnot cycle , the absolute temperature scale, basic of heat engines , basics of refrigerators , practical experiments . **Electric current and magnetism :** electric current and electric resistance, electric current , current density, electric current circuits, electromotive forces, potential difference, Kirchoff's laws, multi loop circuits , magnetic fields , field definitions , magnetic energy, mutual induction, magnetic properties of materials and Maxwell's equations, Gauss's law for magnetism, diamagnetism, paramagnetism, ferromagnetism, magnetic hysteresis, displacement current, generalization of Ampere's law, Maxwell's equations, practical experiments .

PME0003 Engineering Mechanics (2+2)

Position displacement, velocity, and acceleration of a particle- Trajectory of planer Motion of a particle – Description of the planner Motion in Cartesian coordinates – Projectiles – Restricted Motion of Particle along a straight line – Description of motion in natural coordinates, and polar coordinates – Relative motion between particles – Newton's laws of motion – Motion in resistive medium – Variable mass and its applications – Simple harmonic motion of a particle – Restricted Motion of a particle along a circular path – Principle of conservation of mechanical energy – Principle of impulse and momentum .

MPD0001 Engineering Drawing and Projection (1+4)

Engineering isometric drawing – Engineering section – Metallic construction – Introduction to using computer in engineering drawing (projection drawing – Isometric drawing) .

MPD0202 Production Engineering (2+2)

Engineering materials (types – properties –alloys) – Casting processes (sand casting) - Forming processes (forging – rolling – extrusion – drawing – extrusion spinning – Joining processes (riveting – welding – adhesive) – Cutting processes (manual – mechanical turning – shaping – drilling – milling – grinding) - Measuring instruments (Vernier caliper – micrometer) .

***02H1 Technical English Language (2+-)

Properties of technical English language – Revision of language grammar and syntax – Properties of syntax and effective phrase – Some common mistake in writing technical English – Building mistakes paragraphs (main idea – types) – Reading and analysis some technical reports in different engineering branches – improving communication skills .

***02H2 History of Engineering and Technology (2+-)

Definitions : (art – science – technology – engineering) civilization developments and relation to physical and human science – History of technology and different branches – Historical relation between science and technology – Relation between engineering and social and economic environment development – Examples about development of engineering activities .

Architectural Engineering

Architectural Engineering

First Year

FIRST TERM

ARE1101 Architectural Design (1) A (2+6)

The aim is to introduce students to the architectural design process and its various aspects. The course contains the principles of designing – the architectural design expressional language - functional relationships and circulation patterns – qualitative and quantities study of architectural spaces – deducing the functional areas and circulation required for design of simple house – The relationships between function spaces and their required opening – The human , environmental and functional relationships – Simple structures for small scale buildings – Simple design problem solving in the form of design project.

ARE1102 Building Construction and Materials (1) A (2+2)

The aim is to study, theoretically and practically, the principles of building construction and the use of different building materials. The course contains: the presentation of various materials in architectural and structural documents – Principles of building with various materials; stone, wood, brick, concrete, steel – Building types; skeleton & wall bearing – Arches, lintels and stairs – Insulation, water, sound and heat – Introduction to finishing materials.

ARE1103 History & Theories of Architecture (1) A (3+1)

The aim is to introduce the principles of design process with its fundamental theories and design vocabularies. The course contains: the conception of architectural design activity – The different systems of design performance – System of functional performance; functional performance of activity and functional relationships; functional bioclimatic performance; functional expressional performance; functional psychological performance – System of aesthetical performance; aesthetical values; aesthetical expression - System of constructional performance - System of economical performance.

ARC1104 Skills and Visual Studies A (2+4)

The aim is to develop imaginative and three dimensional spatial capabilities. In addition to introduce shades and shadows into form and facades. The course contains: study of shadows of spatial elements: points, lines, planes, and forms – Perspectives basics; image plane, cone of vision, angle of vision, vanishing points, inverse perspective – computer applications.

ARE1105 Computer in Architecture (1) (2+2)

Computer – aided architectural design – Introduction to computer systems – Hardware and software – The different uses of computer techniques in architectural design processes – Linear programming techniques and their applications in architecture – Theory of modeling in architecture – Architectural software such as AutoCAD and 2D programs – Statistic and data bases programs – Search in Internet.

CSE1151 Theory of Structure (2+2)

Introduction to structure analysis – Analysis of statically determinate structures – Internal and external stability of structures – Internal actions of beams; frames and trusses; types of plane and space structures.

Architectural Engineering

First Year

SECOND TERM

ARE1201 Architectural Design (1) B (2+6)

The aim is to study the different aspects of the design problem with its systems through designing such medium public projects. The course contains a designing training for a specific public medium building in real context with only one floor and skeleton structure. Training of design activity within reality through how to collect a design data, how to analyze the design information, how to configure the design goals and architectural program, Selection of site project, design in context, Connections between human, social, functional and environmental needs, Studying the simple structural behaviors, Studying the interrelationships between function and form.

ARE1202 Building Construction and Materials (1) B (2+2)

The aim is to study the various types of building constructions and the detailed implementation processes for the architectural projects. The course contains : The building process – Studying the different types of finishing materials and flooring – Finishing woodwork and metal works – Wood flooring – Advanced construction techniques – Types of concrete ceilings – Preparation of working drawings.

ARE1203 History & Theories of Architecture (1) B (3+1)

The aim is to study the various aspects which influence the architectural form generation through the history. The course contains ; Prehistoric Architecture - Ancient architecture – Egyptian Architecture – Greek Architecture – Mesopotamian – Roman Architecture – Middle age architecture (Byzantine Architecture – Early christen Architecture).

ARE1204 Skills and Visual Studies B (2+4)

The aim is to study the main components of the 2D Forms. The course contains: Training on the 2D forms and the principles of formulation – Pencil techniques, pen and ink – proportions perspective, scale and composition – Foreground middle and background – How to sketch architectural elements and landscapes.

CPW1221 Surveying (2+2)

Introduction to the plane and photogram try surveying and their use in architectural engineering – Drawing scales – measuring devices for topographical surveying

CSE1252 Prosperities and Strength of Materials (2+2)

Introduction to properties and testing of different materials – Introduction to the deal with various specifications, codes and the quality control – Advanced technology of the new structural materials – Properties of concrete materials (aggregate, cement, water mix, reinforcement) – Mechanical properties and behavior of materials.

Architectural Engineering

Second Year

FIRST TERM

ARE2106 Architectural Design (2) A (2+6)

The syllabus aims to orient the student and to upgrade his capabilities to deal with the architectural design as a creative process for resolving spatial issues on different design levels, covering the scope from different circumstances, sites, to masses and spaces. The syllabus is based on carrying-on research tasks, and site activities, and emphasizing the importance of the environment and the urban medium in the process of design and formulation. The student is urged to perform a set of architectural projects that fulfill: functional, social, and civilization needs – architectural forming and scope fundamentals of space – style – value of beauty – designing architectural compositions, and the creation of inventing solutions for architectural projects with special emphasis on spatial aspects with all it may include of values, and also on the structural aspects, with maintaining integration between both criteria.

ARE2107 Building Construction and Materials (2)A (3+2)

The syllabus aims to acknowledge the student with the construction methods, and the detailed implementation steps of architectural projects. The subject deals with the implementation steps of projects, and the construction sequence – forming works – kinds of finishing works of buildings - treating facades (beams, cladding, curtain walls) – carpentry details (for doors and windows) – finishing tables – subsidence and expansion detaches – design conditions and calculations of staircases – performing the executive drawings.

ARE2108 History and Theories of Architecture (2)A (3+1)

The syllabus aims to acknowledge the student with design determinants of public buildings. It also deals with design determinants of educational, cultural buildings, books stores, museums, exhibitions, shopping malls, markets of all kinds, theatres, sanitation and recreational buildings, social centers, schools, universities, office buildings, tourism buildings, …etc.

ARE2109 History and Theories of Planning (3+1)

The syllabus aims to acknowledge the student with the emergence of cities and human settlements across ancient and modern civilizations, and the definition of the characteristics of cities, and different factors affecting it. The syllabus illustrates the stability factors of human settlements and conglomerations – characteristics of different civilizations starting from ancient Egyptian civilization and Mesopotamia and identification of their stability factors and urban centers – Greek and Roman civilization and their mutual relationships – Cities of the middle-ages in Europe and Islamic orient, and their civilization factors, and the characteristics of their cities –

cities during the Renaissance – the industrial revolution in Europe and its effects on cities and the evolution of the industrial cities – planning ideas of improving the society, and the evolution of the utopian society – the modern theories in city planning – definition of urban planning and its levels – introducing the contemporary urban planning through modern and upgrading ideas- studying modern models of these plans.

ARE2110 Environmental Control (3+1)

The syllabus aims to acknowledge the student with the basics of environmental construction, and auditing methods of architectural design, and factors affecting the internal climate of buildings and the surrounding environment and their effects on the design. The syllabus illustrates definitions of the environment and its elements – climate and its levels – man, shelter and climate – effects of climate on the man – thermal exchange between man and the environment – thermal comfort and its measurements and rates – climatic zones of Egypt – thermal behavior of buildings and basics of architectural treatments – energy-aware design – natural ventilation in buildings – air movements inside and outside the building – environmental pollution and treatment methods – different methods of adaptation with climate and controlling it – analysis of some architectural models formulated according to the climate – an introduction to environmental problems of contemporary cities and modern architecture.

CSE2153 Concrete and Steel Construction (3+2)

The syllabus aims to acknowledge the student with the design fundamentals of concrete and metal constructions and selection and designing of the suitable type of foundation. The syllabus includes:

First: Design and analysis of sections, loads distribution, reinforcement details of beams, slabs, columns, and staircases – design of statically identified frames – slabs of blocks and webs – beams network – flat slabs – precast junctions of construction units.

Second: structural systems of steel constructions – design loads – member design for axial forces, bending moment, of shearing forces – design of tied or welded junctions – structural details of trusses and steel skeletons – junction details in buildings.

Architectural Engineering

Second Year

SECOND TERM

ARE2206 Architectural Design (2)B (2+6)

The syllabus aims to orient the student and to upgrade his capabilities for application of scientific principles for the creation of inventing solutions and designs that fulfill the functional and spatial needs through the program analysis and site analysis , and proposition of alternatives and evaluating them, and selection of the optimum alternative, and development of the solutions. The syllabus deals with the formulation of designs and forms, and the creation of inventing solutions for architectural projects with special emphasis on the spatial and structural aspects of multi-mass buildings.

ARE2207 Building Construction and Materials (2) B (2+4)

The syllabus aims to acknowledge the student with the presentation of executive drawings of architectural projects covering: projections, views, elevations, sections, and architectural details. The syllabus continues studying the carpentry details and studying the metallic works – internal finishing works (painting – partitioning – false ceilings) – floors finishing with tiles, carpets, vinyl, and parquet – vertical movement in buildings (staircases, elevators , …etc) – studying the presentation methods for drafting and the extraction of the module network – studying the effective structural surfaces (plane surfaces, shell surfaces, …etc).

ARE2208 History and Theories of Architecture (2) B (3+1)

The syllabus aims to acknowledge the student with the developments of thoughts and ideas that formulated the architecture till the end of the Renaissance era. Also, it illustrates and analytic comparative study of the architecture of historic eras from the (gothic) middle-ages – the Romanesque style in Europe – national styles in Europe – the architecture of the Renaissance era.

ARE2211 Computer in Architecture (2) (2+2)

The syllabus aims to acknowledge the student with the main methodologies of architectural design using the computer or "the computer aided architectural design" CAAD, and upgrading his skills in dealing with such systems. The syllabus deals with the Allocation Problem through the theories and methodologies of the Automated Spatial Synthesis, which includes the Improving and Constructive methodologies - Using computer software in three dimensions drafting (especially with AutoCAD) and its practical training. Also the syllabus illustrates a detailed study for methods of data acquisition and analysis through: studying the observation and registration of different properties of an activity, relationship, and space in

architecture – methods of tabulation, registration, and classification of data by using the computer – an introduction to Databases as a main computer application.

ARE2212 Landscape (3+1)

The course teaches the student the principles of landscape and its integration with the architectural design which achieves the best utilization of site and save the natural environment and uses it.

The course exposes studying the importance of landscape and saving the natural environment and studying different environments- Studying different models of dealing different cultures with gardens and external urban spaces- Land form- Water and its uses in outdoor spaces- Use of plant materials- pedestrian circulation – Paved areas- Principles of external spaces formations- The complete design study to produce a complete landscape project- training the student how to prepare the landscape of a site.

ARE2213 Sanitary Installments (3+1)

The aim of this course is to study the sanitary works in buildings. It contains: The sanitary networks in buildings- The sanitary installments and tools with their connections in buildings- Heating water works- The design criteria in sanitary drainage for the liquid remainders – Get out the solid remainders- Fire-resistance works- Sanitary works for the especial buildings (swimming pools, laundries, kitchens).

Architectural Engineering

Third Year

FIRST TERM

ARE 3114 Architectural Design (3) A (2+6)

The course aims to direct the student and develop its ability to apply the scientific methods to create solutions and new designs which supply with functional and requirements needs within the architectural program and site analysis.

The course exposes new architectural solutions for projects which have complicated characters and contain a collection of functional requirements and different types of internal circulation with concentration on the integration between function and circulation.

ARE 3115 Working Drawing & Construction Methods A (2+4)

The course aims to teach the student the construction methods of building and train him about a complete collection of working drawings which are applicable for real execution on a given projects.

The course contains large span construction- different types of building materials – architectural details- cladding- curtain walls- finishing of construction skeleton- finishing of stairs- preparation of a complete collection of drawings to execute architectural project-architectural drawings and details-structural elements- sanitation works and supply of potable water and technical installations.

ARE 3118 History & Theories Of Architecture (3) A (3+1)

The course aims to teach the student the most important principles and theories of architectural thinking within the nineteen and twelve centuries.

The course exposes to the thinking movements of the architecture of nineteen theories- The functional thinking of the early twelve century –Different schools of functional architecture- Organic architecture- Art nouveau movement-international style-Architecture of between two world wars-Stage the development after world war II –Human stage and post modern architecture and arts-Stage of technology and future movements.

Also, The course exposes to the effects of natural and cultural factors, the structural possibilities and its effects upon architecture during the Islamic eras; Omawy, Abbasi, Fatimic, Awoubic, Mamlouk, and Osmany in Egypt and Arab & Islamic Countries, Spain and Far East – Applied study about real example of building types (Mosques, schools, bathes, commercial malls,…) .The course also contains analyzing of examples of works of arts through different eras; Ancient Egypt, Classical periods, Painting schools in the Renaissance and modern periods.

ARE 3117 Urban Planning (3+2)

The course deals with the approaches of planning studies of cities and different levels of planning: local, urban and regional planning.

The course contains studying the factors affecting the development of cities- Regional studies- Natural environmental studies- Urban and land use studies- Socio-economic studies- Principles and planning norms of services- Studying the steps of preparation the comprehensive and general plan of cities- Training on a real planning project to apply what have been theoretically studied.

ARE3118 Human & Architectural Studies (3+-)

The course aims to introduce the human architectural approach to the students. It contains: The definitions of humanity in architecture – Human and social needs – The relative relationships between man and built-environment – Perception and human behaviors – theory of behavior setting – Theory of participation – Theories of design flexibility and adaptation – Theory of "architect as an enable".

ARE3119 Scientific Methods & Operation Research (3+1)

The course aims to introduce the different scientific design approaches in architecture. It contains: The traditional design approach to architectural design – The classic scientific design approach and systematic design methodologies – The modern scientific design approach and the artificial intelligent systems – The comprehensive design approach.

Architectural Engineering

Third Year

SECOND TERM

ARE 3214 Architectural Design (3) B (2+6)

The course aims to direct the student and develop its ability to apply the scientific methods to create solutions and new designs which supply with functional and requirements needs within the architectural program and site analysis.

The course exposes new architectural solutions for projects which have complicated characters with concentration on the relationship between buildings and external spaces and the layout, the functional relationships and the spatial requirements and needs. The course also deals with designing large span construction using different types of developed systems of structure.

ARE 3215 Working Drawing & Construction Methods B (2+4)

The course aims to teach the student the construction methods of building and train him about a complete collection of working drawings which are applicable for real execution on a given projects.

The course contains large span construction- different types of building materials – architectural details- cladding- curtain walls- finishing of construction skeleton- finishing of stairs- preparation of a complete collection of drawings to execute architectural project-architectural drawings and details-structural elements- sanitation works and supply of potable water and technical installations.

ARE 3120 Urban Design (1) (3+2)

The course aims to teach the student the urban design in the field of natural and built environment, and to inform him about the relation between urban design and other architectural and planning field.

The course exposes to the theories of urban design – Elements of urban design- Socio-Economic aspects- Pattern & elements and Spatial formation of the city – City perception- Constrains of formation- principles of urban land use- Types and dimensions of spaces- Elements of Urban environment- Urban spaces of old cities – Regulations of urban design.

ARE3221 Housing (1) (3+1)

The course aims to teach the student about the housing problem its appearances and reasons, and the different solutions to face it through introducing the activities of urban development and the housing environment and designing planning housing sites.

The course include studying the housing problem, its appearances and reasons - Traditional and non traditional solutions such as core house, site and services, self-help housing- user participations- Informal housing- Planning of cluster housing-

Concept of neighborhood- Norms of services- Design norms of neighborhood- Choosing sites of housing and analysis- Types of housing units and buildings- Housing densities –Low cost housing design and planning-Types of site housing planning- Streets and circulations and planning nets- Environmental upgrading and renewal- The course contains applied study on housing area.

ARE3222 Technical Installments (3+1)

The syllabus aims to study the acoustic installments, illumination, and air conditioning systems in buildings. The syllabus includes:

First: studying the acoustical characteristics of sound – methods of measurements – sound reflection and refraction – absorption and noise insulation – studying the sound behavior inside spaces – methods of designing different architectural spaces for acoustic treatment – materials and methods of surface treatment inside spaces.

Second:studying light through natural illumination – artificial illumination – calculation of illumination – illumination efficiency – types of electricity sources – electrical installments used in illumination – distribution of illumination and selecting its locations inside different spaces.

Third: artificial control of the thermal environment – idea of air conditioning – thermal comfort – cooling and heating loads – artificial ventilation in buildings – fundamentals of controlling systems and air conditioning systems and their economics – suitability of the selected systems to the architectural solution and the spatial needs – distribution of air outlets and ducts and their specifications – design principals of central air conditioning systems and integration with other systems in buildings.

CSE3254 Foundation (2+1)

Main soil Characteristics – Soil classification and loads distribution through it – Soil compression – supporting theory – lateral pressure of soil – shallow bases design – stake foundations – site bores – barring walls – selection of foundation type suitable for the soil type and stress.

Architectural Engineering

Fourth Year

FIRST TERM

ARE4123 Architectural Design (4) (2+6)

The course aims to enhancing the student s architectural thoughts through training on different design approaches.

The course contains : Analytical study of design alternatives for public and residential projects , to reach architectural and urban forms & configurations together with the appropriate design alternatives to satisfy : design , functional , structural , visual , and environmental determinants ; applying the relevant building codes and regulations - The projects are to combine complex features and urban dimensions related to practice & local context , presentation will apply professional techniques and modeling .

ARE4124 Working Drawing And Quantities & Specifications (2+4)

The course aims to Train on preparation of complete set of execution designs and documents for projects, and introduction of building regulations, through undertaking a full set of execution designs for a given project comprising wide spans pre-designed by the student during the third year.

The course contains : General conditions , tenders and tender study , contract documents and payment certificates , quantity surveying on site measuring techniques – general specifications , materials and labour cost analysis .

ARE4125 History And Theories Of Architecture (4) (3+1)

The course aims review the different stages of the development of philosophical and architectural movements in the 20^{th} century.

The course contains : Pre-international school – art nouveau and organic architecture – international architecture in Germany , France and Holland – interwar period – technological progress , post 2^{nd} world war – human period – environmental architecture in Egypt and the world – The primitive vernacular and heritage oriented – post modern architecture – future expectations – scientific and cultural changes .

ARC4126 Town Planning (3+1)

Approaches and introduction town planning studies with emphasis on systematic planning process and analytical methods – Development of student's theoretical and practical abilities in urban planning. Development, planning and settlements studies: structure plan and general plans: elements and stages of plan preparation – regional framework – Physical, economic, demographic and social studies – legal framework – existing conditions: physical structure, land uses, constraints, potentials and

determinants – Goals and objectives – planning alternatives – Evaluation and selection – Implementation and monitoring – Settlement studies – Sector studies – Studies of upgrading and improvement (of urban areas) conceptions and community development (theoretical and practical) urban planning project in an existing or a new town.

ARE4127 Urban Design (2) (3+1)

The course aims to teach the student the urban design and develop its ability to apply the approaches of urban design on models of cities in the Egyptian environment.
The course contains an applied project from the Egyptian environment which have theoretically studied with emphasized about the skeleton o urban design in site- site analysis- studying the visual and cultural measurements-Variable of sites- Effecting factors on urban design- Effect of nature on urban design from socio-economic aspects- Studying elements of urban design- Designing and formation of sites with regards to natural and built environment.

ARE 4128 Housing (2) (3+1)

Housing studies – Housing approaches, processes, patterns and housing types – Development and design of housing areas – Socio-economic and environmental factors. Housing exercise: Development studies of integrated urban residential areas.

Architectural Engineering

Fourth Year

SECOND TERM

ARE42229 Project Management & Feasibility Studies (3+1)

Introduction to the project management methods in architectural design and execution problem solving, within the framework of potentials and resources, and limitations of time and cost. It contains: the introduction to the project management: objective hierarch – task distribution- design flow charts- critical organization methods and temporal bar charts – principles of construction management – execution programmers and schedules- finance and monetary flow. It also contain : Methods and strategy of decision making: decision making process- conceptions and criteria of evaluation – evaluation criteria relative weighting- evaluation nets utilization- principles and applications of operations research and the other mathematical techniques. It also contains the principles of the feasibility studies for the design projects.

ARE4242 Graduation Project (4+12)

The course aims to Formulation of integrated design solutions of architectural, urban design & physical planning dimensions, expressing the various directions and conceptions, of architectural design and thoughts .

The course contains : A collective research study comprising : design determinants formulation , analysis and critiques of public buildings , comprehensive programming and comparative analysis of design alternatives and selection of the most appropriate design of architectural and urban spaces to fulfill design , functional , environmental , structural , human and cultural determinants .

An integrated design project to combine the collective outputs of the previous architectural & urban studies, during the programme.

ARE 4230 Renovation And Urban Upgrading (3+1)

The course aims to introduce approaches and meanings of renewal and urban upgrading for best utilization of the possibilities of built environment and its urban and human resources. The course aims to teach the student the local and international trials of upgrading. The course contains the field of urban upgrading its evaluation and analyzing the urban of existing cities- the reasons of deteriorations –socio-economic aspects- the ways of soling the problems of urban areas- the course tend to train the student how to make applies studies and planning.

ARE 4231 Environmental And Urban Conservation (3+1)

The course aims to introduce meaning of conservation maintenance and controlling urban areas which are have civilized values with emphasis upon design and

comprehensive planning skills with socio-economic and cultural environment in addition to introduce the concept of maintaining the natural environment. The course contains meaning of upgrading and renovation- principles of conservation and maintenance- meaning of balance and sustainability of built environment- meaning of values- surveying and analyzing historical and civilized areas . The course also contains meaning of environmental conservation in terms of ecology- studying factors affecting environment – and how to deal with urban in term of conservation- its levels and code and regulations in relation to conservation.

ARE 4232 Renovation & Development Of Rural Communities (3+1)

The course aims to teach the student the approaches of developing communities with emphasis on the rural communities in the Egyptian villages.
The course contains the development of the role of villages from the socio-economic-urban aspects- Actual conditions, variables, constants and the characters of villages – Methods of development as urban–economic meaning-directions of village's growth and extension- Rural housing-. The course also includes studying types and models of Egyptian villages and makes complete set of studies and analysis- Preparing plans for re-planning of villages and solve its urban social economic and super structure problems.

ARE4233 Environmental Design And Planning (3+1)

The aim of this course is to enhance and develop environmental design and planning skills, with emphasis on the tools and techniques to support architectural and planning for generation processes to introduce solar and natural energy & pollution control studies together with integrated systems in and around buildings. The course contains: Environmental levels and settings review –Climatic regions in Egypt -: features, design and development recommendations – Integrated environmental design – Energy conservation principles- Comfort indicators and human needs- Ecological systems- Environmental protection: Desertification, moving sands, coastal protection, storm water- Pollution & pollution control- Environmental factors in site planning and development: sun and thermal environment- Architectural aerodynamics- Lighting- Non fossil and natural energy- Solar energy: methods and performance- Uses and applications, calculation and feasibility- Design criteria- Integrated environmental systems, internal and external: principles and performance improvement- Case study.

ARE4234 Building Technology And Construction Methods (3+-)

The course aims to study the advanced building technologies and methods, developed and recent construction systems and applications. The course contains : Technology concepts and definitions – Historical background – Building technology in sites – Mechanical methods – Machinery – Mechanical execution – Prefabrication technology- Mass production and prefabrication – Construction systems selection – Systems integrations and overlapping – System design – Industrialization and

execution – Cost analysis and tendering – Feasibility – Flexibility – Finishes – Contracting and tendering alternatives – Industrialization and site works – Transportation and storage.

ARE4235 Building Economy (3+-)

The course aims to study the economic aspects of buildings and environs, to understand cost elements during design execution, operation and demolition phases and to present means and techniques of cost control in the building process. Introducing feasibility studies for architectural projects and its elements. The course contains how to prepare the feasibility studies, cost analysis, analysis of pin fits, Preliminary estimation, finance control, cost and time schedule, sensitivity analysis.

ARE4236 Computers In Architecture (3+-)

The course aims to study the advanced directions and approaches to the computer-aided design models and artificial intelligent design systems. The course contains: AI design systems- Types of expert design systems- Design facts - Interpretive design knowledge; translative design knowledge; generative design knowledge; control systems or design reasoning techniques- Principles of model of design – Principles of how to design a model - Components of expert design systems.

ARE 4237 Methods Of Upgrading Conservation & Rehabitation (3+-)

The course aims to introduce the meaning of upgrading urban environment as a socio-economic urban approach to solve the problems of deterioration zones in developing countries, the meaning of re-habitation as a meaning of conservation and activate the efficiency of reutilization of historical, civilized and valuable areas. The course contains meaning of urban development- reasons for urban deteriorations-fast urbanization and its negative effects upon communities- types of communities which needs developments- recent information's about upgrading urban environment- studying the Egyptian experiences in the field of upgrading- informal housing – positives and negative aspects in informal zones – efforts of the government to sole informal housing and communities.

ARE4238 Architectural Criticism

The course aims to introduce the tools and methods of architectural criticism and to review examples of its schools and directions : output , critics and key workers , to enhance evaluation skills and the ability to express them orally , graphically and in writing .

The course contains: conceptions and definitions - criticism evaluation and improvement – The nature, function and importance of architectural criticism – History of architectural criticism process : Data – Description, Documentation and Recording –Review and analysis – Hypothesis –Criteria and Evaluation basis - Evaluation – Output Evaluation criteria – Subjective and societal values and criteria –

Qualitative and quantitative criteria – Variability and change . Criticism and evaluation of architectural processes and products ; Approaches – Competitions – The work of leading architects – Landmarks and key works – Examples, application and case studies .

ARE4239 Architecture, Civilization, And Heritage

The objective is to enhance and secure the student's background and grasp of the realms and scope of humanities, social and cultural studies with emphasis on the relationship between socio-cultural contexts and architecture, with reference to the issues of : local culture, architectural heritage, local, indigenous and regional architecture. The course contains: Cultural context definition " features and characteristics" – Methodology and principles of identification– Descriptive, functional and structural methods and approaches – Social interactions and built environment; perception; environmental images and behavioral patterns; architecture vs environment– Architecture as a cultural expression – Examples and analytic studies– Humanities' conceptions and the design processes– Privacy – Crowding – Territoriality– Belonging– Enclosure– Cultural expression and socio-cultural patterns – Regional architecture, local, national and international levels - Regional architecture and expression– Determinants and influencing factors – Classification of regional expression – Architectural heritage, Egypt: analysis – vocabulary – Addressing heritage , literature and directions – Analysis and applications.

ARE4240 Interior Architecture

The course aims at the enhancement of design and form generation skills of interior spaces in public and private buildings and the detailed study of internal space components together with the factors affecting its form, and to develop graphic communication and expression skills. The course contains : interior design theory – visual perception of spaces – space components and elements – lighting – Acoustics – Textures – Shapes – Norms and Standards – Industrial design and function – Materials and fixtures – Colors studies and psychology – Aesthetics of interior – Current direction in interiors design – Private and public interiors – Environmental design requirements – Integration of interiors and exteriors – Researches studies and applications – Presentation techniques and expression skills.

Civil Engineering

Civil Engineering

First Year

FIRST TERM

CSE1101 Structural Analysis (1) a (4+2)

Types of structures and supports – Reactions – Elastic stability – Analysis of statically determinate beams, frames and trusses – Internal forces .

CPW1101 Plane Surveying a (4+2)

Classification of surveying science – Units of measurements – Drawing scales – Types of surveying maps – Distance measurements – Angles measurements – Coordinates systems – Setting of points .

CSE1102 Properties and Testing of Materials (a) (4+2)

Loads and stresses – Deformations and strains – Relation between stress and strain – Testing machines – Tests – Standard specifications – Aggregates – Cement – Reinforcing steel – Mixing water and admixtures – Woods – Bricks – Lime – Gypsum – Plastics – Insulation materials

PME1105 Engineering Mathematics (2) a (4+2)

Differentiation and integration for functions of several variables – Multiple integration – Taylor expansion – Ordinary differential equations – Laplace transformation

ARE1191 Architectural construction (2+2)

Basic and principals of architectural construction – analysis of building to its elements – Building using bricks, stones, concrete, wood and steel – Types of buildings – Methods of insulation – finishing – Carpentry works

CIH11H3 The Engineer and Environment (2+-)

Development of construction methods and materials – Development of the usage of water sources – Development of transportation – Development of general works – Relation between engineering and environment – Limiting the natural catastrophic effects as a result of engineering civilization

Civil Engineering

First Year

SECOND TERM

CSE1201 Structural Analysis (1) b (3+2)

Influence lines for statically determinate structures – Properties of plane sections – Stresses and deformations for axially loaded members – Normal stresses due to axial forces and biaxial moments

CPW1201 Plane Surveying b (3+3)

Areas and land divisions – Calculation of quantities for land leveling – Methods of determination of difference in elevation – Grid leveling – Contour line – Theodolite traverses

PME1205 Engineering mathematics (2) b (4+2)

Scalar analysis – Fourier series – Partial differential equations – Numerical analysis – Linear and nonlinear programming

CIH1201 Civil Drawing (2+4)

Notations and scales – Steel Structures – Concrete Structures – Earthwork and retaining walls – Drawing of selected irrigation and drainage structures – Drawing of concrete and steel structures – Drawing of selected civil engineering works – Computer aided drawings

EPM/MEP1261 Electromechanical Equipment and Installments (3+1)

Influence of electrical current in our lives – Introduction to electric circuits – Measuring instruments for electric current, voltage, power and energy – Transmission and distribution network – Indoor connections – Electric equipment and apparatus – lighting – Heating - Refrigeration – Air Conditioning – Lifts – Automatic water lifting- Alarm systems – Traffic signals – Electric drawing standards – Electric installation specification – Mechanical installation – Pumps – Control methods

CSE1203 Engineering Geology (2+1)

Engineering classification of minerals and rocks – faults, folds and joints – earthquake – Geological maps – Engineering properties of rocks – Weathering and related problems – Geophysical applications

Civil Engineering

Second Year

FIRST TERM

CSE2104 Structural Analysis (2) a (3+2)

Shear stresses in solid and hollow sections – Shear flow and shear center – Torsion of thin walled members – Combined and principal stresses Properties of plastic sections – Displacement calculations

CSE2105 Design of Reinforced Concrete Structures (1) a (3+2)

Physical and mechanical properties of concrete and steel reinforcement – Structural systems – Statistical systems of floor elements – Absolute Bending moment and shearing force diagrams – Load distribution – Introduction – Introduction to methods of design – First principle design of reinforced concrete sections subjected to flexure using limit state design method – Bond and anchorage between steel and concrete – Development length of reinforcement of beams – shear stresses of beams

CSE2106 Properties and Testing of Materials (2) (4+3)

Concrete technology – Properties and testing of fresh and solid concrete – Different types of concrete – Non destructive tests for concrete – Quality control – Properties of metallic materials under the effect of impact, fatigue and creep – Theories of failure of materials – Flexure beyond elastic limit

CIH2102 Fluid Mechanics (3+2)

Introduction – Engineering systems – Properties of fluids – Fluid statistics – Fundamentals of fluid flow – Momentum and forces in fluid flow – Principals laws and equations of hydrodynamics – Similitude and dimensional analysis – Steady incompressible flow in pressure conduit – forces in immerged bodies – Flow in closed conduit and pipe systems

CIH2103 Hydrology (3+2)

Introduction to water balance and hydrologic cycles – computational methods and statistics – Surface hydrology – Precipitation – meteorology – transpiration – water shed characteristics – hydrology – groundwater resvoirs – confined and unconfined seepage flow – design of hydraulic of wells – groundwater management – flood and storm management – hydrology of the Nile River – computer applications SMADA – REGRESS – OPSEW – HEC-1

CPW21H3 Applied Statistics (2+1)

Analysis of a single variable data – analysis of multiple variable data – Probability distribution – random numbers and variables – simulation using Monte-Carlo Procedure

Civil Engineering

Second Year

SECOND TERM

CSE2204 Structural Analysis (2) b (3+2)

Displacement calculations using virtual work – Analysis of statically indeterminate structures using consistent deformation for beams and three moment equations and its applications – Analysis of simple and continuous beams under moving loads – buckling of column – Plastic analysis of beams and frames

CSE2205 Design of Reinforced Concrete Structures (1) b (3+2)

Using limit state design method for the design of continuous beams, solid slabs and short and long columns – Design of sections subjected to eccentric forces – Serviceability limit states and cracks control – Design of sections subjected to biaxial bending – Design of reinforced concrete walls – Introduction to the design of concrete members using working stress design method

CPW2202 Topographical Surveying (4+3)

Tachometric surveying – Electronic measuring devices – Drawing methods of counter lines – Drawing using computers and digital maps – Horizontal curves – Vertical curves – Theory of errors

CSE2207 Construction Economics (2+2)

Investment calculations – Different methods for economic comparison – Optimization of the use of assets – Sensitivity analysis – Applications in the construction field

CSE2208 Soil Mechanics (1) (3+2)

Properties of soil – Classification of soil – Permeability – Stresses inside soil – Shear strength – Soil consolidation – Settlement

CIH2208 Irrigation and Drainage Engineering (2+2)

Sources of water irrigation – assessment of water requirements using different methods – Factors affecting the quality of irrigation – land cultivation – Different irrigation methods – Different drainage methods – Development of irrigation system in Egypt – Summary of some advanced projects – soil water relationship – lining and maintenance of canals – modern irrigation systems – GIS application in water consumptive use – future of irrigation systems according irrigation modernization development of drainage systems – computer applications

Civil Engineering

Third Year

FIRST TERM

CSE3109 Theory of Structures (4+3)

Analysis of indeterminate structures: consistence deformation – slope deflection – moment distribution – Dynamic of Structures: Free vibration analysis and forced vibration for single degree and multi degrees of freedom

CSE3110 Design of Reinforced Concrete Structures (2) a (3+2)

Design of sections subjected to torsion – Design of plates slabs – Ribbed and hollow blocks slabs and paneled beams

CSE3111 Design of Steel Structures a (2+2)

Steel properties – Loads and structures systems – design of tension and compression members, wind bracing, trusses and weld connections – bolted ordinary connections

CSE3112 Soil Mechanics (3+2)

Lateral earth pressure – bearing capacity of shallow foundation – Stability of earth slopes – retaining walls

CPW3130 Transportation and Traffic Engineering (2+2)

Urban planes – Objectives, goals and transportation planning stages – Traffic studies (volume, speed, density, and travel time delay) – Traffic flume characteristics – Interception control

CIH3105 Hydraulics (3+2)

Flow in open channels, flow measurement – unsteady flow problems – Steady flow – flow in piping systems – Pumps and turbines – environmental fluid mechanics – hydraulics of groundwater – computer applications

Civil Engineering

Third Year

SECOND TERM

CSE3210 Reinforced Concrete Structures (2) b (3+2)

Long span structures – Structural system – Frames – design of bases – arches – sawtooth – structural joints

CSE3211 Design of Steel Structures b (3+2)

Connection with high bolts – bases – rolled and plate girders subjected to dynamic loads – beam column – rigid frames – lateral torsional buckling – introduction to composite structures

CSE3213 Construction Project Management (3+2)

Planning in the different project stages – Different method of preparing the time schedules construction project organization by owner and contractor points – planning of construction project – Types of construction contracts and bidding methods – Cash-flow for construction project – Cost estimation of construction project and bidding preparation – Bidding competition control – Follow up of construction project – Conditions of construction contracts

CSE3214 Foundation Engineering (1) (3+2)

Shallow foundation: spread footings – Combined footing – Footing subjected to moments – Strip footings – mat foundation – Deep Foundation: classification – Bearing capacity of deep foundation – design of piles – settlement of pile group – pile subjected to lateral loads – design of pile caps

CIH3206 Design of Irrigation Works (1) (4+2)

Introduction to irrigation structures – Design of retaining walls – small bridges – intersection of roads and water channels – culverts – aqueducts – siphons – tail escapes – spillways – introduction to hydraulic tunnels – computer applications on design of irrigation

CPW3204 Railways Engineering (2+2)

Signals – turnouts and switches – stations and yards – railway cost

Civil Engineering

Fourth Year

FIRST TERM

CSE4115 Design of Reinforced Concrete Structures (3) (4+2)

Prestressed concrete – design of Maine structures – design of shallow and deep tanks – design of elevated tanks

CPW4105 Sanitary Engineering (3+2)

Water supplies works – Preliminary studies for wastewater systems and structures – Water resources and collections – Treatment and recycling of wastewater

CIH4107 Design of Irrigation Works (2) (3+2)

Seepage theory and fundamental of flow through porous media – seepage beneath hydraulic structures – erosion and sedimentation downstream hydraulic structures – Wires – regulators and gate operation – reservoirs classification and storage operation – Types of locks – systems of loading and unloading of locks – design of walls – types of dams – design of reservoirs – design gravity and concrete dams – stability of dams – barrages stability – protection of in and outlet of barrages – computer applications

CPW4106 Geodesy and Satellite Surveying (2+2)

3-D coordinates computations and transformations – coordinates determinations using different GPS techniques, GPS operation planning – remote basics and principles – elements of photography process – types of microwave and radars – terrestrial monitoring

CPW4107 Highway Engineering (3+2)

Classification of roads – Planning and route selection – Geometric design criteria – Planning and design of intersection – Design and characteristics of asphalt mixes – Design of pavement and concrete roads – Surface drainage of roads

CSE4116 Foundation Engineering (2) (3+2)

Sheet piling wall – Introduction in Tunnel – Caissons – Dewatering – Earthquake effect on soil – Foundation – Dams

Civil Engineering
Fourth Year
SECOND TERM

CSE4217 Metallic Bridges b (3+2)
Floors of railway bridges – bracing of longitudinal beams and bracing of bricking forces – design of composite and plate girder bridges

CIH4208 Harbors, Navigation and Shores Protection (3+2)
Natural changes of shores – shore water management – management of land shore and sediments – types of navigation channels – hydraulic phenomena – boat effect in water channels – design and protection of navigation channels – Theory and properties of waves stimulation of waves and water deep – Marine planning – Design of Marine structural element – Design of wave barrier – Design of platforms

CIH4210 Environmental Hydrology and water Quality Control (2+2)
Different design methods for open channels – Introduction for river engineering – water quality modeling – Water powers – Analysis for pipe networks – different types of valves – water hammer – stresses due to different types of loads

CIH4211 Dams and Reservoirs Engineering (2+2)
Hydrological studies related to dams – Cost and profit studies and dam project funds – Design considerations from geological and topography and available materials point of view – Hydraulic design of dams – Structural design of dams –Dams and hydraulic energy – Aswan High Dam

CIH4212 Design of Pump Stations (2+2)
Introduction – types of pumps – hydraulic design of pumps – hydraulics of valves – specific velocity principles – net positive suction head – hydraulic considerations in pumping choice – design of pump stations elements – unsteady flow of pumps – structural design of station buildings – protection against uplift pressures – maintenance and rehabilitation – upstream and downstream protection – environmental impacts – computer applications

CPW4208 Airports Engineering (2+2)
Types and properties of airplanes – design of runways – design subways – structural design of airports as a general – system of lights, drainage, and traffic signals

CPW4209 Systems of Traffic Management (2+2)

Definition of management and traffic operation – traffic planning – traffic operating signals – light signals – parking control – traffic tidal effect – improvement of cargo transportation services

CPW4210 Remote Sensing and Applications (2+2)

Basics and principles or remote sensing and applications – advantages of remote sensing and applications – control and check of locations – systems or receive industrial satellite – systems and equipment for analysis given data

CPW4211 Water and Sanitary Networks (2+2)

Construction of water supply networks – types of pipes and networks – construction of wastewater networks

CSE4218 Special Topics in Reinforced Concrete Design (2+2)

One or more topic, from the following, should be chosen: High-rise building – Precast buildings – Yield line theory – Beam column joints – Design of slabs

CSE4219 Inspection and Quality control (2+2)

Technical investigation – procedures of quality control – statistical control for concrete – non destructive tests for concrete

CSE4220 Earthquake Engineering (2+2)

Properties of earthquake – importance of earthquake studies in Egypt – analysis of first degree of freedom – design code – computer application for calculation of earthquake forces – Introduction to seismic isolation

CSE4221 Plastic Design of Structures (2+2)

Introduction to plastic analysis – Properties of plastic analysis – plastic analysis factors – plastics design of beams and frames

C**42** Project (2+6)

The title of project should be offered from structural, public works and irrigation and hydraulics departments

Civil Engineering
(Structural Engineering)

Structural Engineering

Third Year

FIRST TERM

CSE3122 Structure Analysis (3) a (3+2)

Analysis of statically indeterminate structures using: consistent deformation method, slope deflection method and moment distribution method – Matrix structural analysis: flexibility method and stiffness method

CSE3123 Design of Reinforced Concrete Structures (2) a (3+2)

Design of beams under torsional moment – Design of flat slab – Design of ribbed and hollow-block slabs – Design beams – Design of stairs – Design of deep beams – Design of short cantilever

CSE3124 Design of Steel Structures a (3+2)

Steel properties – Loads and statical systems – Design of tension and compression members – Design of columns, wind bracing, trusses, welded connections, ordinary bolted connections – Plastic sections in tension and compression – Buckling of various elements

CSE3125 Soil Mechanics (3) (3+2)

Lateral earth pressure – Bearing capacity of shallow foundation – Stability of earth slopes – Retaining walls – Soil compaction

CSE3126 Quantity Surveying and Specification Preparation (3+2)

Methods and units for quantity surveying – Estimation of quantity excavations , filling, plain and reinforced concrete work, masonry work and finishing – Preparation of bill of quantities – Specifications for various construction elements

CSE3127 Soil Structures Interaction (3+2)

Stress distribution in soil media – Soil modeling – Analysis and distribution of stresses in strip – rectangular and circular foundations – Design of raft foundations – Foundation analysis of high rise buildings

CSE3128 Construction Equipment (3+2)

Equipment for excavation, earth moving and soil compaction – Lifting equipment – pile drilling equipment – Concrete bath plants – pavement equipment

CSE3129 Special Types of Concrete (3+2)

Lightweight and high-density concrete – Precast concrete – High performance concrete – Prourus concrete – Steam cured concrete – Under water concrete – Hot weather concrete

CSE3130 Theory of Plates and Shells (3+2)

Theory of rectangular plates – Membrane theory for surface revolution and transition – Bending theory for cylindrical shells and slabs – Buckling analysis for thin walled structures

Structural Engineering

Third Year

SECOND TERM

CSE3222 Structural Analysis (3) b (3+2)

Influence lines for statically undetermined structures – Introduction to plastic analysis – Absolute bending moments of beams – plastic analysis for beams and frames

CSE3223 Design of Reinforced Concrete Structures (2) b (3+2)

Long span structures – Statical systems – Statically determinate and indeterminate frames (Design of frame sections – Design and analysis of beam to column joints – Design of hinged support of frames) – Arches (slabs and girders) – sheds and Vierendeel girders – Saw-tooth roof structures – Joints in structures

CSE3224 Design of Steel Structures b (3+2)

Connections with high strength blots – Steel bases – rolled and plate girders subjected to dynamic loads – (beam-columns) – Rigid frames – Lateral torsional buckling – Introduction to composite structures – Plastic design for beams and columns – Cold formed sections

CSE3231 Construction Projects Management (1) (3+2)

Construction project organization by owner and contractor points – planning of construction project – Various methods for preparation of time programs of construction project – Types of construction contracts and bidding methods – Cash-flow for construction project – Cost estimation of construction project and bidding preparation – Bidding competition control – Follow up of construction project – Conditions of construction contracts

CSE3232 Design of Foundations (1) (3+2)

Shallow foundation: spread footings – combined footing – footing subjected to moments – strip footings – mat foundation- Deep foundation: classification – Bearing capacity of deep foundation – design of piles – settlement of pile group – pile subjected to lateral loads – design of pile caps – raft over piles

CSE3233 Soil Improvements (3+2)

Engineering needs for soil improvements: Geotechnical problems with soft and loose soils, soil improvement techniques – Mechanical stabilization (Densification) : deep and shallow compaction techniques, soil parameters after densification – Pre-loading: consolidation analysis, pre-loading with and without drains – Design and construction of soil reinforcement: reinforcing materials, physical and mechanical properties, utilization methods, advantages and limitations, reinforcement techniques

– Grouting: Grout properties, grouting techniques – criterion for choosing suitable techniques

CSE3234 Construction Methods (3+2)

Execution methods for permanent works – Temporary structures – Installations of steel structures – Technology of pavement construction – Effect of construction methods upon the design procedure

CSE3235 Structural Dynamics (3+2)

Single degree of freedom under various dynamic loads – Earthquakes properties – Design codes – Computer applications to calculate the earthquake effects

CSE3236 Masonry Structures (3+2)

Introduction – Masonry materials – Masonry assemblages – reinforced beams and lintels – Flexural walls – Load bearing walls under axial load and out of plane bending

Structural Engineering

Fourth Year

First TERM

CSE4137 Design of Reinforced Concrete Structures (3) a (3+2)

Prestressed reinforced concrete – design of shells – Design of folded plates – Introduction to the types and the details of reinforced concrete bridges – Introduction to design of high rise buildings

CSE4138 Design of Metallic Bridges a (3+2)

Floors of railway bridges – Bracing for stringers and brake forces – Design of composite and plate girder bridges – Cost estimation of metallic bridges

CSE4139 Construction Project Management (2) (3+2)

Quality management and construction security – Different methods for planning of time schedule – planning in the different project stages – using the mathematical models in construction management

CSE4140 Design of Foundations (2) (3+2)

Sheet piling wall – Lateral supports in open cuts – Caissons – Floating foundation – Design of machine foundation – Dewatering – Earthquake effect on soil foundation system – special topics (Foundation on weak and compressible soil – Foundation on expensive soil – Foundation on collapsible soil)

CPW4112 Highway and Airports Engineering (3+2)

Classification of roads – Planning and route selection – Geometric design criteria – Planning and design of intersection – Design and characteristics of asphalt mixes – Design of pavement and concrete roads – Surface drainage of roads – Types and properties of airplanes – Design of runways – Design subways – structural design of airports as a general – system of lights drainages, and traffic signals

CPW4113 Sanitary Engineering (3+2)

Water supplies works – Preliminary studies for wastewater systems and structures – Water resources and collections – Treatment and recycling of wastewater

CPW4114 Railway Engineering (3+2)

Signals – turnouts and switches – stations and yards – railway cost

CPW4115 Transportation and Traffic Engineering (3+2)

Urban planes – Objectives, goals and transportation planning stages – Traffic studies (volume, speed, density, and travel time delay) – Traffic flume characteristics – Interception control

CSE4141 Repair and Strengthening of Structures (3+2)

Causes of building defects – Materials for repair strengthening – Methods of repair – Methods of strengthening

CSE4142 Advanced Structural Analysis (3+2)

Cases of stresses and strain in and out of plane – Stress strain relationship – Principal of energy technique – introduction for finite element method

CSE4243 Plastic Design of Structures (3+2)

Introduction to plastic analysis – properties of plastic analysis – plastic analysis factors – plastic design of beams and frames

CSE4244 Inspection and Quality Control (3+2)

Technical investigation – procedures of quality control – statistical control for concrete – non destructive tests for concrete

Structural Engineering

Fourth Year

SECOND TERM

CSE4237 Design of Reinforced Concrete Structures (3) b (3+2)

Design of marine structures and open channel – water tanks – Circular beams – Circular slabs

CSE4238 Design of Metallic Bridges b (3+2)

Design of train bridges – cross girder and their application on road way bridges – suspension bridges – Design of supports – design of box girder

CSE4245 Computerized Structural Analysis (2+2)

Stiffness method of the analysis for beam – Frames and trusses in plane space

CIH4213 Hydraulics (2+2)

Flow in open channels, flow measurement – unsteady flow problems – Steady flow – flow in piping systems – Pumps and turbines – environmental fluid mechanics – hydraulics of groundwater – computer applications

CIH4214 Design of Irrigation Works (2+2)

Design of retaining walls – Bridges – Culverts – Aqueducts – Wires – Regulators – Dams - Locks

CIH4215 Harbors and Beaches Protection (3+2)

Theory and properties of waves stimulation of waves and water deep – Marine planning – Design of Marine structural element – Design of wave barrier – Design of platforms

CIH4216 Dams and Storages Engineering (2+2)

Hydrological studies related to dams – Cost and profit studies and dam project funds – Design considerations from geological and topography and available materials point of view – Hydraulic design of dams – Structural design of dams –Dams and hydraulic energy – Aswan High Dam

CSE4246 Tunnels and Underground Structures (2+2)

Classification of tunnels – drilling of tunnels – analysis, design and tunneling lining – soil settlement due to tunneling – measuring devices for Geotechnical engineering – analysis and design of culverts and underground structures

CSE4247 Special Topics in Reinforced Concrete Design (2+2)

One or more topic, from the following, should be chosen: High-rise building – Precast buildings – Yield line theory – Beam column joints – Design of slabs

CSE4248 Composite Structures (2+2)

Classification of shear connection – Theory of partial interaction – Nonlinear analysis of composite members under various loads – Design of different composite members

CSE4249 Seismic Engineering Isolation (2+2)

Introduction to seismic isolation – Types of earthquake in Egypt – Study of different types of seismic isolation – Analysis of structures under different types of seismic isolation

CSE4250 Project (2+6)

The student according to the project schedule should choose one of projects.