# Northern Technical University
# الجامعة التقنية الشمالية

*First Cycle – Four Levels – 240 ECTS*
*Bachelor's Degree (B.Sc.) – Geomatics Technics Engineering*

الدورة الأولى - بكالوريوس هندسة تقنيات الجيوماتكس – أربع سنوات – ٢٤٠ وحدة اوربية

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# 1. Overview

This catalogue is about the courses (modules) given by the program of Geomatics Technology Engineering to gain the Bachelor of Science degree. The 4-year program delivers (50) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

**نظره عامه**

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة تقنيات الجيوماتكس للحصول على درجة بكالوريوس العلوم. يقدم برنامج الأربع سنوات ( 50 ) مادة دراسية، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

# 2. Undergraduate Modules 2025-2026

**Module 1**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| NTU 100 | DEMOCRACY AND HUMAN RIGHTS | 2 | 1 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 1 | 50 | 0 |
| **Description** | | | |
| يُعد مقرر "الديمقراطية وحقوق الإنسان" من المتطلبات الأساسية في البرامج الأكاديمية، ويهدف إلى بناء وعي قانوني، سياسي، وأخلاقي لدى الطلبة. يركز المقرر على دراسة المفاهيم الأساسية للحريات العامة، العلاقة التبادلية بين الأنظمة الديمقراطية وصيانة حقوق الأفراد، وبيان التطور التاريخي والفلسفي لهذه المبادئ في مختلف الشرائع والقوانين المحلية والدولية. | | | |

**Module 2**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 102 | PLANE SURVEYING 1 | 8 | 1 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 4 | 4 | 200 | 0 |
| **Description** | | | |
| The Plane Surveying module covers fundamental techniques for mapping and measuring land over small areas (under 250 square kilometers). It teaches students to assume the Earth is perfectly flat, allowing them to use straightforward geometry to calculate distances, angles, elevations, and areas for civil engineering and construction projects | | | |

**Module 3**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 103 | COMPUTER ENGINEERING DRAWING | 8 | 1 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 4 | 150 | 50 |
| **Description** | | | |
| The Computer Engineering Drawing module focuses on creating and interpreting technical drawings using modern Computer-Aided Design (CAD) software. It bridges the gap between engineering theory and manufacturing, teaching students how to turn a concept into an exact, standard-compliant digital model. | | | |

**Module 4**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 100 | MATHEMATICS | 6 | 1 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 4 | 150 | 0 |
| **Description** | | | |
| The mathematics for engineering provides the essential numerical, analytical, and statistical tools required to solve complex physical and structural problems. It bridges abstract mathematical theories with real-world applications, teaching students how to model physical systems and analyze engineering data | | | |

**Module 5**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 101 | ENGINEERING GEOLOGY | 4 | 1 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 1 | 1 | 50 | 50 |
| **Description** | | | |
| The Engineering Geology module bridges the gap between geological sciences and civil engineering. It focuses on applying geological principles to the planning, design, construction, and maintenance of engineering structures. Students learn to evaluate how the physical properties of earth materials (rocks, soils, and groundwater) interact with man-made structures to ensure safety, stability, and cost-effectiveness. | | | |

**Module 6**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 101 | ENGLISH LANGUAGE 1 | 2 | 1 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 0 | 50 | 0 |
| **Description** | | | |
| The English Language module is designed to enhance students' academic and professional communication skills. It bridges general English proficiency with technical literacy, focusing on developing the four core language skills: reading, writing, listening, and speaking within an academic context. Students learn to interpret technical data, draft professional reports, deliver academic presentations, and master essential grammatical structures required for their specific fields of study. | | | |

**Module 7**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 106 | PLANE SURVEYING 2 | 8 | 2 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 4 | 4 | 200 | 0 |
| **Description** | | | |
| The Plane Surveying module covers fundamental techniques for mapping and measuring land over small areas (under 250 square kilometers). It teaches students to assume the Earth is perfectly flat, allowing them to use straightforward geometry to calculate distances, angles, elevations, and areas for civil engineering and construction projects | | | |

**Module 8**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 107 | ENGINEERING MECHANICS | 7 | 2 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 4 | 3 | 175 | 0 |
| **Description** | | | |
| The Engineering Mechanics module is a foundational course that introduces students to the principles of mechanics governing bodies at rest (Statics) and bodies in motion (Dynamics). It develops the analytical skills required to predict the effects of forces and motion during engineering design. Students learn to formulate and solve mathematical models of physical systems using vector algebra, free-body diagrams, and fundamental physical laws. | | | |

**Module 9**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 109 | ENGINEERING PHYSICS | 4 | 2 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 1 | 1 | 50 | 50 |
| **Description** | | | |
| The Engineering Physics module bridges the gap between fundamental physics concepts and practical engineering applications. It provides students with a deep understanding of the physical laws governing mechanics, wave phenomena, electromagnetism, and modern physics. The course emphasizes analytical problem-solving, mathematical modeling of physical systems, and laboratory experimentation, equipping students with the scientific foundation necessary to innovate across various engineering disciplines. | | | |

**Module 10**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| NTU 102 | COMPUTER 1 | 3 | 2 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 1 | 2 | 50 | 25 |
| **Description** | | | |
| The Computer Applications module provides students with a foundational understanding of computer systems, digital literacy, and introductory programming concepts. It covers both theoretical knowledge of computer hardware and software architectures, and practical skills in operating systems, office automation tools, and algorithmic problem-solving. This course prepares students to utilize computing resources efficiently to solve technical and academic problems throughout their engineering education. | | | |

**Module 11**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| NTU 103 | ARABIC LANGUAGE 1 | 2 | 2 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 0 | 50 | 0 |
| **Description** | | | |
| يهدف مقرر اللغة العربية إلى تمكين الطالب من مهارات التواصل الأساسية (القراءة، الكتابة، والتحدث) وضمان سلامة التعبير اللغوي في الأوساط الأكاديمية والمهنية. يركز المقرر على صيانة اللسان والقلم من الأخطاء النحوية والإملائية الشائعة، وتطوير قدرة الطالب على صياغة التقارير الفنية، والمراسلات الرسمية، وقراءة النصوص العلمية وتحليلها بلغة عربية فصيحة وسليمة. | | | |

**Module 12**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 110 | DESCRIPTIVE GEOMETRY | 6 | 2 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 1 | 2 | 75 | 75 |
| **Description** | | | |
| The Descriptive Geometry module provides students with the graphical and analytical techniques needed to solve three-dimensional geometric problems using two-dimensional planes. This course acts as a fundamental bridge between abstract mathematical geometry and practical engineering drawing. Students will develop spatial visualization skills, enabling them to project, analyze, and determine the true shapes, sizes, and intersections of points, lines, planes, and solids in space. | | | |

**Module 13**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 201 | Plain Surveying 3 | 8 | 3 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 4 | 4 | 200 | 0 |
| **Description** | | | |
| The Plane Surveying module covers fundamental techniques for mapping and measuring land over small areas (under 250 square kilometers). It teaches students to assume the Earth is perfectly flat, allowing them to use straightforward geometry to calculate distances, angles, elevations, and areas for civil engineering and construction projects | | | |

**Module 14**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 202 | Estimation & Quantity Surveying 1 | 4 | 3 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 100 | 0 |
| **Description** | | | |
| The Estimation & Quantity Surveying module provides students with the vital skills required to quantify materials, estimate costs, and manage financial contracts for construction projects. It bridges the gap between engineering designs and real-world project execution by teaching how to read technical drawings, prepare bills of quantities, and manage project budgets from inception to completion. | | | |

**Module 15**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 203 | Cartography | 4 | 3 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 100 | 0 |
| **Description** | | | |
| The Cartography module introduces students to the science, art, and technology of map-making. It covers the theoretical principles of transforming the three-dimensional Earth into a two-dimensional representation and explores the design methodologies used to communicate geographic data effectively. Students learn to balance accurate spatial data with visual aesthetics to create maps that are both scientifically precise and easily understood by users. | | | |

**Module 16**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 204 | Engineering Surveying 1 | 6 | 3 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 150 | 50 |
| **Description** | | | |
| The Engineering Surveying 1 module introduces students to the fundamental principles, techniques, and equipment used in establishing spatial control for engineering projects. This course focuses on high-precision measurements of distances, elevations, and angles. It bridges theoretical geometric concepts with practical field applications, ensuring students can accurately collect spatial data and set out design dimensions on a construction site. | | | |

**Module 17**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 205 | Photogrammetry | 4 | 3 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 100 | 0 |
| **Description** | | | |
| The Photogrammetry module introduces students to the science and technology of obtaining reliable spatial measurements, 3D models, and maps from photographs and digital imagery. The course covers the geometric principles of aerial, spaceborne, and close-range imaging systems. Students learn the mathematical models used to transform distorted two-dimensional images into precise, scaled three-dimensional geographic data. | | | |

**Module 18**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| NTU 201 | ENGLISH LANGUAGE 2 | 2 | 3 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 0 | 50 | 0 |
| **Description** | | | |
| The English Language module is designed to enhance students' academic and professional communication skills. It bridges general English proficiency with technical literacy, focusing on developing the four core language skills: reading, writing, listening, and speaking within an academic context. Students learn to interpret technical data, draft professional reports, deliver academic presentations, and master essential grammatical structures required for their specific fields of study. | | | |

**Module 19**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| NTU 200 | Al-Ba'ath Regime Crimes In Iraq | 2 | 3 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 0 | 50 | 0 |
| **Description** | | | |
| المقرر الأكاديمي "جرائم نظام البعث في العراق" هو مقرر وطني إلزامي في الجامعات العراقية، يُدرس لتسليط الضوء على الحقبة التاريخية الممتدة من عام 1968 إلى 2003. يهدف المقرر إلى توثيق الانتهاكات والجرائم الممنهجة التي ارتكبها النظام السابق، وتعزيز قيم حقوق الإنسان والمواطنة والديمقراطية لدى الطلبة لمنع تكرار الديكتاتورية. | | | |

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**Module 20**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 207 | Plain Surveying 4 | 8 | 4 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 4 | 4 | 200 | 0 |
| **Description** | | | |
| The Plane Surveying module covers fundamental techniques for mapping and measuring land over small areas (under 250 square kilometers). It teaches students to assume the Earth is perfectly flat, allowing them to use straightforward geometry to calculate distances, angles, elevations, and areas for civil engineering and construction projects | | | |

**Module 21**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 208 | Fundamentals of Geographic Information System | 4 | 4 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 100 | 0 |
| **Description** | | | |
| This course introduces the basic principles and applications of Geographic Information Systems (GIS). Students learn spatial data models, coordinate systems, map projections, data acquisition, storage, visualization, and basic spatial analysis using GIS software. The course develops essential skills for creating digital maps and supporting engineering, environmental, and planning decision-making. | | | |

**Module 22**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 209 | Estimation & Quantity Surveying 1 | 4 | 4 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 100 | 0 |
| **Description** | | | |
| The Estimation & Quantity Surveying module provides students with the vital skills required to quantify materials, estimate costs, and manage financial contracts for construction projects. It bridges the gap between engineering designs and real-world project execution by teaching how to read technical drawings, prepare bills of quantities, and manage project budgets from inception to completion. | | | |

**Module 23**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 210 | Engineering Surveying 2 | 4 | 4 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 100 | 0 |
| **Description** | | | |
| The Engineering Surveying 1 module introduces students to the fundamental principles, techniques, and equipment used in establishing spatial control for engineering projects. This course focuses on high-precision measurements of distances, elevations, and angles. It bridges theoretical geometric concepts with practical field applications, ensuring students can accurately collect spatial data and set out design dimensions on a construction site. | | | |

**Module 24**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 211 | Digital Photogrammetry | 4 | 4 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 100 | 0 |
| **Description** | | | |
| The Photogrammetry module introduces students to the science and technology of obtaining reliable spatial measurements, 3D models, and maps from photographs and digital imagery. The course covers the geometric principles of aerial, spaceborne, and close-range imaging systems. Students learn the mathematical models used to transform distorted two-dimensional images into precise, scaled three-dimensional geographic data. | | | |

**Module 25**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| NTU 202 | Computer 2 | 3 | 4 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 1 | 2 | 75 | 25 |
| **Description** | | | |
| This course introduces essential computer skills with emphasis on artificial intelligence tools. Students learn to use AI applications for writing, data analysis, presentations, programming support, and problem-solving while developing digital literacy, ethical AI practices, and effective technology integration for academic and professional purposes. | | | |

**Module 26**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| NTU 200 | Arabic Language 2 | 2 | 4 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 0 | 50 | 0 |
| **Description** | | | |
| يهدف هذا المقرر إلى تنمية مهارات الطلبة في اللغة العربية من خلال دراسة مختارات من الأدب العربي شعرًا ونثرًا، والتعرف إلى أبرز المدارس الأدبية وأساليب التعبير البلاغي. كما يعزز مهارات القراءة والتحليل والتذوق الأدبي، وينمي القدرة على الكتابة السليمة والتواصل باللغة العربية الفصحى. | | | |

**Module 27**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 301 | Global Position System 1 | 5 | 5 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 3 | 125 | 0 |
| **Description** | | | |
| This course introduces the fundamentals of the Global Positioning System (GPS), including satellite navigation principles, coordinate systems, signal structure, and GPS measurements. Students learn basic positioning methods, observation planning, field procedures, and error sources affecting accuracy. The course provides practical skills in GPS data collection and preliminary processing for surveying and engineering applications. | | | |

**Module 28**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 302 | Remote Sensing 1 | 4 | 5 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 75 | 25 |
| **Description** | | | |
| This course introduces the fundamentals of remote sensing, including electromagnetic radiation, sensor systems, image acquisition, and satellite platforms. Students learn the principles of image interpretation, spectral characteristics of Earth features, and basic digital image processing. The course provides practical knowledge for environmental monitoring, mapping, resource management, and engineering applications. | | | |

**Module 29**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 303 | Python Language | 7 | 5 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 150 | 25 |
| **Description** | | | |
| This course introduces the fundamentals of Python programming, including syntax, variables, data types, control structures, functions, and file handling. Students develop problem-solving and programming skills through practical exercises. The course also introduces basic data processing and automation techniques, preparing students for engineering, scientific, and geospatial computing applications. | | | |

**Module 30**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 304 | Cadastral Surveying 1 | 6 | 5 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 3 | 3 | 150 | 0 |
| **Description** | | | |
| This course introduces the principles and practices of cadastral surveying, focusing on land parcel identification, boundary determination, property subdivision, and cadastral mapping. Students learn legal aspects of land surveying, measurement techniques, field procedures, and documentation standards. The course develops practical skills for preparing accurate cadastral plans and supporting land administration systems. | | | |

**Module 31**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 305 | Numerical Analyses | 4 | 5 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 0 | 100 | 0 |
| **Description** | | | |
| This course introduces fundamental numerical methods for solving mathematical and engineering problems. Topics include error analysis, root-finding techniques, systems of linear equations, interpolation, numerical differentiation and integration, and numerical solutions of ordinary differential equations. Students develop computational skills for implementing numerical algorithms and analyzing engineering data with accuracy and efficiency. | | | |

**Module 32**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 306 | Geodesy 1 | 4 | 5 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 3 | 0 | 75 | 25 |
| **Description** | | | |
| This course introduces the fundamentals of geodesy, including the Earth's shape, reference ellipsoids, coordinate systems, geodetic datums, gravity concepts, and geodetic measurements. Students learn basic computational methods and develop essential skills for positioning, mapping, surveying, and engineering applications using modern geodetic principles. | | | |

**Module 33**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 307 | Surveying Systems | 7 | 6 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 3 | 3 | 150 | 25 |
| **Description** | | | |
| This course introduces the principles of modern surveying systems, including conventional and digital surveying methods, measurement techniques, coordinate systems, and surveying instruments. Students learn survey planning, data collection, error evaluation, and integration of total stations, GNSS, and GIS technologies to support engineering, mapping, and land management applications. | | | |

**Module 34**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 308 | Global Position System 2 | 5 | 6 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 3 | 125 | 0 |
| **Description** | | | |
| This course builds on the fundamentals of GPS by introducing advanced positioning techniques, differential and RTK methods, static and kinematic surveys, network design, data processing, and accuracy assessment. Students gain practical experience in GNSS field operations, post-processing, and the integration of GPS data with GIS and engineering surveying applications. | | | |

**Module 35**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 309 | Remote Sensing 2 | 4 | 6 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 100 | 0 |
| **Description** | | | |
| This course builds on the fundamentals of remote sensing by introducing advanced digital image processing, image classification, change detection, and accuracy assessment. Students learn techniques for extracting geospatial information from multispectral and satellite imagery and integrating remote sensing data with GIS for environmental monitoring, resource management, and engineering applications. | | | |

**Module 36**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 310 | Cadastral Surveying 2 | 6 | 6 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 3 | 3 | 150 | 0 |
| **Description** | | | |
| This course advances students' knowledge of cadastral surveying through boundary re-establishment, land subdivision, cadastral adjustment, and digital cadastral mapping. It covers legal and technical procedures, geospatial data management, and the application of GNSS, GIS, and total stations in cadastral surveys. Students develop practical skills for modern land administration and property registration. | | | |

**Module 37**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 311 | Geotechnic | 4 | 6 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 4 | 0 | 100 | 0 |
| **Description** | | | |
| This course introduces the fundamental principles of geotechnics, including soil formation, classification, physical and mechanical properties, and soil behavior under loading. Students learn basic site investigation methods, soil testing techniques, and the application of geotechnical principles in foundation design, earthworks, and civil engineering projects. | | | |

**Module 38**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 312 | Geodesy 2 | 4 | 6 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 3 | 0 | 75 | 25 |
| **Description** | | | |
| This course builds on the fundamentals of geodesy by introducing advanced geodetic computations, geodetic networks, coordinate transformations, map projections, and height systems. Students learn adjustment techniques, geodetic data processing, and the application of modern geodetic methods to surveying, mapping, and engineering projects. | | | |

**Module 39**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 401 | Urban Planning 1 | 6 | 7 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 150 | 0 |
| **Description** | | | |
| This course introduces the fundamental concepts and principles of urban planning, including land use, urban growth, transportation systems, and sustainable development. Students learn planning methods, spatial analysis, and the preparation of basic urban plans. The course emphasizes the relationship between planning, infrastructure, environmental considerations, and community development. | | | |

**Module 40**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 402 | Image Processing 1 | 7 | 7 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 4 | 150 | 25 |
| **Description** | | | |
| This course introduces the fundamentals of digital image processing, including image representation, enhancement, filtering, transformation, and feature extraction. Students learn basic techniques for processing aerial and satellite images using specialized software. The course develops practical skills for improving image quality and extracting information for mapping, remote sensing, and geospatial applications. | | | |

**Module 41**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 403 | Radar Engineering 1 | 7 | 7 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 4 | 150 | 25 |
| **Description** | | | |
| This course introduces the fundamental principles of radar engineering, including electromagnetic wave propagation, radar systems, signal transmission and reception, target detection, and radar performance. Students learn the basics of radar measurements, system components, and radar applications in surveying, remote sensing, navigation, and environmental monitoring. | | | |

**Module 42**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 404 | Traffic Engineering 1 | 4 | 7 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 100 | 0 |
| **Description** | | | |
| This course introduces the fundamental principles of traffic engineering, including traffic flow characteristics, road user behavior, traffic data collection, and roadway capacity analysis. Students learn traffic control devices, intersection design, and safety considerations. The course develops practical skills for planning, analyzing, and managing efficient and safe transportation systems. | | | |

**Module 43**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 405 | Theory of Errors 1 | 4 | 7 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 100 | 0 |
| **Description** | | | |
| This course introduces the fundamental concepts of measurement errors and their impact on surveying and engineering observations. Students learn error classification, probability theory, statistical analysis, precision and accuracy assessment, error propagation, and the principles of least squares adjustment. The course develops essential skills for evaluating and improving the reliability of measurement results. | | | |

**Module 44**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| TEMO 400 | Project 1 | 2 | 7 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 50 | 0 |
| **Description** | | | |
| This course represents the first stage of the graduation project for final-year Geomatics Engineering Technology students. Under academic supervision, students identify a research or engineering problem, conduct a literature review, define project objectives and methodology, prepare the project proposal, and develop a detailed implementation plan while applying professional, technical, and research skills. | | | |

**Module 45**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 407 | Urban Planning 2 | 6 | 8 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 150 | 0 |
| **Description** | | | |
| This course builds on the principles of urban planning by introducing advanced planning methods, land use management, transportation planning, urban design, and sustainable development strategies. Students learn spatial planning techniques, GIS-based urban analysis, and the preparation and evaluation of comprehensive urban development plans for modern cities and communities. | | | |

**Module 46**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 408 | Image Processing 2 | 7 | 8 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 4 | 150 | 25 |
| **Description** | | | |
| This course builds on the fundamentals of digital image processing by introducing advanced techniques for image classification, feature extraction, segmentation, pattern recognition, and change detection. Students learn to process high-resolution aerial and satellite imagery using specialized software and apply image analysis methods to remote sensing, mapping, and geospatial engineering applications. | | | |

**Module 47**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 409 | Radar Engineering 2 | 7 | 8 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 4 | 150 | 25 |
| **Description** | | | |
| This course builds on the fundamentals of radar engineering by introducing advanced radar systems, synthetic aperture radar (SAR), signal processing, target classification, and radar image interpretation. Students learn the integration of radar data with remote sensing and GIS technologies for terrain mapping, environmental monitoring, disaster assessment, and engineering applications. | | | |

**Module 48**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 410 | Traffic Engineering 2 | 4 | 8 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 100 | 0 |
| **Description** | | | |
| This course builds on the fundamentals of traffic engineering by introducing advanced traffic operations, transportation planning, traffic simulation, intelligent transportation systems, and roadway safety analysis. Students learn methods for traffic management, capacity optimization, and network performance evaluation, applying engineering principles to improve the efficiency, safety, and sustainability of transportation systems. | | | |

**Module 49**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| GEO 411 | Theory of Errors 2 | 4 | 8 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 100 | 0 |
| **Description** | | | |
| This course builds on the fundamentals of error theory by introducing advanced statistical methods, least squares adjustment, network adjustment, variance–covariance analysis, and quality assessment of surveying observations. Students learn to process and evaluate geodetic and engineering measurements, ensuring the accuracy, reliability, and consistency of spatial data for professional surveying applications. | | | |

**Module 50**

| Code | Module Title | ECTS | Semester |
|---|---|---|---|
| TEMO 401 | Project 1 | 2 | 8 |
| **Class (hr/w)** | **OLect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/sem)** |
| 2 | 2 | 50 | 0 |
| **Description** | | | |
| This course represents the final stage of the graduation project for Geomatics Engineering Technology students. Students implement the approved project, collect and analyze data, apply appropriate engineering methods and geospatial technologies, evaluate results, and prepare a comprehensive technical report. The course culminates in an oral presentation and project defense, demonstrating professional competence and problem-solving skills. | | | |

## 3. Contact


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امسح الكود للوصول إلى النسخة الإلكترونية