School	School of Engineering		
Major	Surveying Engineering		

Core Requirements			
Code	**Title**	**Credits**	**Description**
MATH310	Probability & Statistics for Scientists & Engineers	3	The concept of probability and its properties, descriptive statistics, discrete and continuous random variables, expected value, distribution functions, the central limit theorem, random sampling and sampling distributions, Hypothesis testing. Prerequisite: MATH 170
IENG300	Engineering Project Management	3	This course covers the fundamentals of project management for engineering professionals. It reviews the project management framework in organizations and covers in-depth the tools and techniques used in initiating, planning, executing, monitoring, controlling and concluding a project to achieve the set goals within schedule and budget targets. Real life engineering project examples are used to demonstrate the application of project management concepts to engineering projects. The course is aligned with the Project Management Institute‬s (PMI‬s) Project Management Body of Knowledge (PMBOK) and helps learners to prepare for PMI certification exams. Prerequisites: ENGL201.
MATH210	Calculus II	3	The course material includes hyperbolic functions and their inverses and their derivatives integration techniques, improper integrals, sequences, infinite series, power series, Taylor and Maclaurin series and application of power series. The mathematical software Maple will be introduced and used in support of the comprehension of the material. Prerequisites: MATH160
MENG250	Mechanics I (Statics)	3	This course treats only rigid-body mechanics and forms a suitable basis for the design and analysis of many types of structural, mechanical,‗electrical devices encountered in engineering. As the course name suggests, this course deals with the equilibrium of bodies that are either at rest‗move with constant velocity. Therefore, this Statics course provides the students with the principles that treats the Statics of particles and rigid bodies, trusses, frames, machines; centroids, centers of gravity; and friction. Prerequisites: ENGL051. Co-requisites: MATH210.
MENG225	Engineering Drawing & CAD	3	This course consists in two parts: 2 D and 3D. It can be defined as a tool in order to generate accurate drawings due to scales in 2 D and in 3 D. It focuses on drawings related to engineering. Drawings may be ‬descriptive‬, describing an object‗a tool,‗they may represent the first step of design (Design of tools and machines).
MATH220	Calculus III	3	This text covers basic topics on infinite series, lines and planes in space, cylinders and quadric surfaces, functions of several variables, limits and continuity, Partial derivatives, chain rule, directional derivatives, Gradient vector, tangent planes, double and triple integrals, areas, moments, center of mass, volumes, double integrals in polar forms, triple integrals in cylindrical and spherical coordinates, line integrals, vector fields Green‬s theorem, surface integrals, Stokes theorem, and the divergence theorem. Students are required to solve extensive number of problems and computer assignment using the mathematical software package Maple.
MATH225	Linear Algebra with Applications	3	Introduction to the systems of linear equations and matrices, Gaussian eliminations, matrix operations, inverses, types of matrices, determinants and their applications, vector spaces, subspaces, linear independence, basis and dimension, rank and nullity, inner product spaces and orthogonal bases, eigenvalues and eigenvectors, applications from other disciplines such as physics, computer science, and economics.
MATH270	Ordinary Differential Equations	3	First-order equations, linear and non-linear differential, linearization, numerical and qualitative analysis, second-order equations, existence-uniqueness theorem, series solutions, Bessel s and Legendre s functions, Laplace transforms, systems of differential equations, applications and modeling of real phenomena. Prerequisite: MATH 220.

Code	Title	Credits	Description
PHYS220	Physics for Engineers	3	Electricity, Electric Field and Electric Potential, Magnetism, Biot-Savarat Law, Ampere□s Law, Faraday□s Law, Fluid Mechanics, Wave Motion, Sound Waves, Superposition and Standing Waves, Temperature, Heat, Laws of Thermodynamics.
SURV251	Introduction to Surveying Equipment	3	This course is an attempt to break the ice between fresh surveying students and surveying instruments. Therefore, it tries to develop an understanding between different types of surveying measurements and the related various types of surveying instruments: tapes, electronic distance meters, levels, theodolites, total stations, Global Positioning Systems □etc.
SURV251L	Introduction to Surveying Equipment Lab	1	This course aims to develop students an understanding of the basic concepts relating to the measurement of land and the use of maps and site plans A practical application of the study, theory and field methods of route and topographic surveying, Introduction to using chaining, stadia, leveling, transit. The objective of this lab is to orient the student to linear measurements, become familiar with measurement techniques and their applications, compare the relative accuracy of different techniques, and learn the principles of keeping notes. Utilization of computers and software for data collection, reduction, analysis, and presentation.
EENG250	Electric Circuits I	3	Introduce techniques of DC circuit analysis (Node, Mesh, Superposition, & Source Transformation) containing ideal and dependent sources. Covers real power calculations, perform equivalent resistive circuits. Introduce concept of Thevinin and Norton equivalent circuits, basic concept of mutual inductance, and determine the transient responses of RL, RC, parallel and series RLC. Prerequisites: ENGL051. Co-requisites: MATH210

Major Requirements			
Code	Title	Credits	Description
SURV305	Surveying I	3	This course treats the basics of surveying and basis for topographical problems encountered in surveying engineering. As the course deals the earth (earth and universe, earth size measurements, spheroid, spherical triangles), methods of surveying and mapping (introduction, classical ground surveys, aerial surveys, and global position system), mathematical review (function, derivative, differential of a function), and theory of error (statistics and probabilities, types of error accidental errors and calculations, accidental error for indirect measurements, measurements of different reliability. Angular measurements and instruments (definitions, instruments errors of angular measurements).Distance measurements (definitions and types, direct measurements. behavior of systematic error in direct measurements methods and equipments for indirect measurements reduction of distances to projection plan), leveling and instruments (definitions, methods of leveling), execution of surveying works (basic net work, calculation principles), areas calculations (regular and irregular figures).
SURV305L	Surveying Practice I Lab	1	This course aims to develop students an understanding of the basic concepts relating to the measurement of land and the use of maps and site plans A practical application of the study, theory and field methods of route and topographic surveying, Introduction to using chaining, stadia, leveling, transit. The objective of this lab is to orient the student to linear measurements, become familiar with measurement techniques and their applications, compare the relative accuracy of different techniques, and learn the principles of keeping notes. Utilization of computers and software for data collection, reduction, analysis, and presentation.

SURV315	Geology	3	This course is designed for the Survey engineering students (non-science students) to understand the Earth processes and phenomena. This course is designed in eight parts and twenty five chapters. The first part starts with defining geology and its principal branches. It deals with cosmology; the origin of earth and planets. Students will make a journey to the earth core and will be introduced to the Plate tectonic theory. In the second part students will learn about different types of Rocks (metamorphic, igneous and sedimentary). Part three will deal more about earth dynamics (volcanism, earthquakes, and mountains building). The fourth part would be dedicated for studying the biography of the Earth and the ways and methods for dating the rock age. While part five is about earth resources (Energy & Mineral). Part six will handle the Processes and Problems at the Earth□s Surface, students would be exposed to the notion and processes of mass movements, the geology of running water, oceans and coast, groundwater, atmosphere, climate, deserts, and glaciers. Part seven, on the other hand, deal with the art of making and reading geological maps in addition to performing the stratigraphical column and cross sections. Last and not least Part eight will have an over view on the Geology of Lebanon and its related processes.
SURV325	Cartography	3	Basic concepts of cartography, geographical maps, types and proprieties, cartographical expression and representation, map realization, earth surface, earth representation.
SURV335	Surveying Drawing & CAD	3	Procedure and methods of topographical planes drawing. Topographical symbols (sign convention), axing and briefing on planes survey, drawing scales, traverses surveys, plotting. Surveys of existing buildings. Contouring, leveling, location of contours by cross- section method, elevations, area and volumes.
SURV355L	Surveying Practice II Lab	1	An intermediate lab course covering the equipment (theodolite, electronic distance measurement, total station), techniques and hardware of the profession necessary to measure horizontal and vertical angles and distances used in traversing, according to prevailing and applicable professional standards. Study of the measurement and determination of boundaries, areas, shapes, and location through traversing techniques. Instruction in a variety of adjustment methods using programmed and non-programmed hand-held calculators and computers.
SURV355	Surveying II	3	Introduction, branches of surveying, earth surface determinations. Introduction about geodesy. Ellipsoid and Geoids. Mapping of earth surface. Properties of plane representation, properties of conform representation. Mapping procedures used in topography. Surveying instruments. Determination of surveying points net work (azimuth, surveying intersection, three points problem, traverse). Leveling instruments. Surveying of details (side shots-abscissa and ordinates, lateral oblique). Representation of relief (Methods used, construction of contour lines). Longitudinal profile- cross sections- earth world).
SURV365	Geodesy I	3	Basic concepts of geodesy. The gravity field of the system of natural coordinates. Approximating the natural system. The geoids, the ellipsoid, basic surface geometry.
SURV385	Computer Aided Drafting for Surveyors	3	Softdesk introduction, DTM settings, surface, site, contour, section, DTM tools and profile.
SURV375	Topometric Calculus I	3	General concepts on topometrical calculus- resolution of triangles, point coordinates rabatment. Radiation.
SURV420	Surveying application I	3	Summer training for field surveying application. Determination of surveying points net work (azimuth, surveying intersection, three points problem, and traverse). Leveling instruments. Surveying of details (side shots-abscissa and ordinates, lateral oblique). Representation of relief (Methods used, construction of contour lines). Longitudinal profile- cross sections- earth world).

Code	Title	Credits	Description
SURV405	Photogrammetry	3	Introduction to photorammetry, introduction the photographic negative and its optical and chemical elements, the relief constitution, aerial photography, analogical stereophotogrammetry. The modem stereophotogrammetry. Digital photogrammetry, aerial triangulation, mapping from space, multi-sensor aerial triangulation, integration aerial and satellite imagery, the rope of features in photogrammetric operations.
SURV414	Cadastral Surveying and Construction LAW	3	Cadastral surveying refers to those surveys involving the definition of land boundaries and requires a thorough knowledge of the current system for the registration of land. The majority of survey graduates will have some involvement with cadastral surveying during their career, if not for the whole of their careers, and must be introduced to the underlying principles as early as possible.
SURV425	Topometric Calculus II	3	Polygonal development, Straight line and curve problems, acreage, surface division. Implantation.
SURV435	Theory of Measurement Errors	3	Generality, measurements in surveying, random errors, characteristics, notions of probability, precision and accuracy, relative precision, accuracy ratio, least square method, weighted measurement, and weights by repeated measurements, adjustment of net work and level net work. Concepts of measurement and error, error propagation and error linearization, reanalysis of survey in measurements, applications in plane coordinate surveys, adjustment of several geodetic net works.
SURV445	Geodesy II	3	Computation of distance on earth surface, rigidity of geodesy net works, engineering and location conditions in net works. Geodesy cal triangles, triangles scales. The geometry of spheroid, geodesic lines. First and second fundamental problems spheroid, normal sections. Datum problems.
SURV455	Geographic Information Systems I	3	Introduction, origin, field of applications, methods of capturing and storing data, coordinate system, and data analyses. Coordinate projection, geo-referencing.
SURV465	Spatial Geodesy (GPS I)	3	Introduction, overview of GPS, reference systems satellites orbits, observables, the DOP factors, errors in GPS, the direct and reverse problems, satellite signal structure.
SURV474	Urban Planning and Land Subdivision	3	This course is aimed at providing those who will work in allied professions with knowledge of planning principles and practice, and the major planning issues confronting urban societies at the beginning of the 21st century. The course begins with a study of the evolution of urban and regional planning theory and practice, with an emphasis on urban design. This is followed by a review of current planning processes as they are applied at capital, regional and local areas in Lebanon. The course concludes with a discussion of the major urban planning and design issues that will need to be resolved in the coming years.
SURV495	Senior Project	3	This project is a requirement for graduation with the B.S. in Engineering degree. Proposed by the supervising faculty, projects are geared towards integrating several topics covered in the curriculum. Students will have the opportunity to exercise research, experimentation, implementation and technical writing skills. Students typically work in teams; each team agrees on a project with the supervisor. The project scope must be adjusted to match at least a 3 credit load per team member. The project concludes with a demonstration, a presentation and a technical report all of which are appraised by a committee of faculty members.

General Education Requirements

Code	Title	Credits	Description
ARAB200	Arabic Language and Literature	3	This course is a comprehensive review of Arabic Grammar, Syntax, major literature and poetry styles, formal and business letters.

CULT200	Introduction to Arab - Islamic Civilization	3	The purpose of this course is to acquaint students with the history and achievements of the Islamic civilization. Themes will include patterns of the political and spiritual leadership; cultural, artistic, and intellectual accomplishments Prerequisites: ENGL051, ENGL101, ENGL151.
ENGL201	Composition and Research Skills	3	This course focuses on the development of writing skills appropriate to specific academic and professional purposes; the analysis and practice of various methods of organization and rhetorical patterns used in formal expository and persuasive writing; the refinement of critical reading strategies and library research techniques; and the completion of an academically acceptable library research paper. Prerequisites: ENGL150, ENGL151.
ENGL251	Communication Skills	3	The objectives of this course are to improve students writing skills for academic purposes by developing effective use of grammatical structures; analytical and critical reading skills; a sensitivity to rhetorical situation, style, and level of diction in academic reading and writing; and competence in using various methods of organization used in formal writing.