

Course Description CE

MATH 101 – Calculus I (4,1,0)

This course is designed to cover the basic concepts and methods of Calculus. It includes limits, continuity, and differentiability of functions of a single variable: polynomial, exponential, trigonometric, hyperbolic, and their inverses. Applications: related rates, local linear approximation, differentials, curve sketching and optimization problems. During the semester students will learn to recognize and express the mathematical ideas graphically, numerically and in writing. The course material will be presented in lectures (4 hrs./week). Problem solving techniques will be developed in tutorials.

MATH 102 – Calculus II (4,1,0)

This course is a continuation of Math 101. Topics covered include definite and indefinite integrals of functions of a single variable. Fundamental Theorem of Calculus. Techniques of integration. Applications of the definite integral to area, volume, arc length and surface of revolution. Improper integrals. Sequences and series: convergence tests, integral, comparison, ratio, and root tests. Alternating series. Absolute and conditional convergence. Power series. Taylor and Maclaurin series, Parametric function.

MATH 201 – Differential Equations (3,1,0)

This course covers the following topics: classification of differential equations, first order differential equations, higher order linear differential equations, linear systems of algebraic equations, first order linear systems of ordinary differential equations, Laplace transforms, and their application on initial value problems

MATH 202 – Calculus III (3,1,0)

This course is a continuation of Math 102. Topics covered include different aspects of vector fields: vector fields in two and three dimensions, operations on vectors such as scalar and vector products, gradient, divergence, and curl of vector fields.

Basic of analytic geometry: Lines and planes in three dimensions, surfaces Equations of the tangent plane and normal line to a surface. Vector-valued functions and connecting them with single variable functions. Concepts of motion and curvature. Line and surface integrals, multiple integrals. Green and Stokes Theorems.

STAT 342 – Statistical Methods for Engineers (3,1,0)

This course provides probabilistic modeling and quantitative engineering methods. It focuses on the application of quantitative data analysis methods in all the engineering fields. The course also emphasizes the use of engineering applications and advanced statistical tools and techniques for the data analysis, problem-solving, and decision-making.

PHYS 101- General Physics I (3,1,3)

The topics covered include particle kinematics and dynamics; Newton laws, conservation of energy and linear momentum; rotational kinematics; rigid body dynamics; conservation of angular momentum; gravitation; simple harmonic motion; the static and dynamics of fluids.

PHYS 102- General Physics II (3,1,3)

This course is a continuation of PHYS 101. Topics covered include Coulomb's law; the electric field; Gauss' law; electric potential and energy; capacitors and dielectrics; D.C. circuits; the magnetic field; Ampere's and Faraday's laws. Students will learn the concepts and applications underlie the working of household appliances, electric motors, power generation, all types of monitoring screens, printers, MRI machines etc.

CHEM 101– General Chemistry (3,0,3)

The course is designed to give students a foundation in chemistry by providing an introduction to the following areas: atomic theory; physical and chemical properties of gases, liquids, solids, and their solutions; properties of some elements and their compounds, etc. The course laboratory will include some qualitative and quantitative measurements to formulate and analyze chemical reactions.

CS 141 – Introduction to Computing for Engineers (2,0,3)

The course provides an introduction to computing logic, algorithmic thinking, and programming constructs using MATLAB, a programming language and computing environment. Knowledge obtained in this course will enable students use computer as an instrument to solve computing problems. Topics include an introduction to programming in MATLAB, including matrix operations, functions, arrays, loops and structures, working with data files and plotting. No previous programming experience is required.

ENGG 103 – Introduction to Engineering Drawing (0,0,3)

This course includes an introduction engineering drawing course. This is a laboratory course and both hand sketching and computer-aided design (CAD) are the two main tools to formulate and convey design intent. Therefore, this course is planned to introduce sufficient classical tools, which would help the student to visualize three-dimensional objects and develop orthographic projection drawings. The course topics are arranged in sequence starting from: the basic concepts of geometrical constructions & engineering curves proceed to the principles of projection techniques. Some fundamentals of computer graphics will be introduced through an introduction to the basic of computer-aided design (CAD) techniques using the software AutoCAD.

ENGL 101 – First Year Composition (3,1,0)

English 101 is an intensive course (45 contact hours spread over a fifteen-week semester) in reading and writing English focusing on the language skills needed for success in college courses. The focus of this class is on developing fluency in academic reading and writing: "read well to write well". Students are exposed to different genres of reading material such as encyclopedias, magazines, newspapers and websites. They are taught strategies for dealing with each genre independently and effectively. The writing component teaches argumentation and such rhetorical modes as definition writing, description, exemplification, causal analysis and comparison.

Students are taught the writing process and introduced to paragraphing, cohesion, conciseness, unity and the use of specific details. They are alerted to common errors in grammar and sentence structure. The vocabulary component is based on the Academic World List, a corpus of vocabulary items based on the most frequently occurring lexis in a broad range of academic texts. In addition, students are expected to give short talks on a variety of topics

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ENGL 102 – Introduction to Report Writing (3,1,0)

Students write a term report on a themed topic. They are introduced to basic research skills involving the Internet and the University's databases and print collections. They are taught about document design, the MLA (Modern Language Association) style of documentation, evaluating sources, summarizing, outlining, note taking, drafting, revising and editing. Academic integrity in report writing is strongly emphasized. Their reading skills are further enhanced through exposure to a variety of graphical sources such as charts, graphs and diagrams. Students are taught presentation skills culminating in a PowerPoint presentation based on their term report. The ENGL 102 course explores then three common academic rhetorical modes: summary and critique, analysis, discussion synthesis and report writing. Students will learn the purpose and key elements of each, and practice writing, evaluating, and revising. Students will also learn techniques for introducing, developing, and concluding their productions and term reports and present it verbally. These three modes are going to be based on selected reading themes assigned by the teacher, as well as related vocabulary.

ENGL 201– Technical Writing (3,1,0)

The ultimate goal of Technical Communication is to enhance students' reading, writing, oral and electronic skills in order for them to become able to effectively communicate in English. The course comprises leading research, organization of collected information and writing audience-centered technical reports and correspondence documents as well as preparing oral presentations of their reports. The current course will also enable students to develop skills of collaborative work. It will help students build effective abilities to compose various types of business correspondence such as memos, emails, and business letters. The course then will provide them with significant opportunities to effectively function not only in the academic environment but also in their future professional environment.

GIAS 101– Islamic culture (3, 0 ,0)

The Islamic culture course includes the concept of culture in language and terminology and the relationship of Islamic culture with other cultures. The concept of the pillars of the Islamic faith includes the characteristics of the belief and its effects on the individual and society. It deals with the concept of worship, its pillars and conditions, in addition to an overview of morals and its status in Islam. It deals with examples of the morals of the Prophet Muhammad, may God bless him and grant him peace. Peace be upon him, as well as the course is exposed to human rights in Islam and models of their applications through the Kingdom of Saudi Arabia.

GIAS 102– Arabic Language Skills (3, 0 ,0)

The language skills curriculum contains the basics of Arabic grammar that the learner must be familiar with. To be able to read, write, and formulate structures correctly, and there are exercises and texts that help the student to access in a smooth and easy way.

CHEM 101 – General Chemistry (3, 0, 3)

The course is designed to give students a foundation in chemistry by providing an introduction to the following areas: atomic theory; physical and chemical properties of gases, liquids, solids, and their solutions; properties of some elements and their compounds, etc. The course laboratory will include some qualitative and quantitative measurements to formulate and analyze chemical reactions. Three class periods and one 3-hour laboratory period.

CE 201: Statics (3, 1, 0)

This course discusses the following topics: Basic concepts and principles of mechanics; vector algebra; equilibrium of particles in two and three dimensions; definition of moment and couple; reduction of systems forces; equilibrium of rigid bodies; statically determinate structures including beams, trusses, frames, and machines; internal forces; shear force and bending moment diagrams in beams; friction and its applications, centroid and center of gravity of lines, areas, and volumes; moment of inertia and radius of gyration.

CE 202: Dynamics (3, 1, 0)

This course includes the Fundamentals of dynamics using vector methods. Rectilinear and curvilinear motion, translation, rotation, plane motion; work, energy, and power; impulse and momentum. Kinematics of rectilinear and curvilinear motion of particles. Dynamics of particles and systems of particles. Kinematics of rotation and plane motion of rigid bodies. Work and energy relations. Impulse and momentum principles. Dynamics of rigid bodies in plane motion

CE 203: Computer Graphics (2, 0, 6)

The course focus on the following topics: Introduction to Computer Aided Design and Drafting for civil engineers (CAD), 2D Drawings with AutoCAD includes Multiview projection, dimensions, sections, Introduction to civil and architectural Drawings, preparing CAD documents for civil and architectural engineering.

CE 212: Strength of Materials (3, 1, 0)

The course focus on the Concepts of stress, strain, and constitutive relations; stress and deformation of axially loaded members; thermal stresses; pressure vessels; energy concepts; torsion of circular and thin-walled sections; shear and bending moment diagrams in beams; elastic bending and shear stresses in beams; compound stresses; stress transformation; bending moment-

curvature equation; deflection of beams; singularity functions methods, analysis and design applications.

CE 262: Surveying (1, 0, 3)

This is an introductory course to plane surveying as related to the construction industry. Emphasis is placed on obtaining field skills in linear measurement and the operation of levels, transits, theodolites and total stations. Elevations, horizontal, vertical, and spiral curves are explored.

CE 301: Civil Engineering Materials (2, 0, 3)

The course focus on the discussion of basic mechanical and physical properties of a variety of civil engineering materials such as concrete, asphalt, wood and fiber composites. Evaluation and design for properties, load-time deformation characteristics, response to typical service environments.

CE 303: Fluid Mechanics (3,1,0)

The course focus on the properties of fluids, hydrostatics with applications to manometers, forces on plane and curved surfaces, buoyancy, equations of continuity, energy and linear momentum with applications, dimensional analysis, dynamic similarity, conduit flow, open channel flow.

CE 311: Structural Analysis (3,1,0)

This course discusses the following topics: Shear force and bending moment diagrams for frames; Influence lines for beams and trusses; Displacement analysis for beams; Virtual work method for beams, Frames and trusses; Castigliano's Theorem; Analysis of statically indeterminate structures; the Force Method; the Slope-Deflection Method, the Moment Distribution Method; Introduction to Stiffness Method for beams and frames.

CE 312: Reinforced Concrete Design (3,1,0)

This course discusses the following topics: Introduction to reinforced concrete structures; Basic material properties; Loads; Design codes; Design for flexure; Design for shear; Design for compression; bond and detailing. Design of rectangular beams, flanged sections, short columns, one-way slabs, two-way slabs, isolated footings, serviceability considerations, Design project.

CE 332: Soil Mechanics (3,1,0)

The course focus on the central concepts to be covered in this course are: Composition and classification of soils; Engineering soil properties and their measurement; Soil permeability and pore water movement; Stresses in soil and the effective stress concept; soil compressibility, consolidation, and settlements; and Shear strength of soil and bearing capacity.

CE 342: Water Resources Engineering (3,0,3)

The course is an Introduction to hydrologic engineering. Descriptive and quantitative hydrology and groundwater. Surface hydrology and runoff modeling. Subsurface flow and hydraulics of wells. Flow of water through pipes and channels. Analysis and design of watershed hydraulic systems and storm water management. Open channel hydraulics, and flow modeling.

CE 362: Transportation Engineering (2,0,3)

This course introduces students to the fundamentals of planning, design, and operation of highway transportation facilities. Topics covered include driver and vehicle performance characteristics, highway geometric design principles, basics of traffic analysis, and transportation planning, application of transportation related software.

CE 372: Introduction to Civil Engineering Design (1,0,0)

This course is A broad introduction to design in all four disciplines; design and requirements related to data, information, specification and codes, methods and tools, design considerations and constraints; issues related to safety, economy and impact; professional ethics and responsibility; design drawings; a small-scale project work to complement student's understanding.

CE 411: Foundation Design (3,1,0)

The course focus on the Site investigation, including determination of soil properties for design; bearing capacity theory of shallow foundation; settlement of building foundations; design and analysis of retaining walls, sheet piles and braced excavations; design of pile and pier foundations.

CE 413: Steel Design (3,1,0)

This course is designed to introduce the behavior and design of steel structural members according to the limit states design concept. The course includes behavior and design of tension members, compression members, laterally restrained and unrestrained beams, beam-columns and design of connections as per American Institute of Steel Construction (AISC) code. Students are expected to obtain basic knowledge about the design and failure mode of steel structural members after finishing this course.

CE 451: Environmental Engineering (3,0,0)

The course focus on the Concepts of aqueous chemistry, biology, and physics applied in a quantitative manner to environmental problems and solutions. Mass and energy balances, chemical reaction engineering. Quantitative and fundamental description of water and air pollution problems. Environmental regulations and policy, pollution prevention, risk assessment. Written and oral reports.

CE 472: Construction Engineering & Management (3,0,0)

This course focus on the construction industry, contracts, contract documents and professional liabilities, issues during construction phase, business ownership, cost estimation, equipment productivity; concrete form design; planning and scheduling, resource leveling, cost control; introduction to pert, construction management aspects; materials management, construction productivity and safety.

ME 201: Thermodynamics (3,1,0)

Introduction and basic thermodynamic concepts and definitions, System and control volume concepts. Properties and behavior of a pure substance, equation of states, table of properties Work and heat, The first law of thermodynamics applied to a system and control volume, Internal energy, enthalpy, steady state, Unsteady state, the second law of thermodynamics analysis for the control volume, heat engines, refrigerators and heat pumps, Carnot cycle, reversible and irreversible processes, Entropy, Clausius inequality, principle of the increase of entropy, Efficiencies. Entropy of ideal gas.

GEO 144: Geology (3,0,0)

This course consists of two sections: basic geology and engineering geology. The basic geology section includes: formation and evolution of the earth, common rocks and minerals, internal and external dynamic geological process, geological structures, geological maps and other basic knowledge of the earth's geology. The engineering geology section includes engineering geological natures of groundwater, rock and soil, stability analysis of slope, surrounding rock of underground cavern and rock foundation, geological analysis, subsidence; earthquakes; strong ground motion.

ENGG 404 – ENGINEERING ECONOMICS (2,1,0)

The purpose of this course is to teach students (1) the basic principles, concepts, and methodology of engineering economy; and (2) to help them develop proficiency with these methods and with the process for making rational decisions regarding situations they are likely to meet in professional practice.

CE 491: Capstone Project- I (0,0,2)

This course focus on the design of Civil Engineering Projects. Students working singly or in groups produce solutions to Civil Engineering design projects from the first concepts through preliminary proposals, sketches, cost estimations, design, evaluation, oral presentation and written reports.

CE 492: Capstone Project-I I (0,0,9)

This course focuses on the design of Civil Engineering Projects. Students working singly or in groups produce solutions to Civil Engineering design projects from the first concepts through preliminary proposals, sketches, cost estimations, design, evaluation, oral presentation and written reports.

MATH 303 – Numerical Methods (3,1,0)

This course covers the following topics: Floating-point arithmetic and error analysis, solution of non- linear equations, polynomial interpolation, numerical integration and differentiation. Data fitting, solution of linear and non-linear algebraic systems, initial and boundary value problems of ordinary differential equations.