

School			
Major	Masters of Science in Surveying Engineering		
Major Requirements			
Code	Title	Credits	Description
SURV500	Geographic Information Systems II	3	This course allows students to identify the different procedures of spatial data acquisition and the diverse treatments that can be applied on vector data (extraction, local interpolation (spline), krigging, erase, clip, identity, intersect, union, etc...). It introduces the concept of three-dimensional space in GIS (creating and managing 3D data, computing hillshade, creating a line sight and analyzing visibility, mapping distance and density, zonal statistics, etc...). It educates participants on how geodatabase operates and it aims to leverage the RDBMS to scale GIS datasets. Participants in this course will be introduced to new notions that are used to extend simple tables, features, and raster to add rich behavior, data integrity, and data management capabilities
SURV510	Remote Sensing	3	This course presents the necessary bases for the comprehension of techniques and applications of remote sensing. It details the different sensors of great interest for land, climate and marine observation, through describing the electromagnetic spectrum, general rules of orbitology (geostationary and revolving orbits), systems receiving the solar radiation (whiskbroom and pushbroom), image characteristics (spatial, spectral and radiometric resolutions, scene dimensions), and panchromatic, multi-bands and radar-microwaves applications.
SURV530	GPS II	3	Global Positioning Systems for mapping is designed to teach the knowledge and skills necessary to use the GPS to collect, process, and use geographic data. Students will learn and apply GPS theory and techniques through field survey experiences. The goal of this course is to provide the fundamental knowledge and skills to effectively use the GPS to collect and integrate spatial and non-spatial data. This course discusses the different types of GPS measurements, the design of static network in preparation for a GPS field survey, least square adjustment of GPS networks and RINEX data format
SURV550	Image Processing	3	This course focuses on hands on applications of Remote Sensing data collection, data preparation and processing, satellite image distortion, radiometric and geometric corrections, satellite image enhancement, image mosaicking and masking, space triangulation, filtering, methods of supervised and unsupervised classifications. It apprehends knowledge practically through its application on computers holding software of image treatments
SURV580	Geomatics for Civil Works	3	This course describes the relations between the civil works and their necessary surveying works and how to construct these relations. These geomatic works describe the linear measurements, the practical leveling, the building survey, the building setting out, the calculation and setting out of roads and the survey for pipe lines.
SURV590	Map Projection	3	This course treats the transformation of the curve surface of the Earth into a plane surface called a map. This representation includes descriptions of the systems used, the accuracy on the representation the deformation of distances, angles and areas. This course treats also the applications of the projection systems that is depending on its criteria.
SURV615	Surveying application II	3	An advanced field application course concentrating on surveying advanced skills and important surveying tasks. The course covers the analysis of the GNSS receivers and Laser Scanners. It also covers the techniques of using and operating these equipment, calibration and care off. Practice in the establishment of monuments, networks, point clouds and witness points in accordance with available data. Practice in the preparation of filed notes and generating digital and hardcopy maps. Practice in triangulation, navigation using GNSS receivers, coordinates geometry and point cloud data analysis and features modeling.

SURV620	Engineering Transportation and Roads Design	3	This course introduces of the concept of roads design, with particular emphasis on the design of geometric elements of the road, including, the typical cross section, the horizontal and the vertical alignment. It covers traffic engineering, highway capacity and road classification. It also treats the intersections problems and their design, the signs and road marking. In addition the profession of transportation engineering, the modes of transportation, and the transportation planning, the collection of data, the road life studies and traffic volume studies. The course is complement an application component; the student prepare and submit a project of a road that includes the design of typical cross section and the horizontal and vertical alignments using AutoCAD software.
SURV670	Technology Of Construction	3	This course deals with the relationship between the Surveying and the civil engineering on site achieves in the following fields: The soil mechanics, foundations, piles, retaining walls, the building components (column, framework, slab), the building and road construction materials (such as concrete, steel, base course, asphalt,..). The course provides a basic knowledge to the students in order to state, analyze, interpret and recommend the convenient propositions in construction fields.
SURV695A	Master Thesis Project(Part I)	3	The master thesis project is a six credits research and application course that spans over two semesters. Students are expected to develop a theoretical or an applied model in their respective field of specialization. Students should write a thesis describing the research methodology, implementation and results. The developed model might be a valid numerical simulation, a well-functioning prototype or a well-supported mathematical or scientific model.
SURV695B	Master Thesis Project(Part II)	3	The master thesis project is a six credits research and application course that spans over two semesters. Students are expected to develop a theoretical or an applied model in their respective field of specialization. Students should write a thesis describing the research methodology, implementation and results. The developed model might be a valid numerical simulation, a well-functioning prototype or a well-supported mathematical or scientific model.
SURV560L	Advanced Digital Photogrammetry Lab	1	Advanced lab course concentrating on map production using digital photogrammetric workstations. The course covers the procedure of map production from aerial photographs using digital photogrammetric techniques. The student will be introduced and will gain skills in the following topics: Camera calibration , aerial block construction (strips and stereo-pairs),interior orientation , exterior orientation , tie point measurement , control point measurement, photo triangulation adjustment (LS Adjustment , bundle adjustment), data collection in stereo mod, building Digital terrain modes, Ortho-rectification, mosaicking and map production.
SURV560	Advanced Digital Photogrammetry	3	This course relates the principles of precise measurement and proper data reduction through measurements of photographs followed by calculations to determine spatial information. The focus of the course is on hands-on experience with digital photogrammetric modeling, both for airborne imagery and terrestrial close-range applications. It also contains lectures about digital imagery and emerging trends and applications in digital photogrammetry and computer vision After completing this course, the student should be familiar with methods commonly used in digital photogrammetric practice as well as their theoretical bases.
Core Requirements			
Code	Title	Credits	Description

ENGG650	Engineering Profession & Ethics	3	Engineering Profession and Ethics 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.
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