

School			
Major	Bachelor of Science in Surveying Engineering		
Core Requirements			
Code	Title	Credits	Description
MATH310	Probability & Statistics for Scientists & Engineers	3	The course is intended to provide you with the basic probabilistic and statistical concepts with related computational and analytic skills for three main purposes: 1) To become an integrated part of the student scientific education. 2) To give the student an adequate ability for comprehending and interpreting many non-deterministic situations. 3) To appreciate the wide range of applications of such concepts to real-life situations.
MATH210	Calculus II	3	This is the second course in the Calculus sequence. The course material includes logarithmic, exponential, and trigonometric functions, their inverses and their derivatives, integration techniques, improper integrals, sequences, infinite series, tests of convergence, alternating series, power series, polar coordinates and its application.
MENG250	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, or electrical devices encountered in engineering. As the course name suggests, this course deals with the equilibrium of bodies that are either at rest or 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.
MENG225	Engineering Drawing & CAD	3	This course consists of 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 or a tool, or they may represent the first step of design (Design of tools and machines).
MATH220	Calculus III	3	The course consists of two parts: Multivariable calculus and vector calculus. The multivariable calculus is the extension of calculus in one variable to calculus in more than one variable: (quadric surfaces, partial differentiation, multiple integration). Vector calculus applies calculus to the concept of vector fields.
MATH225	Linear Algebra with Applications	3	This course provides an introduction to linear algebra topics. Emphasis is placed on the development of abstract concepts and applications for vectors, systems of equations, matrices, determinants, vector spaces, multi-dimensional linear transformations, eigenvectors, eigenvalues, diagonalization and orthogonality. The concepts of linear algebra are extremely useful in physics, economics and social sciences, natural sciences, and engineering.
MATH270	Ordinary Differential Equations	3	This course provides an introduction to ordinary differential equations and their applications. The contents of this course include first order equations, separable, exact, and linear equations, second and higher order differential equations, systems of differential equations, series solutions, and Laplace transformation.
PHYS220	Physics for Engineers	3	This course is designed to provide an overview of calculus based introductory physics, which is a requirement for all undergraduate engineering students. It offers an introduction to mechanical oscillations and mechanical waves, exploring different wave phenomena such as interference of mechanical waves, reflection and refraction of light, in addition to image formation.
SURV251	Introduction to Surveying Engineering	3	This course is a general introduction that explains the geomatics concepts and the domains of life where geomatics are needed. It creates a consistent knowledge about surveying applications and tasks, the deliverables and products of surveying projects and the duties of a surveyor or surveying engineer are also included. New technologies and tools and soft programs are indicated.

SURV251L	Introduction to Surveying Engineering Lab	1	An intermediate lab course concentrating on general survey principals and equipment and basic surveying tasks. The course covers the analysis of the following surveying equipment: tapes, laser meter, tilts, plumb bob, tripods, tribach, surveying rods, and staff. It also covers the techniques of setup and calibrates these equipment, and care off. Practice in reading maps and legends, drawing sketches and producing filed notes and simple maps.
EENG250	Electric Circuits I	3	The course provides an introduction to Electrical and Electronics Engineering. The course has been designed to introduce fundamental principles of circuit theory commonly used in engineering research and science applications, the Concepts of voltage, current, power, resistance capacitance and inductance. Circuit analysis techniques such as Kirchhoff's Laws, node voltages, and mesh currents. Thevenin's and Norton's equivalent circuits, in addition to special circuits with op-amp and the response of 1st order RL and RC circuits.
ENGG300	Engineering Economics	3	This course covers the fundamentals of Engineering Economics for engineering professionals to match engineering practice today. It recognizes the role of the engineer as a decision maker who has to make and defend sensible decisions. It emphasizes on the analytical consideration of money and its impact on decision making as well as on other factors such as environmental and social factors and tasks. By the end of the course students will be equipped with basic analytical skills for solving problems of an economic nature real-world example.
ENGG450	Engineering Ethics and Professional Practice	3	Engineering Ethics and Professional Practice is a complete study course on the role of ethics in engineering in their historical, philosophical and professional contexts. The course examines the impact of ethical theories and their application to issues encountered in the engineering profession, such as employee rights, whistleblowing, safety, risk and liability, professional responsibility to consumers and employers, conflicts of interest, codes of ethics, legal obligations, environmental and social responsibility. Through the use of real and hypothetical case studies, the course focuses on developing analysis techniques and applying them to ethical problems through independent critical thinking and moral sensitivity.

Major Requirements			
Code	Title	Credits	Description
SURV305	Surveying I	3	This course treats the basics of surveying and topographical problems encountered in surveying engineering. It deals with 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. Distance measurements (definitions and types, direct measurements. behavior of systematic error in direct measurements methods and equipment for indirect measurements reduction of distances to projection plan), leveling and instruments (definitions, methods of leveling), are also covered.
SURV305L	Surveying Practice I Lab	1	An intermediate lab course concentrating on survey principals and equipment and basic surveying tasks. The course covers the analysis of the following surveying equipment: Level, digital level, square prism, surveying chain, surveying rods, and compass. It also covers the techniques of using these equipment, calibration and care off. Practice in the establishment of monuments, corners, lines and witness points in accordance with available data. Practice in the preparation of filed notes. Practice in leveling and chaining and contouring.

SURV315	Geology	3	This course is designed to provide an understanding of Earth processes and phenomena. Students will learn about different types of rocks (metamorphic, igneous and sedimentary), earth dynamics (volcanism, earthquakes and mountains building), earth resources (Energy & Mineral), earth processes and problems (mass movements, erosion, glaciers, deserts, oceans, running water, atmosphere). The course will introduce the making and reading of geological maps in addition to performing the stratigraphical columns and cross sections. Students will be exposed to the geology of Lebanon and its related processes.
SURV325	Cartography	3	The course focuses on the history of cartography and elements of maps, which are often used as a source for research. It gives students a good knowledge on cartographic conception and representation, map projections, base elements of thematic maps, cartographic symbology, positioning, scaling, referencing and different coordinate systems. Students will be introduced to the notion of colors, global position system, and the art of making professional maps. It integrates with computer technology mapmaking to present new challenges and opportunities.
SURV335	Surveying Drawing & CAD	3	This course covers procedure and methods to produce topographical drawing using CAD. Topographical symbols (sign convention), axing and briefing on planes survey, drawing scales, traverse surveys, plotting are also introduced . Surveys of existing buildings, and creating contours, leveling, location of contours by cross- section method, elevations, area and volumes. it will be present introduction to Civil 3D including creating and modifying styles and points
SURV355L	Surveying Practice II Lab	1	An intermediate lab course concentrating on survey principals and equipment and basic surveying tasks. The course covers the analysis of the following surveying equipment: Total Station, digital level, and Planimeter. It also covers the techniques of using these equipment, calibration and care off. Practice in the establishment of monuments, corners, lines, buildings, roads and witness points in accordance with available data. Practice in the preparation of filed notes and generating digital and hardcopy maps. Practice in traversing, triangulation, Resection, coordinates geometry and profiling.
SURV355	Surveying II	3	This course treats the basics of surveying and topographical problems encountered in surveying engineering. It deals with the earth surface measurements, methods of surveying and mapping. Geodetic surveys and methods, triangulation, trilateration and traversing. Horizontal and vertical angles measurements. The methods of horizontal, vertical and slope distances in addition, the buildings survey and layout are also included
SURV365	Geodesy I	3	This course attempts to develop an appreciation of the scope of geodesy and to generate some understanding of the problems encountered in the science. The basic principles are presented through discussions of various geodetic topics such as: Ellipsoids, geoids, horizontal surveying, leveling, geodetic datum s, and gravity.
SURV385	Computer Aided Drafting for Surveyors	3	Autodesk Civil 3D is used worldwide by most civil engineers and land surveyors for all kinds of Land Development Projects. Civil 3D allows engineers and surveyors to precisely model land topography and show existing and proposed structures and utilities. It is a great design and analysis tool used for land grading, quantities surveying, highway designs, hydraulics and hydrology analysis, and for underground utilities designs. Concept of Design drawings, shop-drawings and as-built drawing for Roads and infra-structures. Quantity survey: Manual and CAD procedures used for quantifying construction material quantities for building and civil infrastructure projects

SURV375	Topometric Calculus I	3	A study of the principles and methods of surveying computations as they relate to Cartesian coordinate systems, coordinate geometry including a four parameter similarity transformation and an introduction to coordinate systems and the use of mathematical trigonometry and geometry features
SURV420	Surveying application I	3	This Course is an introduction to proper field surveying theory, techniques and terminology. Topics covered in this course include taping, tape corrections, leveling, angle measurements, traversing, traverse adjustments, contouring and fundamentals of mapping, and proper use and care of surveying instruments. In addition, the relationship between engineering studies and field works will be covered too. Note keeping formats will be covered throughout the course for all the procedures that are introduced. The proper care and handling of the equipment and safe work procedures will be emphasized throughout the term. This course involves the development and application of good professional practices.
SURV405	Photogrammetry	3	This is an introductory course in analog photogrammetry covering, in part, the history of photogrammetry, aerial cameras and camera calibration, geometry of the aerial photograph, stereoscopy and stereoscopes, parallax and the theory and techniques of plotter orientation. Students will perform basic mapping tasks on the stereo plotter.
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. An introduction of construction Law is also present
SURV425	Topometric Calculus II	3	This course is a study of the principles and methods of surveying computations as they relate to the use of mathematical trigonometry and geometry features. It covers Computation of areas along regular and irregular boundaries, Polygonal development, straight line and curve problems, acreage, surface division; implantation, azimuth and volume
SURV435	Theory of Measurement Errors	3	This course deals with the measurements, classification of measurements and errors of measurements. It explains the methods used to get the best estimation of measured values, compensation of random errors and elimination of systematic and blunders. It also includes several applications in topography mainly adjustment of leveling and horizontal networks. The course is designed to give basic theory and techniques of item analyses, including reliability and validity analyses, and item response theory analysis
SURV445	Geodesy II	3	The aim of this course is to explain the student some knowledge about the gravity of the Earth and its influence on the topometric works especially leveling. It also covers analyzing the choice of the leveling datum to study the gravity field and all the dependent approximations that are accomplished to reduce the difficulties in the formula of the gravity field.

SURV455	Geographic Information Systems I	3	The GIS course allows handling of spatial information and its powerful mapping tools, it helps investigating problems, producing variable solutions, supporting therefore decisions and planning. This can be done using thematic mapping, algorithms and queries, producing network analysis, buffer zones, or simply interpretation of cartographic presentations depending on computer aided GIS software. This course provides a basic introduction to geographical information systems. GIS data types, editing GIS data and spatial data analysis, GPS collection, with emphasis on applications to natural resources. Students will be introduced to basic concepts and techniques of map analysis and the way these are used in geographical information systems in general and desktop GIS in particular. The major areas of practical application of GIS will be discussed. The use of data and principles of sampling and modeling will be presented. The basic computer skills necessary to use a desktop GIS will be taught
SURV465	Spatial Geodesy (GPS I)	3	The Global Positioning System (GPS) and the wider Global Navigation Satellite System (GNSS) include constellations of earth-orbiting satellites that broadcast their locations in space and time, a network of ground control stations, and military and civilian receivers that calculate ground positions by trilateration. Geospatial professionals need to possess a working knowledge of current and future GPS and GNSS capabilities because satellite positioning is so prevalent in geographic information systems (GIS) applications in government, industry, and academia. GPS has always been a dual use system, military and civilian. From the beginning, GPS signals have been available with no direct user fees. GNSS has built on those concepts and added some new ones. GPS and GNSS are used now in all of transportation—aviation, maritime, railroad, highway and mass transit. Satellite positioning also plays critical roles in telecommunications, land surveying, law enforcement, emergency response, precision agriculture, mining, finance, and scientific research. It controls computer networks, air traffic, power grids, and so on. As the scope of satellite positioning has expanded, the systems continue to evolve
SURV495	Senior Project	3	This course integrates the knowledge acquired in the various courses of the undergraduate curriculum to an open-ended design effort and applies the knowledge gained to the solution of a contemporary engineering problem. Students improve oral and written communication skills, gain familiarity with available technical literature, and experience the life cycle of a design project within a group environment. Many projects include practice in the use of computers and relevant support software while solving a design problem. Students work together as a team to accomplish common goals and be able to participate in regional and national competitions.

General Education Requirements

Code	Title	Credits	Description
ARAB200	Arabic Language and Literature	3	ØªØªØ£ÙØÙØ ÙØØ\$Ø-Ø© Ø\$ÙØÙØØªØ© Ø\$ÙØØ¹Ø±Ø"ÙØØ© ÙØØ¢Ø-Ø\$Ø"ÙØØ\$ ÙØØªÙØØ± Ø\$ÙØÙØØªªØµØµÙØÙØ ÙØÙØ Ø«ÙØØ\$Ø«Ø© Ø£ÙØØ³Ø\$ÙØØØ Ø£ØØ-ÙØØ\$ ÙØØªÙØØ\$ÙØÙØ Ø-Ø±ÙØØ³Ø\$ÙØ Ø£Ø³Ø\$Ø³ÙØØ© ÙØÙØ Ø\$ÙØÙØØÙØ ÙØØ\$ÙØØµØ±ÙØ ÙØØ\$ÙØØ"ÙØØ\$ØªØ©. ÙØØ\$ÙØØ«Ø\$ÙØÙØ ÙØØªÙØØ\$ÙØÙØ ÙØØ-Ø\$ØØ«ÙØÙØ Ø\$ÙØØ£Ø-Ø" ÙØØ\$ÙØØªØÙØÙØÙØ. Ø£ÙØØ\$ Ø\$ÙØÙØØ³ÙØ Ø\$ÙØØ«Ø\$ÙØØ« ÙØÙØØ¹Ø\$ÙØØ¬ Ø"Ø¹Ø¶ ØªÙØÙØÙØØ\$Øª Ø\$ÙØØªØ¹Ø"ÙØØ± ÙØØ\$ÙØØªÙØØ\$ØµÙØ.

CULT200	Introduction to Arab - Islamic Civilization	3	ØªÙÙØ«ÙÙ Ø§ÙÙØªØ¶Ø§Ø±Ø© Ø§ÙÙØ¹Ø±Ø²ÙØ© Ø§ÙÙ¥Ø³ÙÙØ§ÙÙØ© ÙÙØ§ØªØ-Ø© ÙÙ Ø£ÙÙÙ Ø§ÙÙØ-Ø¶Ø§Ø±Ø§ ÙÙ Ø§ÙÙªØ§Ø±ÙØ® Ø²ÙÙØ§ Ø£ÙÙ-Ø²ØªÙ ÙÙ Ø¥Ø²Ø-Ø§Ø¹Ø§Øª Ø¹ÙÙÙØ© ÙÙ«ÙÙØ§ÙÙØ© ÙÙØ¶Ø§Ø±ÙØ© ØªØ±ÙØª Ø£Ø«Ø±ÙØ§ Ø§ÙÙØ¹Ø, ÙÙ ÙÙ ØªØ§Ø±ÙØ® Ø§ÙÙØ´Ø´Ø±ÙØ©. ØªÙÙØ´ÙÙÙ ÙÙ°Ù Ø§ÙÙÙØ§ØªØ© Ø§ÙÙØªØ±Ø§Ø³ÙØ© ÙÙÙØ²ÙØ©Ù Ø£Ø³Ø§Ø³ÙØ© ÙÙÙªØ¹Ø±Ù ÙÙ Ø¹Ø±Ø²Ù Ø¹ÙÙ ØªØ§Ø±ÙØ® Ø-Ø¶Ø§Ø±ØªÙÙ ÙÙØ§ ÙÙÙÙªØ®Ø± Ø²ÙÙØ§ ÙÙØ³Ø²ÙÙ Ø²ÙÙÙØªØ²ÙÙ Ø²ÙÙØ§Ø±Ø§ØªÙÙ Ø²ÙÙØªØ±Ø§ØªÙ Ø§ÙÙØ¹ÙÙÙØ© Ø§ÙÙÙØ§ÙÙØ© ÙÙ¥Ø¹Ø§ØªØ© Ø§ÙÙØ§Ø³ØªÙÙÙØ§¶ Ø§ÙÙ-Ø¶Ø§Ø±Ù. ÙÙªØªØ±Ù Ø§ÙÙÙØ§Ø¶Ù ÙÙÙÙØ§ Ø²ÙÙ Ø¹Ø¹ÙØ±Ù ÙÙØ§¹Ù ÙÙÙÙØ±ÙØ± Ø§ÙÙØ²Ø±Ø§Ø³Ù ÙÙØ§ÙÙ Ø£ÙÙ ÙÙØ³ØªØ«ÙØ± Ø§ÙÙÙØ¹Ù Ø§ÙÙØ¶Ø¶Ø§Ø±Ù ÙÙØ§ÙÙ«ÙÙØ§ÙÙ Ø¹ÙÙØ²Ø§ÙÙØ²Ù ÙÙÙØ³ØªÙÙÙØ²ÙÙ ÙÙÙØµÙØ¹ Ø£ÙÙÙÙÙØ§Ø²ÙÙØ²ÙÙ.
ENGL201	Composition and Research Skills	3	This course builds upon the skills acquired in pre-requisite courses mainly ENGL 151 to further develop students' critical thinking and academic writing competencies. Students will read and respond to a variety of texts from different disciplines and produce a research paper using analytical and critical skills in response to texts.
ENGL251	Communication Skills	3	Workplace Occupational Writing is an advanced interdisciplinary writing course emphasizing workplace and technical communication and editing appropriate to diverse professions. It incorporates practice and study of selected types of discourse employed in professional writing situations, preparing students for different systems of writing in their professional lives. Examples from the writing of workplace professionals are analyzed and used as models to demonstrate the transition from academic to professional writing.