Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Ministry of Higher Education and Scientific Research
Scientific Supervision and Evaluation Authority
Quality Assurance and Academic Accreditation Department

Academic Program Description Form for Colleges and Institutes

University Name: Northern Technical University

College/Institute: Kirkuk Technical Institute

Scientific Department: Surveying Technical

Name of academic or professional program: Technical Diploma

Name of final certificate: Technical Diploma

Study system: Courses

Description preparation date: / /2025

File filling date: / /2025

Signature:

Name of Head of Department: Asst.Pro.Dr. Nihad Davut

Date:

Signature:

الدكتور
عصواش شاهين ابراهيم
معاون العميد للشؤون العلمية

Scientific Assistant Name:

Date:

File checked by
Quality Assurance and University Performance Division
Quality Assurance and University Performance Division Head: Assist.Lecturer.. Alaa Abdulwahhab Azeez Baker
Date:
Signature:

ashty

Approval of the Dean
Prof. Dr. Ashti Mahdi Aref

1. Program Vision

We look forward to developing the characteristics and skills of administrative creativity among future business leaders in line with the needs of the labor market..

2. Program Mission

Qualifying accepted students with the cognitive skills and specializations required in the field of implementing the concept of “From the Institute to the Workplace” based on modern curricula and advanced training techniques in preparing and training students on surveying equipment and practical training to provide them with high-level technical skills and a high degree of efficiency and launch them into the labor market and ensure they obtain appropriate opportunities at the level of government departments and private sector institutions.

3. Program Objectives

The department aims to prepare highly skilled technical personnel to carry out various field and office surveying tasks, whether in government departments or the private sector. These include:

1. Calculating areas and determining ownership.
2. Triangulating, angularizing, and leveling work.
3. Preparing general survey maps and carrying out mapping work in accordance with Iraqi and international networking.
4. Preparing thematic maps using GIS software.

4. Program Accreditation

According to the approved learning system (semester, annual), whether it is a requirement (ministry, university, college, or scientific department), and the number of academic units.

5. Other external influences

A consistent set of knowledge, skills, and values acquired by a student after successfully completing the academic program. Learning outcomes for each course must be defined in a manner that achieves the program's objectives.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	22	10		8 basic & 2 elective
College Requirements	5	2		basic
Department Requirements	79	22		basic
Summer Training	exist			
Other				

* This can include notes whether the course is basic or optional.

7. Courses

Year/Level	Course Code	Course Name	Credit Hours		unit	semester
			theoretical	practical		
Academic level (first)	NTU 100	Human Rights	1	0	1	First semester
	NTU 101	English Language 1	2	0	2	
	NTU 102	Computer Fields 1	1	2	3	
	NTU 104	Arabic Language	2	0	2	
	TIMO 110	Mathematics 1	2	0	2	
	TIMO 111	Mechanics Laboratories	0	3	3	
	SUT 120	Area 1	2	4	6	
	SUT 122	Aerial Survey 1	2	2	4	
	SUT 128	Computer Engineering Drawing 1	0	2	2	
	SUT 124	Remote sensing 1	1	0	1	
	NTU 106	Democracy	1	0	1	second semester
	NTU 103	Computer Principles 2	1	2	3	
	NTU 105	Sports (optional)	1	1	2	
	NTU 107	French Language (Optional)	2	0	2	
	SUT 130	Spherical triangles	2	0	2	
	SUT 121	Area with Thpodolite	2	4	6	
	SUT 129	Drawing using AutoCAD	0	2	2	
	SUT 123	Photogrammetry	2	2	4	
	SUT 125	Image processing	1	0	1	
	SUT 126	Earth surface science	1	0	1	
	SUT 127	Civil Laboratories	0	2	2	
Academic level (second)	NTU 203	Baath party crimes	2	0	0	First semester
	NTU 200	English Language 2	2	0	2	
	NTU 201	Professional Ethics	2	0	2	
	SUT 206	Photogrammetry 2	2	2	4	
	SUT 202	Planar area	2	6	8	
	SUT 203	Engineering Survey	2	3	5	
	SUT 204	Principles of Mapping	2	0	5	
	SUT 208	Specifications and guessing	2	0	2	
	SUT 205	Global Positioning System	1	3	4	
	SUT 207	Computer mapping	0	3	3	
	SUT 213	Digital Survey	2	2	4	second semester
	SUT 209	Geodetic Area	2	6	8	
	SUT 210	Cadastral Survey	2	3	5	
	SUT 211	Design and preparation of maps	2	3	5	
	SUT 215	Quantity Survey	2	0	2	
	SUT 212	Geographic Information Systems (GIS)	1	3	4	
	SUT 214	Computer Road Design	0	3	3	
	SUT 216	Project	0	3	3	

8. Expected learning outcomes of the program

Knowledge

Cognitive learning outcomes are the expected learning outcomes that focus on acquiring knowledge, understanding, and critical thinking skills. These outcomes include the ability to recall facts, understand concepts, apply knowledge, analyze, evaluate, and synthesize information.

1. How to conduct field surveys
2. How to use modern surveying equipment
3. Familiarize yourself with aerial photography equipment and read aerial photographs
4. Link computer programs with field data
5. Use a computer to prepare maps
6. Use a GPS device to determine positions, elevations, and coordinates
7. Analyze aerial photographs

Skills

Expected learning outcomes are a set of skills and abilities that a learner should acquire after successfully completing the learning process. These skills can be practical skills (such as using a tool or performing a procedure), intellectual skills (such as problem-solving or critical thinking), or communication skills (such as writing or speaking).

1. Aims to prepare qualified technical personnel to practice activities related to determining the elevations and coordinates of observed points, preparing topographic maps of the work area, and analyzing aerial and satellite images and converting them into maps.
2. Prepare highly skilled technical personnel in the field of surveying, capable of dealing with the variables occurring in their field of expertise.
3. The department qualifies an effective cadre to carry out surveying operations, including field work and the use of modern surveying equipment.
4. Provide staff with skills in field and office surveying activities, in line with labor market requirements.
5. Develop leadership skills, responsibility, and the required work performance.

Ethics

Expected learning outcomes are what a learner is expected to learn or acquire through the learning process. They are specific outcomes that express the level of knowledge, skills, and attitudes the learner should attain upon completion of the learning process.

1. Developing students' ability to share ideas
2. Evaluating proposed solutions, selecting the best ones, and student interaction in the classroom
3. For daily, semester, and final exams, and submitting weekly and semester reports
4. Academic reports, student seminars, study, cultural, and general seminars
5. Examination at the beginning of the lecture, including a topic from the previous lecture, and oral exams during the lecture on the same topic as the lecture

9. **Teaching and Learning Strategies**
1. Detailed explanation of the scientific material to students 2. Field survey applications using modern surveying equipment 3. Computer applications 4. Use of visual aids such as data show 5. Preparation of weekly and quarterly reports and scientific visits 6. Interactive and direct teaching strategies to develop students' abilities and help them communicate the scientific material Gaining students' ability to learn independently and the skill to apply what they have learned in new fields 7. Use of workshops (mechanical and civil) and specialized laboratories 8. Summer training

10. **Evaluation methods**
1. Weekly, monthly, daily, and end-of-year exams 2. Field surveying equipment use test 3. Drawing boards

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)	Number of the teaching staff	
	General	Special		Staff	Lecturer
Assistant Professor	Surveying Engineering	Surveying Engineering		Staff	
teacher	mathematics	Optimization		Staff	
teacher	Geomatic	Geomatic		Staff	
Assistant Lecturer	Applied Earth Sciences	Engineering Geology		Staff	
Assistant Lecturer	Agriculture	Horticulture and Garden Engineering		Staff	
Assistant Lecturer	Surveying Engineering	Photogrammetry		Staff	
Assistant Lecturer	Surveying Engineering	Aerial Survey		Staff	
Assistant Professor	Surveying Engineering	Photogrammetry			Lecturer
Assistant Lecturer	Surveying Engineering	Surveying Engineering and GIS			Lecturer
Assistant Lecturer	Software engineering	Advanced Software Engineering			Lecturer
Assistant Lecturer	Law	Civil Law			Lecturer
Assistant Lecturer	Arabic Language	Language			Lecturer

Professional Development

Mentoring new faculty members

Organizing digital and developmental library courses, scientific seminars, study groups, guiding, preparing and preparing them, and the strategy for delivering lectures and publishing research.

Professional development of faculty members

1. Holding digital and developmental library courses, scientific seminars, and study circles within higher education and scientific research institutions, guiding, preparing, and developing lecture strategies, publishing research, and developing and improving curricula in line with the development of the new curriculum.
2. Training workshops
3. Scientific conferences
4. Sessions presenting scientific developments

The curriculum is developed by monitoring the latest publications of books, devices, tools, and modern surveying programs related to the Department of Surveying Technology and scientific research, as well as reports, projects, recommended books and references, scientific journals, and research related to the Department of Surveying Technology.

12. Acceptance Criterion

The department accepts graduates of preparatory studies in both the scientific and literary branches, and competition is held between the technological departments according to grades and average, in addition to the student's desire.

13. **The most important sources of information about the program**
1. Required textbooks/curriculum books 2. Recommended books and references (journals): Al-Taqni Magazine - Publications of the University Journal in Kirkuk - University of Technology - University of Baghdad - University of Tikrit 3. Paper resources (books and resources available in the institute's library) 4. Electronic resources (books available in the institute's electronic library) 5. Resources available in the virtual library of the Ministry of Higher Education and Scientific Research 6. Specialized websites on the Internet

14. Program Development Plan
1. Utilizing the latest electronic devices and modern surveying software, linking the theoretical and practical components of the course through student project material. 2. Developing the curriculum by keeping up with the latest publications of books related to the Surveying Technology Department, scientific research, reports, and projects. 3. Electronic references/website for the Surveying Department and the Institute's website. 4. Studies to develop curricula based on recommendations from sector committees. 5. Utilizing the virtual library of the Ministry of Higher Education and Scientific Research. 6. Utilizing academic websites to develop the curriculum by displaying scientific films and new developments in the field.

Program Skills Outline															
Year/Level	Course Code	Course Name	Basic or optional	Required program Learning outcomes											
				Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
1st Level 2025-2024	NTU 100	Human Rights	basic	✓			✓					✓	✓		
	NTU 101	English Language 1	basic	✓	✓			✓	✓						
	NTU 102	Computer Fields 1	basic	✓		✓		✓	✓						
	NTU 104	Arabic Language	basic	✓	✓			✓							
	TIMO 110	Mathematics 1	basic	✓	✓			✓							
	TIMO 111	Mechanics Laboratories	basic			✓		✓	✓	✓					
	SUT 120	Area 1	basic	✓		✓		✓	✓		✓				
	SUT 122	Aerial Survey 1	basic	✓		✓		✓	✓	✓					
	SUT 128	Computer Engineering Drawing 1	basic	✓		✓		✓	✓		✓				
	SUT 124	Remote sensing 1	basic	✓		✓		✓	✓	✓					
	NTU 106	Democracy	basic	✓	✓		✓					✓	✓		
	NTU 103	Computer Principles 2	basic	✓		✓		✓	✓		✓				
	NTU 105	Sports (optional)	elective					✓	✓			✓		✓	
	NTU 107	French Language (Optional)	elective	✓	✓			✓	✓						
	SUT 130	Spherical triangles	basic	✓	✓			✓	✓						
	SUT 121	Area with Thpodolite	basic	✓		✓		✓	✓	✓					
	SUT 129	Drawing using AutoCAD	basic	✓		✓		✓	✓		✓				
	SUT 123	Photogrammetry	basic	✓	✓	✓		✓	✓	✓	✓				
	SUT 125	Image processing	basic	✓	✓	✓		✓	✓	✓	✓				
	SUT 126	Earth surface science	basic	✓	✓		✓	✓	✓						
	SUT 127	Civil Laboratories	basic			✓	✓	✓	✓	✓	✓				

Program Skills Outline															
Year/Level	Course Code	Course Name	Basic or optional	Required program Learning outcomes											
				Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
2nd Level 2025-2024	NTU 200	English Language 2	basic	✓	✓			✓	✓						
	NTU 201	Professional Ethics	basic				✓					✓	✓	✓	
	SUT 206	Photogrammetry 2	basic	✓	✓	✓		✓	✓	✓	✓				
	SUT 202	Planar area	basic	✓		✓		✓	✓		✓				
	SUT 203	Engineering Survey	basic	✓		✓		✓	✓	✓					
	SUT 204	Principles of Mapping	basic	✓				✓	✓						
	SUT 208	Specifications and guessing	basic	✓			✓	✓	✓						
	SUT 205	GPS	basic	✓		✓		✓	✓						
	SUT 207	Computer mapping	basic	✓		✓		✓	✓		✓				
	SUT 213	Digital Scanning	basic	✓		✓		✓	✓	✓					
	SUT 209	Geodetic Area	basic	✓		✓		✓	✓						
	SUT 210	Cadastral Survey	basic	✓		✓		✓	✓						
	SUT 211	Design and preparation of maps	basic	✓		✓		✓	✓						
	SUT 215	Quantity Survey	basic	✓		✓		✓	✓						
	SUT 212	Geographic Information Systems (GIS)	basic	✓		✓		✓	✓						
	SUT 214	Computer Road Design	basic	✓		✓		✓	✓		✓				
	SUT 216	Project	basic					✓	✓	✓	✓	✓	✓	✓	✓
	NTU 203	Baath Party Crimes	basic	✓	✓		✓					✓	✓		

First stage curricula

1. Course Name:
Plane Surveying
2. Course Code:
SUT120
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 4 hours per week = 60 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Nihad Davut Hassan Hussein - Shelan Khaled Raouf Email: nihadhassan@ntu.edu.iq - shelan_khald@ntu.edu.iq
8. Course Objectives

Course Objectives	• Equip students with essential skills in triangulation, traversing, and leveling. • Introduce students to the use of surveying instruments such as the level and theodolite available in the department. • Develop students' skills in creating contour maps using indirect methods with leveling instruments. • Familiarize students with engineering procedures conducted during tape measurements. • Teach students how to calculate areas and define property boundaries.

9. Teaching and Learning Strategies	
Strategy	• **Lectures:** Easy explanations of ideas using pictures and videos to help students understand tools and problems. • **Practical Work:** Going outside to practice with real surveying tools like the level and theodolite. • **Mini Projects:** Working on small projects like measuring land or drawing a map to learn by doing. • **Problem Solving:** Giving real-life problems and helping students think and find the right solutions. • **Using Technology:** Using computer programs like CAD to draw and analyze surveying data. • **Ongoing Tests:** Giving short quizzes and questions to check student progress and understanding.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	Understand the fundamenta of surveying	introduction to surveying, measurement unit scale types, and distance measurement in the field	Theoretical and Practical	Oral and Practical Exams
7–9	4hours weekly	Perform horizontal and vertical component calculations in closed traverses, coordinate computation, and error corrections	Calculations of horizontal and vertical components in closed circular traverses, corrections, and coordinate determination	Theoretical and Practical	Oral and Practical Exams
10–12	4hours weekly	Learn how to select travers points, correct angles using Deflection and Angle to th Right methods	Traverse point selection, angle correction usi two methods: Deflection Angle and Angle to Right	Theoretical and Practical	Oral and Practical Exams
13–15	4hours weekly	Conduct closed traverse surveys, calculate coordina and corrections using comp and transit methods, and ap error closure corrections	Conducting a closed traverse, calculating horizontal and vertical components, coordinating computation, corrections using compass and transit methods, and dealing wi closure error	Theoretical and Practical	Oral and Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Raymond E. Davis & Joe Welly. Elementary Plane Surveying
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	"Plane Surveying" by Dr. Ibrahim Abdullah Al-Najjar "Elementary Surveying: An Introduction to Geomatics" by Charles D. Ghilani & Paul R. Wolf "Applied Surveying" by Dr. Younis Abdulrahman
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Surveying Using Theodolite
2. Course Code:
SUT 121
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 3 hours per week = 45 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Nihad Davut Hassan Hussein - Shelan Khaled Raouf Email: nihadhassan@ntu.edu.iq - shelan_khald@ntu.edu.iq
8. Course Objectives

Course Objectives	• Provide students with the basic skills needed for surveying tasks that require the use of the theodolite. • Introduce the theodolite instrument, its components, and the function of each part, and teach how to read horizontal and vertical circles. • Equip students with the ability to measure horizontal and vertical angles, understand types of north, and identify different types of traverses. • Teach how to calculate coordinates (point positions) using corrected horizontal and vertical components, and how to apply coordinate corrections. • Train students on selecting closed traverse points, measuring all angles, correcting angles, and how to draw the traverse.

9. Teaching and Learning Strategies	

Strategy	• **Theoretical Explanation:**
	  • Learn the parts of the theodolite and their functions.
	  • Understand how to set up the instrument and read angles.
	• **Visual Demonstration:**
	  • Use educational videos and images to show how to operate the theodolite step by step.
	  • Help students visualize the process before applying it in the field.
	• **Practical Fieldwork:**
	  • Practice using the theodolite to measure real angles in the field.
	  • Encourage teamwork and role rotation in groups.
	• **Problem Solving:**

- Solve practical problems like measuring the angle between two points or finding direction deviation.
- Train logical thinking and correct instrument usage.

- **Technology Use:**
  - Link field data to programs like AutoCAD.
  - Use simulation software to demonstrate how the instrument works.
- **Ongoing Assessment:**
  - Short quizzes on instrument parts and steps.
  - Observe and evaluate field performance.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	3hours weekly	Understand basic surveying ta using the theodolite; identify types of traverses	Introduction to theodolite: parts and function reading horizontal and vertical circles, types north and traverses, angle corrections	Theoretical and Practical	Oral and Practical Exams
7–9	3hours weekly	Learn to compute horizontal a vertical components in closed circular traverses, apply corrections and find coordinat	Horizontal & vertical component calculation closed traverses, corrections, and coordinate determination	Theoretical and Practical	Oral and Practical Exams
10–12	3hours weekly	Learn how to choose traverse points, correct traverse angles using two methods	Selection of closed traverse points and angle correction using: Deflection Angle & Angle the Right	Theoretical and Practical	Oral and Practical Exams
13–15	3hours weekly	Understand how to conduct a closed traverse, calculate coordinates, apply corrections using compass and transit methods, and fix closure error	Conducting closed traverse, calculating coordinates, corrections using compass and transit methods, and fixing closure error	Theoretical and Practical	Oral and Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Raymond E. Davis & Joe Welly. Elementary Plane Surveying
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scien Research
Recommended books and references (scientific journals, reports…)	Ministry and engineering institution reports (e.g., Ministry of Construction & Housing, Road & Bridge Departments) *Applied Surveying* – Dr. Younis Abdul Rahman

Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:	
Photogrammetry	
2. Course Code:	
SUT 123	
3. Semester / Year:	
2024/2025	
4. Description Preparation Date:	
2025 / /	
5. Available Attendance Forms:	
Daily – In-Person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
15 weeks × 4 hours per week = 60 hours (for the semester)	
7. Course administrator's name (mention all, if more than one name)	
Name: Nihad Davut Hassan Hussein - Suzan Atta Bakr Mustafa Email: nihadhassan@ntu.edu.iq - Suzan-atta@ntu.edu.iq	
8. Course Objectives	
Course Objectives	• Provide students with foundational skills to understand aerial and satellite imagery. • Introduce modern software such as Erdas Imagine. • Equip students with the skills needed for geometric correction and cutting of images (both regular and irregular shapes). • Train students in creating aerial mosaics using satellite imagery in Erdas Imagine.
9. Teaching and Learning Strategies	

Strategy	• **Interactive Theoretical Instruction:**
	  ○ Present core concepts such as image types, scale, displacement, and parallax.
	  ○ Use PowerPoint, photos, and maps to compare vertical and oblique images.
	• **Hands-on Practice with Aerial Images:**
	  ○ Train students in reading and analyzing aerial images.
	  ○ Conduct exercises to extract image scale, distances, and elevations.
	• **Project-Based Learning:**
	  ○ Assign practical projects, like preparing a map from a pair of aerial photos using specialized software.
	• **Specialized Software Use:**
	  ○ Train students on tools like *Erdas Imagine*, *Agisoft Metashape*, and *Photomod*.
	  ○ Teach image processing and 3D modeling techniques.
	• **Video Lessons and Interactive Media:**
	  ○ Use videos to show how aerial photos are captured, camera setups, and result analysis.
	• **Collaborative Learning:**
	  ○ Divide students into groups to process real images and compare outcomes.
	  ○ Encourage role rotation within groups to improve understanding of

	various steps. • **Theoretical and Practical Assessment:** o Short quizzes and assignments on core concepts. o Evaluate reports and final projects based on real-image work.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	Introduction to aerial imagery and its types	Overview of photogrammetry software and basic image types, ERDAS interface, and dig matrix setup	Theoretical and Practical	Written + Practical Exams
7–9	4hours weekly	Understand geometric correct and image enhancement	Geometric correction, radiometric enhancem and edge sharpening of satellite imagery	Theoretical and Practical	Written + Practical Exams
10–12	4hours weekly	Learn about types of aerial ma and how to extract them	Image classification, types of classification, image analysis, and map extraction	Theoretical and Practical	Written + Practical Exams
13–15	4hours weekly	Understand the various types geometric correction	Types of geometric correction applied to opt satellite imagery	Theoretical and Practical	Written + Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• *Manual of Photogrammetry* – American Society of Photogrammetry by Moffitt • *Elements of Photogrammetry* – Paul R. Wolf, 2nd Edition • *Erdas Imagine Tour Guides* – Leica Geosystems Geospatial Imaging, 2006 • *Photogrammetric Surveying* – Labeeb Nassif, Technical Education Authority, 2nd Edition, 1999
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scien Research
Recommended books and references (scientific journals, reports…)	• *Photogrammetry, Vol. 1: Fundamentals* – Karl Kraus • *Introduction to Modern Photogrammetry* – Edward M. Mikhail & James Bethel • Reports from relevant ministries and engineering authorities
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Aerial Surveying 1
2. Course Code:
SUT 122
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 4 hours per week = 60 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Omar Falah Mardan Raouf - Suzan Atta Bakr Mustafa Email: omer-falah@ntu.edu.iq- Suzan-atta@ntu.edu.iq
8. Course Objectives

Course Objectives	• Equip students with basic knowledge of photogrammetry and the types of aerial imagery. • Familiarize students with different types of aerial and digital images and how to handle them. • Develop students' skills in analyzing and interpreting aerial and digital images. • Teach students how to produce maps from aerial and digital images.
9. Teaching and Learning Strategies	

Strategy	• **Interactive Theoretical Explanation:**
	
	  • Define aerial surveying, its types, and significance in engineering.
	  • Explain principles such as flying height, image scale, displacement, overlap, and coverage.
	
	• **Use of Real Aerial Images:**
	
	  • Train students to interpret and analyze aerial images by identifying features, shadows, and variations.
	
	• **Software-Based Learning:**
	
	  • Apply tools such as *Erdas Imagine*, *Global Mapper*, or *ENVI* for image processing and analysis.

- **Practical Field Application:**
  - Present models of drones or aerial cameras, including flight planning and shooting schedules.
  - Organize field visits or simulate aerial photography missions.
- **Mini Projects:**
  - Assign tasks like creating maps from aerial images or comparing different areas to analyze changes.
- **Instructional Videos:**
  - Show videos on how aerial cameras and imaging systems work, along with digital processing methods.
- **Ongoing Assessment:**
  - Include quizzes and applied exercises on image reading and interpretation.
  - Evaluate individual or group aerial survey projects through detailed reports.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	Introduction to vertical image image types, calculation meth and stereoscopic vision	History and overview of aerial surveying, vertical imagery, image scale, and ground coordinates, stereoscopic viewing and its principles	Theoretical and Practical	Written + Practical Exams
7–9	4hours weekly	Understanding oblique image scales and types of aerial and space cameras	Oblique image scale, coordinate calculation, image geometric analysis, camera types and viewing angles, classification and rotational orientation	Theoretical and Practical	Written + Practical Exams
10–12	4hours weekly	Understanding mosaicking an orientation	Image mosaicking, its advantages and disadvantages, relative orientation, and devic movement in image display	Theoretical and Practical	Written + Practical Exams
13–15	4hours weekly	Understanding image moveme and digital imagery	Translational and rotational movements, and aerial images captured by airborne digital sensors	Theoretical and Practical	Written + Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	*Photogrammetric Surveying* – Labeeb Nassif, Technical Education Authority, 2nd Edition, 1999
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scien Research
Recommended books and	• *Remote Sensing* – MDPI

references (scientific journals, reports…)	• *Journal of Applied Remote Sensing* – SPIE • *Aerial Photography and Image Interpretation* – David P. Paine & James D. Kiser
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:	
English Language 1	
2. Course Code:	
NTU101	
3. Semester / Year:	
2024/2025	
4. Description Preparation Date:	
2025 / /	
5. Available Attendance Forms:	
Daily – In-Person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
15 weeks × 2 hours per week = 30 hours (for the semester)	
7. Course administrator's name (mention all, if more than one name)	
Name: Lana Hamid Ahmed Email: lana.hameed23@ntu.edu.iq	
8. Course Objectives	
Course Objectives	• Develop students' skills in pronunciation, reading, listening, and speaking. • Enable students to use prefixes and suffixes properly. • Understand essential vocabulary related to time, places, and other basic themes.
9. Teaching and Learning Strategies	
Strategy	• **Communicative Language Teaching (CLT):** Focuses on using English in real-life situations through pair work, role play, and group discussions. • **Task-Based Learning:** Students complete meaningful tasks such as writing emails, preparing short presentations, or conducting interviews in English. • **Listening and Speaking Practice:** Using audio materials, podcasts, and videos to improve listening. Practicing pronunciation and speaking via dialogues and storytelling. • **Reading and Vocabulary Building:** Students are provided with graded texts, articles, or short stories. Reading strategies like skimming, scanning, and contextual guessing are taught. Vocabulary is introduced in context and revised regularly. • **Writing Skill Development:** Begins with guided writing (forms, short paragraphs), then transitions to free writing (emails, reports, essays). Peer review and feedback techniques are applied.

	• **Use of Educational Technology:** PowerPoint, videos, and interactive whiteboards are used to engage learners. • **Continuous Assessment and Feedback:** Quizzes, oral presentations, vocabulary logs, and language portfolios are used for ongoing evaluation

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	2hours weekly	Basic conversation, vocabular (objects, food), numbers, countries & cities, singular/plu forms, reading and listening exercises	**Hello & Introductions**, Basic Everyday English, Pronunciation	Theoretical + Practical (Oral)	Oral & Written Exams
7–9	2hours weekly	Personal information, jobs, negatives, reading/listening/speaking practice, stress in pronunciatio social expressions	**Personal Info & Jobs**, Grammar Practice, Listening Skills	Theoretical + Practical (Oral)	Oral & Written Exams
10–12	2hours weekly	Family & friends vocabulary, present simple tense, preferen nationalities, currencies, listen and reading practice	**Family & Lifestyle**, Present Simple, Likes/Dislikes	Theoretical + Practical (Oral)	Oral & Written Exams
13–15	2hours weekly	Time-related vocabulary, daily routine, object pronouns, question words, traveling, adjectives, practical translatio	**Time & Travel**, Grammar: Questions/Negatives, Everyday English	Theoretical + Practical (Oral)	Oral & Written Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	*New Headway Plus Beginner Student Book* • Audio & Video Resources: https://elt.oup.com/student/headway/beg/download?cc=us&selLanguage=enOxford Link
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scien Research
Recommended books and references (scientific journals, reports…)	• *Oxford Word Skills* – Ruth Gairns & Stuart Redman • *ELT Journal*
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Crimes of the Ba'ath Regime in Iraq
2. Course Code:
NTU203
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 2 hours per week = 30 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Idrees Ihsan Star Email: Idrees_ihsan@ntu.edu.iq
8. Course Objectives

Course Objectives	• Develop students' skills in pronunciation, reading, listening, and speaking. • Introduce students to human rights and the violations committed by the Ba'ath regime. • Explain the fundamental rights and freedoms of citizens as stated in the Constitution. • Clarify the basic rights and freedoms of citizens under Iraqi legislation.
9. Teaching and Learning Strategies	
Strategy	• **Theoretical Explanation:** • Overview of the Ba'ath regime and its governing system. • Presentation of major crimes such as the Anfal Campaign, Halabja massacre, and the 1991 Shaaban Uprising. • **Use of Real Footage and Documents:** • Viewing documentaries, testimonies of victims, and scenes from trials. • Class discussions to reflect on the scale and impact of the crimes. • **Class Discussions:** • Open dialogue on: ○ Why did these crimes occur? ○ How can they be prevented? ○ What is the role of the state and society? • **Simplified Case Studies:** • In-depth analysis of selected events such as Halabja: what happened and who was responsible? • **Group Work:** • Dividing students into groups to research specific topics, such as: ○ Mass graves

	○ Trials of regime leaders ○ Impact on Iraq's ethnic and religious communities • **Continuous Assessment:** • Using quizzes, short reports, or oral presentations. • Encouraging students to express opinions and critical reflections.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	2hours weekly	Introduction to Ba'ath crimes; types and definitions of crime from legal, psychological, sociological, and religious perspectives; human rights violations; types of internation crimes and genocide as documented by the Iraqi High Criminal Court Law (2005)	Definitions and Types of Crimes; Ba'ath Regime Crimes (Part 1)	Theoretical	Oral & Writt Exams
7–9	2hours weekly	Crimes against humanity and crimes; court rulings and decisions; psychological and social crimes; state responsibi and legal violations; impact of crimes on society	Humanitarian, Psychological & Social Crime Legal Violations	Theoretical	Oral & Writt Exams
10–12	2hours weekly	Political and military violation prison locations; environment crimes (radioactive pollution, landmine explosions, marsh drying, deforestation); mass graves; 1963 events; Iran–Irac war; 1983 events and related massacres	War Crimes, Environmental Crimes, and Ma Graves	Theoretical	Oral & Writt Exams
13–15	2hours weekly	Events of the 1991 uprising; timeline of mass graves (1963 2003); Kurdish Barzani massa (1983); Anfal genocide (1987 1988); Shaaban Uprising massacres (1991)	Shaaban Uprising & Timeline of Genocide	Theoretical	Oral & Written Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Lectures prescribed by the Ministry of Higher Education and Scientific Research
Main references (sources)	Lectures and course materials from the Ministry of Higher Education and Scien Research
Recommended books and references (scientific journals, reports…)	• Virtual Library of the Ministry of Higher Education and Scientific Research • Reports from human rights organizations

Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:	
Human Rights and Democracy	
2. Course Code:	
NTU100	
3. Semester / Year:	
2024/2025	
4. Description Preparation Date:	
2025 / /	
5. Available Attendance Forms:	
Daily – In-Person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
15 weeks × 2 hours per week = 30 hours (for the semester)	
7. Course administrator's name (mention all, if more than one name)	
Name: Idrees Ihsan Star Email: Idrees_ihsan@ntu.edu.iq	
8. Course Objectives	
Course Objectives	• Introduce students to the Universal Declaration of Human Rights issued in 1948. • Explore international conventions related to civil, political, and socio-economic rights and freedoms. • Explain the concept of a constitution, its legal principles, and how laws are derived from it. • Educate students about the rights of others and how to safeguard their own rights without harming others. • Clarify the laws derived from the constitution such as the Penal Code and Civil Law.
9. Teaching and Learning Strategies	
Strategy	• **Theoretical Explanation:** • Introduce key concepts: freedom, equality, dignity, freedom of expression, and the rule of law. • Define democracy, its types, and its principles (separation of powers, elections, majority rule with minority protection). • **Discussion of Declarations and International Covenants:** • Explain the principles of the *Universal Declaration of Human Rights* and the two international covenants (Civil and Political Rights; Economic, Social, and Cultural Rights). • Discuss how these documents affect individual and societal life. • **Discussion-Based Learning:** • Engage students with questions such as: ○ Is absolute freedom possible? ○ Is democracy alone enough to guarantee rights? ○ What is the difference between a democratic and an authoritarian state? • **Real-World Case Analysis:** • Analyze real examples of human rights violations or successful democratic practices.

	• Examine a specific country's case from a human rights and democratic perspective. • **Student Presentations and Projects:** • Assign student presentations on topics like women's rights, child rights, freedom of expression, or fair elections. • Prepare awareness posters or reports on fundamental rights. • **Visual and Media Resources:** • Show short films or documentaries on the struggles for freedom or human rights organizations. • **Simulations:** • Conduct mock trials or student parliaments to practice debate, voting, and opinion-sharing values. • **Continuous Assessment:** • Use short quizzes, written discussions, personal reports, or reflective journals on individual rights and democracy.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	Definition and objectives of human rights; their presence i ancient civilizations (especiall Mesopotamia); religious laws with focus on Islam; human rights in modern history; international recognition post-WWI and via the League of Nations; regional agreements: European Convention (1950), American Convention (1969), African Charter (1981), Arab Charter (1994); human rights Iraqi constitutions	Human Rights: Historical & Legal Evolution	Theoretical	Written Exar
7–9	4hours weekly	Guarantees of human rights at national level; constitutional, legal, and rule-of-law guarant role of public opinion and pre freedom; role of NGOs; introduction to democracy, its types and concepts; democrati systems around the world	Legal Guarantees & Democracy Concepts	Theoretical	Written Exar
10–12	4hours weekly	Basic freedoms: intellectual, economic, and social; freedon education, press, assembly; revisiting relevant human righ concepts; ensuring understand of civic engagement and freedoms	Fundamental Freedoms in Practice	Theoretical	Written Exar
13–15	2hours weekly	Freedoms of association, labo ownership, trade, and industry women's freedoms; political parties; general public freedor scientific and technological progress and its impact on liberties; future of public freedoms	Rights of Association, Gender Equality & Future Outlook	Theoretical	Written Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Lectures prescribed by the Ministry of Higher Education and Scientific Research
Main references (sources)	Lectures and course materials from the Ministry of Higher Education and Scien Research
Recommended books and references (scientific journals, reports…)	• *Human Rights: Concepts and Foundations* by Dr. Mohamed Said Al-Ashmawy • *Democracy and Human Rights* by Dr. Saeed bin Saeed
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:	
Mathematics	
2. Course Code:	
TIMO 110	
3. Semester / Year:	
2024/2025	
4. Description Preparation Date:	
2025 / /	
5. Available Attendance Forms:	
Daily – In-Person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
15 weeks × 2 hours per week = 30 hours (for the semester)	
7. Course administrator's name (mention all, if more than one name)	
Name: Amal Nashat Shaker Zainal Email: Umayaa75@ntu.edu.iq	
8. Course Objectives	
Course Objectives	• Equip students with basic skills to understand and apply equations in various fields of surveying engineering. • Introduce vectors, their operations, matrices, determinants, and trigonometric equations. • Develop students' skills in applying differential and trigonometric equations. • Emphasize the use of fundamental laws for geodetic area applications. • Teach students specific equations used in land surveying fields.
9. Teaching and Learning Strategies	
Strategy	• **Conceptual Teaching:** • Focus on understanding concepts rather than rote memorization. • Explain "why" a law is used, not just "how." • **Problem Solving:** • Train students to think through solution steps. • Use real-life problems that link mathematics to practical applications. • **Active Learning:** • Engage students in solving, explaining, and analyzing. • Organize group activities and in-class math competitions. • **Visual Aids and Graphical Representations:** • Simplify abstract concepts using diagrams, models, or interactive software. • Example: plotting functions graphically, or using cubes for linear algebra. • **Spiral Learning:** • Review previous concepts before introducing new ones. • Reinforce understanding through repetition in gradually complex forms. • **Technology Integration:**

	• Utilize tools like GeoGebra, Desmos, MATLAB, or graphing calculators. • Include video lessons or interactive simulations. • **Continuous Formative Assessment:** • Conduct short quizzes and in-class exercises. • Provide immediate feedback to enhance comprehension.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	Understanding of vectors, matrices, and determinants	Vectors – vector resolution – vector equation a line – matrices and determinants	Theoretical	Oral or Writt Exams
7–9	4hours weekly	Understanding line equations, perpendicularity, and trigonometry	Straight line equation – perpendicular/parall lines – distance between points – triangles – trigonometric equations	Theoretical	Oral or Writt Exams
10–12	4hours weekly	Understanding circles and calculating areas and perimete	The circle and its properties – finding area a circumference – solution of a sector	Theoretical	Oral or Writt Exams
13–15	2hours weekly	Understanding differential an trigonometric equations	Differential equations – trigonometric differentiation	Theoretical	Oral or Written Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	CALCULUS by George B. Thomas
Main references (sources)	Virtual Library of the Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	Applied Mathematics by Yaqoub Sabbaghah
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:	
Earth Surface Science	
2. Course Code:	
SUT 126	
3. Semester / Year:	
2024/2025	
4. Description Preparation Date:	
2025 / /	
5. Available Attendance Forms:	
Daily – In-Person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
15 weeks × 1 hours per week = 15 hours (for the semester)	
7. Course administrator's name (mention all, if more than one name)	
Name: Zeina Hussein Shukor Mohammed Email: zeena-hussin@ntu.edu.iq	
8. Course Objectives	
Course Objectives	• Equip students with the fundamental skills to understand various topics in Earth sciences and their important applications in life. • Introduce the different branches of Earth science and their relevance to human life. • Develop students' ability to distinguish between different types of rocks. • Teach students how to apply Earth surface science in surveying and civil engineering projects
9. Teaching and Learning Strategies	
Strategy	• **Theoretical Explanation:** • Introduce basic concepts such as: • Tectonic processes • Erosion and weathering • Formation of mountains, valleys, rivers, and plains • Use illustrative maps and images during lectures. • **Models and Visuals:** • Present videos or 3D animations showing Earth surface formation over time. • Visually compare different landforms. • **Learning through Maps and Aerial Images:** • Analyze satellite imagery and topographic maps to identify landforms. • Train students to interpret surface features from maps. • **Field Trips:** • Visit real geological sites (e.g., valleys, caves, mountain ranges) to observe phenomena firsthand.

	• Prepare field reports and compare theoretical vs. practical insights. • **Project-Based Learning:** • Assign students to study a specific region and identify its surface features. • Present visual projects (videos, maps, models). • **Use of Geospatial Technology:** • Introduce software such as Google Earth and ArcGIS for terrain analysis. • Train students to trace natural phenomena and their impact on Earth's surface. • **Continuous Assessment:** • Conduct theoretical exams, field reports, and classroom discussions. • Encourage students to reflect on the relationship between humans and natural changes.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	1hours weekly	Understanding key features of Earth's crust	Introduction to Earth surface science and its relation to surveying; Earth's layers and surrounding spheres	Theoretical & Practical	Oral or Writt Exams
7–9	1hours weekly	Differentiating rocks and minerals	Straight line equation – perpendicular/parall lines – distance between points – triangles – trigonometric equations	Theoretical & Practical	Oral or Writt Exams
10–12	1hours weekly	Understanding soil formation control	Introduction to soil types and controlling fac	Theoretical & Practical	Oral or Writt Exams
13–15	1hours weekly	Distinguishing geomorpholog phenomena	Geomorphological phenomena resulting fron erosion and sediment deposition	Theoretical & Practical	Oral or Written Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• *Principles of Engineering Geology and Its Applications*, Majid Aboud Jassim Al-Taie, University of Basrah, 2001 • *Engineering Geology*, Muqdad Hussein Ali, Basim Roshdi Hijab, Sinan Hashim Al-Jassar, University of Baghdad, 1990 • *Fundamentals of Geology for Engineers*, Kanana Mohammed Thabit, Mohammed Omar Al-Esho, University of Mosul, 1993 • *Principles of Geology and Geomorphology*, Ghada Mohammed Salim, Mohammed Mahdi Abbas, Fadel Noumas Al-Saadouni, Foundation of Technical Institutes, 1984
Main references (sources)	Virtual Library of the Ministry of Higher Education and Scientific Research

Recommended books and references (scientific journals, reports…)	• *Process Geomorphology* – Dale F. Ritter • *Earth and Its Resources* – Dr. Mohammed Mahmoud Al-Nasiri
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Computer Fundamentals
2. Course Code:
NTU 102
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 2 hours per week = 30 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: shelan Khaled Raouf Mohammed Rashid Email: shelan_khald@ntu.edu.iq
8. Course Objectives

Course Objectives	• Provide students with the basic skills to understand computer fundamentals, operating systems, and related applications. • Introduce the hardware components of computers and peripherals (keyboard, mouse, speakers, USB, screen, CD/DVD drives), as well as laptops across different generations. • Equip students with the necessary skills to use Microsoft Office applications (Word, Excel, PowerPoint), and to understand commands and system windows. • Teach students about computer components, operating systems (Windows 7 and 10), and train them on navigating system windows and commands.
9. Teaching and Learning Strategies	

Strategy	• **Theoretical and Practical Instruction:**
	  • Introduce concepts theoretically with immediate hands-on computer applications.
	• **Project-Based Learning:**
	  • Assign tasks like creating PowerPoint presentations or editing text documents.
	• **Laboratory Work:**
	  • Practical application of operating systems, software tools, and basic computer skills.
	• **Demonstrations and Videos:**
	  • Use simple videos to explain computer components or how the internet works.
	• **Continuous Assessment:**

	• Short quizzes, in-class activities, and simple projects like designing a resume using Word.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	2hours weekly	Identify computer component	General introduction to computer fundament hardware and software; creating files/folders basics of Word processing, page formatting, typing skills	Theoretical & Practical	Theoretical and Practical Exams
7–9	2hours weekly	Understand Word and Excel interfaces and functions	Use of Word and Excel; typing, formatting t symbols, shapes, and table creation; introduction to Excel environment	Theoretical & Practical	Theoretical and Practical Exams
10–12	2hours weekly	Use Excel for calculations and data management	Add/delete/move sheets, create functions manually, manage data, modify cell content, work with data import/export	Theoretical & Practical	Theoretical and Practical Exams
13–15	2hours weekly	Learn how to create and forma PowerPoint slides	Introduction to PowerPoint; slide creation, formatting, adding animations and sounds	Theoretical & Practical	Theoretical and Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• *Computer Fundamentals* by Ahmed Mohammed Ibrahim Mohammed (PDF) • *Learn and Master Windows 10* • *Office 2010* by Ihsan Mohammed Abdullah Al-Haisami
Main references (sources)	• *Computer Fundamentals* – Dr. Ammar Yasser Al-Samarrai • *Introduction to Computers and Information Technology* – Dr. Basheer Al-Allaq
Recommended books and references (scientific journals, reports…)	Virtual Library – Ministry of Higher Education and Scientific Research
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:

Spherical Trigonometry

2. Course Code:

SUT 130

3. Semester / Year:

2024/2025

4. Description Preparation Date:

2025 / /

5. Available Attendance Forms:

Daily – In-Person

6. Number of Credit Hours (Total) / Number of Units (Total)

15 weeks × 2 hours per week = 30 hours (for the semester)

7. Course administrator's name (mention all, if more than one name)

Name: Amal Nashat Shaker Zainal
Email: Umayaa75@ntu.edu.iq

8. Course Objectives

Course Objectives	1. Equip students with essential skills to understand and apply spherical trigonometry in the field of surveying engineering. 2. Familiarize students with concepts of spherical triangles, statistics, and integration. 3. Train students to apply spherical trigonometric laws effectively. 4. Emphasize the use of foundational laws in geodetic surveying applications. 5. Teach students how to utilize relevant equations in terrestrial surveying.

9. Teaching and Learning Strategies

Strategy	1. **Theoretical Explanation with Comparison:** o Start by reviewing plane triangle concepts. o Highlight differences between plane and spherical triangles in terms of angles and total angle sum. o Introduce core concepts: radius, spherical angles, and arcs. 2. **Use of Visuals and Models:** o Employ physical spheres or 3D software to represent spherical triangles. o Show how triangle sides form from great circle arcs on a sphere's surface. 3. **Real-World Problem Solving:** o Apply concepts to real-life tasks like calculating distances between cities or determining geographic positions. o Solve problems using sine and cosine laws for spherical triangles. 4. **Step-by-Step Problem Solving:** o Teach systematic solutions: □ Identify given values (three angles, or two sides and an angle, etc.) □ Select appropriate law □ Solve using a scientific calculator 5. **Use of Mathematical and Geospatial Software:** o Employ tools like GeoGebra 3D or spherical trigonometry calculators for visual solutions. 6. **Continuous Assessment and Practice:** o In-class exercises and quizzes with diverse problem types.

	○ Group corrections and reinforcement of correct problem-solving steps.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	Knowledge of integration and applications	Integration – applications of integration – tangents – area under curves – numerical integration – determinants	Theoretical	Oral or Written E
7–9	4hours weekly	Knowledge of statistics and measures	Statistics – mean – median – range – standar deviation of ungrouped and grouped data	Theoretical	Oral or Written E
10–12	4hours weekly	Understanding spherical trian	Spherical triangles – inclined spherical triang – sine and cosine laws	Theoretical	Oral or Written E
13–15	4hours weekly	Introduction to MATLAB and applications	Introduction to MATLAB – solving equation graphical representation using MATLAB	Theoretical	Oral or Written Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	*Trigonometry* by P. Abbott, B.A.
Main references (sources)	*Spherical Trigonometry* by Yaqoub Sabbagh
Recommended books and references (scientific journals, reports…)	Virtual Library – Ministry of Higher Education and Scientific Research
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

13. Course Name:	
Arabic Language	
14. Course Code:	
NTU104	
15. Semester / Year:	
2024/2025	
16. Description Preparation Date:	
2025 / /	
17.Available Attendance Forms:	
Daily – In-Person	
18.Number of Credit Hours (Total) / Number of Units (Total)	
15 Weeks × 2 Hours per Week = 30 Hours (for the semester)	
19. Course administrator's name (mention all, if more than one name)	
Name: Jasim Mohammed Hassan Al-Dawoodi Email: Jasim@ntu.edu.iq	
20. Course Objectives	
Course Objectives	Introduce students to the correct use of the Arabic language and avoidance of common errors. Teach students to distinguish between nouns, verbs, and particles, and use punctuation marks correctly. Develop students' ability to write accurately and effectively in academic and official correspondence, as a fundamental goal of Arabic language study.
21. Teaching and Learning Strategies	
Strategy	Classroom Lectures: Deliver simplified theoretical explanations of Arabic language concepts with applied examples. In-Class Exercises and Assignments: Provide practice in applying grammar and spelling rules through guided exercises. Presentations and Group Discussions: Encourage students to present linguistic topics and discuss them in small groups. Language Error Correction: Use texts containing common language mistakes for correction and clarification. Educational Media:

	Incorporate videos, audio recordings, and digital presentation tools to enhance understanding. Mini-Projects: Assign short essays, reports, or formal letters to apply language skills practically. Formative Assessment: Conduct quizzes, written tasks, and oral discussions to assess ongoing progress

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	2 hrs/week	Mastery of hamza placement and proper punctuation usage	Writing Hamza and Punctuation	Theoretical	Exams, Discussions
7–9	2 hrs/week	Distinguishing nouns and verbs; understanding types of objects	Nouns, Verbs, and Objects	Theoretical	Exams, Discussions
10–12	2 hrs/week	Rules of number and counted nouns; correcting common langu mistakes	Numbers and Applications, Comn Language Errors	Theoretical	Exams, Discussions
13–15	2 hrs/week	Differentiating between "noon" a "tanween"; understanding prepositions; identifying tied and open "taa"	Tied & Open Taa, Noon & Tanwe Prepositions	Theoretical	Exams, Discussions

23. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Arabic Language for University Levels – Ministry of Higher Education Publication.
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	Arabic Composition by Dr. Badr Al-Din Al-Qasimi Spelling and Punctuation by Dr. Abdul Aziz Sharaf Writing Skills by Dr. Mohammed Youssef
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:

Computer-Aided Drawing

2. Course Code:

SUT128

3. Semester / Year:

2024/2025

4. Description Preparation Date:

2025 / /

5. Available Attendance Forms:

Daily – In-Person

6. Number of Credit Hours (Total) / Number of Units (Total)

15 Weeks × 2 Hours per Week = 30 Hours (for the semester)

7. Course administrator's name (mention all, if more than one name)

Name: Amal Nashat Shaker Zainal
Email: Umayaa75@ntu.edu.iq

8. Course Objectives

Course Objectives	• Enable students to master the use of **AutoCAD software**. • Train students to use **AutoCAD** for all types of technical drawing tasks. • Equip students with the ability to draw **highly detailed maps** using AutoCAD

9. Teaching and Learning Strategies

Strategy	• **Classroom Lectures:** Provide theoretical explanations of AutoCAD tools and interface features. • **Practical Lab Sessions:** Train students on implementing drawings directly using computers. • **Presentations:** Display completed models and real-world projects created with AutoCAD. • **Problem-Based Learning:** Apply realistic design and drafting scenarios using appropriate tools. • **Multimedia Resources:** Use instructional videos and screen recordings to explain commands. • **Mini-Projects:** Assign students simple architectural or engineering drawing tasks. • **Continuous Assessment:** Conduct regular practical tests and drawing exercises. • **Formative Evaluation:** Implement short quizzes, written tasks, and oral discussions to measure learning progress.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1–6	2 hrs/week	Identify software interface and basic drawing tools	Introduction to AutoCAD, Advanced Drawing Tools	Theoretical & Practical	Exams – Practical Assessment
7–9	2 hrs/week	Apply modification commands (e.g., copy, offset, mirror, array)	Modification Commands and Applications	Theoretical & Practical	Exams – Practical Assessment
10–12	2 hrs/week	Create 3D geometric shapes	Architectural, Engineering, and Survey Drawing Applications	Theoretical & Practical	Exams – Practical Assessment
13–15	2 hrs/week	Complete an integrated 3D drawing project using layers, dimensions, and plotting	Comprehensive Application Project	Theoretical & Practical	Exams – Practical Assessment

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• *AutoCAD 2023 for Beginners* – by CadArtifex
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	AutoCAD *Instructor* – by James A. Leach Technical *Drawing with Engineering Graphics* – by Frederick E. Giesecke Computer-*Aided Engineering Drawing* – by Dr. Fouad Al-Shammaa (in Arabic)
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:

Remote Sensing I

2. Course Code:

SUT124

3. Semester / Year:

2024/2025

4. Description Preparation Date:

2025 / /

5. Available Attendance Forms:

Daily – In-Person

6. Number of Credit Hours (Total) / Number of Units (Total)

15 Weeks × 1 Hours per Week = 15 Hours (for the semester)

7. Course administrator's name (mention all, if more than one name)

Name: Suzan Atta Bakr Mustafa
Email: Suzan-atta@ntu.edu.iq

8. Course Objectives

Course Objectives	• Introduce students to the **concept of remote sensing** and its diverse applications. • Enable students to **interpret and analyze satellite imagery**. • Apply **remote sensing techniques** in **environmental, geographical, and engineering fields**.

9. Teaching and Learning Strategies

Strategy	• **Classroom Lectures:** Deliver theoretical content on remote sensing concepts and imaging systems. • **Practical Image Analysis:** Analyze satellite imagery using image processing software. • **Presentations:** Demonstrate real-world case studies applying remote sensing techniques. • **Multimedia Resources:** Use satellite images, educational videos, and real datasets. • **Applied Projects:** Prepare analytical reports addressing environmental or geographical problems using remote sensing tools. • **Continuous Assessment:** Administer short quizzes and analytical exercises to monitor progress.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	1 hrs/week	Understand the concept, componen and types of remote sensing	Introduction to Remote Sensing	Theoretical	Exams
7–9	1 hrs/week	Identify sensor and platform types; understand optical, thermal, and ra systems	Remote Sensing Systems and Data Types	Theoretical	Exams
10–12	1 hrs/week	Analyze satellite imagery and	Digital Image Processing and	Theoretical	Exams

		distinguish between surface feature	Analysis		
13–15	1 hrs/week	Apply remote sensing in agricultur environment, and natural resource management	Applications of Remote Sensing	Theoretical	Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	*Fundamentals of Remote Sensing* – by George Joseph
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	Remote Sensing and Image Interpretation – by Thomas M. Lillesand Introduction to Remote Sensing – by James B. Campbell NASA Earthdata – https://earthdata.nasa.gov USGS Earth Explorer – https://earthexplorer.usgs.gov
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

25. Course Name:

Computer Fundamentals

26. Course Code:

NTU 103

27. Semester / Year:

2024/2025

28. Description Preparation Date:

2025 / /

29. Available Attendance Forms:

Daily – In-Person

30. Number of Credit Hours (Total) / Number of Units (Total)

15 weeks × 2 hours per week = 30 hours (for the semester)

31. Course administrator's name (mention all, if more than one name)

Name:
Email:

32. Course Objectives

Course Objectives	• Provide students with the basic skills to understand computer fundamentals, operating systems, and related applications. • Introduce the hardware components of computers and peripherals (keyboard, mouse, speakers, USB, screen, CD/DVD drives), as well as laptops across different generations. • Equip students with the necessary skills to use Microsoft Office applications (Word, Excel, PowerPoint), and to understand commands and system windows. • Teach students about computer components, operating systems (Windows 7 and 10), and train them on navigating system windows and commands.

33. Teaching and Learning Strategies

Strategy	• **Theoretical and Practical Instruction:**
	  • Introduce concepts theoretically with immediate hands-on computer applications.
	• **Project-Based Learning:**
	  • Assign tasks like creating PowerPoint presentations or editing text documents.
	• **Laboratory Work:**
	  • Practical application of operating systems, software tools, and basic computer skills.
	• **Demonstrations and Videos:**
	  • Use simple videos to explain computer components or how the internet works.
	• **Continuous Assessment:**
	  • Short quizzes, in-class activities, and simple projects like designing a resume using Word.

34. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	2hours weekly	Identify computer component	General introduction to computer fundament hardware and software; creating files/folders basics of Word processing, page formatting, typing skills	Theoretical & Practical	Theoretical and Practical Exams
7–9	2hours weekly	Understand Word and Excel interfaces and functions	Use of Word and Excel; typing, formatting t symbols, shapes, and table creation; introduction to Excel environment	Theoretical & Practical	Theoretical and Practical Exams

10–12	2hours weekly	Use Excel for calculations and data management	Add/delete/move sheets, create functions manually, manage data, modify cell content, work with data import/export	Theoretical & Practical	Theoretical and Practical Exams
13–15	2hours weekly	Learn how to create and forma PowerPoint slides	Introduction to PowerPoint; slide creation, formatting, adding animations and sounds	Theoretical & Practical	Theoretical and Practical Exams

35. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

36. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• *Computer Fundamentals* by Ahmed Mohammed Ibrahim Mohammed (PDF) • *Learn and Master Windows 10* • *Office 2010* by Ihsan Mohammed Abdullah Al-Haisami
Main references (sources)	• *Computer Fundamentals* – Dr. Ammar Yasser Al-Samarrai • *Introduction to Computers and Information Technology* – Dr. Basheer Al-Allaq
Recommended books and references (scientific journals, reports…)	Virtual Library – Ministry of Higher Education and Scientific Research
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:

AutoCAD Drawing

2. Course Code:

SUT129

3. Semester / Year:

2024/2025

4. Description Preparation Date:

2025 / /

5. Available Attendance Forms:

Daily – In-Person

6. Number of Credit Hours (Total) / Number of Units (Total)

15 Weeks × 2 Hours per Week = 30 Hours (for the semester)

7. Course administrator's name (mention all, if more than one name)

Name: Zeena Hussein Shukor Mohammed
Email: Zeena -hussin@ntu.edu.iq

8. Course Objectives

Course Objectives	• Enable students to **master the use of AutoCAD software**. • Train students to use AutoCAD in **various fields of technical drawing**. • Empower students to **draw highly detailed maps** using AutoCAD efficiently.

9. Teaching and Learning Strategies

Strategy	• **Classroom Lectures:** Provide theoretical explanations of AutoCAD commands and interface features. • **Hands-on Lab Sessions:** Train students on how to implement technical drawings using a computer. • **Presentations:** Display pre-designed projects and AutoCAD models. • **Problem-Solving Activities:** Apply real-world design and drawing scenarios using appropriate tools. • **Educational Media:** Use instructional videos and screen recordings to explain commands. • **Mini Projects:** Assign simple architectural or engineering drawing tasks to reinforce skills. • **Continuous Assessment:** Conduct regular practical exams and drawing assignments. • **Formative Evaluation:** Include short quizzes, written tasks, and oral discussions to evaluate progress.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	2 hrs/week	Identify AutoCAD interface and basi drawing tools	Introduction to AutoCAD, Basi Drawing Tools	Theoretical & Practical	Exams – Practical Evaluation
7–9	2 hrs/week	Apply modification commands like copy, offset, array, and mirror	Modification Commands and Tl Applications	Theoretical & Practical	Exams – Practical Evaluation
10–12	2 hrs/week	Draw 2D geometric shapes	Applications in Architectural an Engineering Drawing	Theoretical & Practical	Exams – Practical Evaluation
13–15	2 hrs/week	Complete a comprehensive 2D drawi project using layers, dimensions, and plotting	Integrated Application Project	Theoretical & Practical	Exams – Practical Evaluation

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular	• *AutoCAD 2023 for Beginners* – by CadArtifex

books, if any)	
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	AutoCAD *Instructor* – by James A. Leach Technical *Drawing with Engineering Graphics* – by Frederick E. Giesecke Computer-*Aided Engineering Drawing* – by Dr. Fouad Al-Shammaa (in Arabic)
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Democracy
2. Course Code:
NTU106
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 Weeks × 2 Hours per Week = 30 Hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Idrees Ihsan Sattar Email: Idrees_ihsan@ntu.edu.iq
8. Course Objectives

Course Objectives	• Introduce students to the fundamental principles of democracy, such as **public freedoms and political participation**. • Raise awareness about the importance of democracy as a governance system that

	achieves **social justice**. • Analyze **global democratic experiences** and compare different political systems. • Understand the role of **constitutions, elections, and institutions** in reinforcing democratic governance. • Connect theoretical concepts with reality by analyzing **democratic events and developments** worldwide.

9. Teaching and Learning Strategies

Strategy	• **Theoretical Explanation:** Introduce basic concepts such as **freedom, participation, elections, and rule of law**. • **Discussion of Declarations and Charters:** Study **international covenants** related to public freedoms and democratic systems. • **Discussion-Based Learning:** Pose questions like: *Is democracy sufficient for justice? What challenges does it face?* • **Case Analysis:** Explore **actual democratic systems** and the **obstacles they encounter**. • **Student Presentations:** Present projects on **political systems, elections, local governance, or public oversight**. • **Simulations:** Organize **student parliaments** or **mock elections** to apply democratic principles practically. • **Documentary Videos:** Show stories of **democratic transitions, elections, and popular uprisings**.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	2 hrs/week	Understand the concepts, developmer types, and applications of democracy	Introduction to Democracy – Concepts, History, and Applications	Theoretical	Written Exams
7–9	2 hrs/week	Study democratic institutions, rule of law, and constitutions	Democratic Systems – Authoriti Laws, Political Participation	Theoretical	Written Exams
10–12	2 hrs/week	Understand basic freedoms and rights democratic systems	Public Freedoms – Freedom of Speech, Press, Education, and Work	Theoretical	Written Exams
13–15	2 hrs/week	Analyze the future of democracy, technology's role, and practical challenges	Challenges of Democracy – Me Modern Technologies, Manipulation	Theoretical	Written Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Lectures covering the syllabus approved by the Ministry of Higher Education and Scientific Research

Main references (sources)	Principles of Democracy – by Dr. Mohammed Saeed Al-Ashmawi
Recommended books and references (scientific journals, reports…)	The Virtual Library – Ministry of Higher Education and Scientific Research
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:	
Image Processing	
2. Course Code:	
SUT125	
3. Semester / Year:	
2024/2025	
4. Description Preparation Date:	
2025 / /	
5. Available Attendance Forms:	
Daily – In-Person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
15 Weeks × 1 Hours per Week = 15 Hours (for the semester)	
7. Course administrator's name (mention all, if more than one name)	
Name: Omar Falah Mardan Raouf Email: omer-falah@ntu.edu.iq	
8. Course Objectives	
Course Objectives	• Introduce students to the **principles of digital image processing**. • Enable students to apply **basic algorithms for image enhancement**. • Teach students how to **analyze images and extract information** using image processing tools and techniques.
9. Teaching and Learning Strategies	
Strategy	• **Theoretical Lectures:** Explain core concepts such as **image initialization, enhancement, and transformations**. • **Demonstrations:** Present **practical examples** of image processing operations and analyze results. • **Short Projects:** Implement **mini-projects** where students apply image processing to **real-world cases**. • **Continuous Assessment:** Use **applied assignments** and **short quizzes** to track learning progress.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	1 hrs/week	Understand basics of digital images, image types, and formats	Introduction to Digital Image Processing	Theoretical	Oral & Written Exams
7–9	1 hrs/week	Apply contrast enhancement, filtering and brightness adjustment techniques	Image Enhancement and Filteri Techniques	Theoretical	Oral & Written Exams
10–12	1 hrs/week	Learn techniques for edge detection, segmentation, and object recognition	Image Analysis and Feature Extraction	Theoretical	Oral & Written Exams
13–15	1 hrs/week	Conduct comprehensive review and assess understanding of image processing methods	Final Review and Analytical Applications	Theoretical	Oral & Written Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	*Digital Image Processing – by Rafael C. Gonzalez & Richard E. Woods*
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	Fundamentals of Digital Image Processing – by Anil K. Jain Practical Image Processing in C – by Craig Lindley
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

Second stage curricula

1. Course Name:
Geographic Information System (GIS)
2. Course Code:
SUT 212
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 4 hours per week = 60 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Farman Saed ghaleb- Amal Nashat Shaker Email: farmanghaleb@ntu.edu.iq - Umayaa75@ntu.edu.iq
8. Course Objectives

Course Objectives	• Equip students with basic skills to understand how GIS programs work, including installation and activation, and familiarize them with interfaces of **ArcMap** and **ArcCatalog**, as well as how to set up projects and identify the correct coordinate system (Zone 38N). • Introduce the principle of GIS operation, its usefulness in data analysis, decision-making, and representing map features (points, lines, and polygons), including editing attributes and map printing. • Teach students how to perform georeferencing of maps with or without known coordinates, identify acceptable error margins for X, Y, Z coordinates, and transfer this data into GIS software for map creation. • Train students in using ArcMap□s toolbar and icons, including how to add maps and create a spatial database for feature representation (point □ line □ polygon).

9. Teaching and Learning Strategies	
Strategy	1. **Introductory Theoretical Explanation:** o Define GPS and GIS concepts, differences, and functions. o Explain GPS system components: satellites, ground stations, receivers. o Clarify the structure and analytical capabilities of GIS in data storage and interpretation. 2. **Use of Visual Aids and Videos:** o Show videos on satellite operation and location tracking. o Demonstrate GIS maps and types of layers. 3. **Practical Field Applications (GPS):** o Train students to use handheld or mobile GPS devices. o Collect real-world coordinates and convert them into GIS maps. 4. **Use of GIS Software:** o Introduce software such as: □ **ArcGIS** □ **QGIS** (open-source)

- Practice data entry, layer creation, data analysis, and map production.

5. **Student Projects:**
   - Assign projects involving mapping services or environmental phenomena using GPS and GIS.
   - Conduct mini-studies (e.g., waste locations, parks, road networks).
6. **Analysis of Real Maps:**
   - Import maps from Google Earth or OpenStreetMap for analysis.
   - Train students to interpret coordinates, directions, and map scales.
7. **Continuous Assessment:**
   - Provide short exercises on location identification.
   - Grade students based on a final GIS-based practical project.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	GIS Basics and ArcMap/ArcCatalo Skills	**GIS system concept and components – related progra (e.g., ArcCatalog) – georeferencing – topographic map correction – acceptable error – new project – drawing tools (point, line, polygon)**	Theoretical + Practical	Theoretical and Practical Exam
7–9	4hours weekly	Editing and Drawi Tools	Editing tools – Copy, Editor Tools – point, line, and area features	Theoretical + Practical	Theoretical and Practical Exam
10–12	4hours weekly	Online Map Interaction	Zooming, selection tools – attribute tables – data entry	Theoretical + Practical	Theoretical and Practical Exam
13–15	4hours weekly	Map Printing	Final map layout preparation – grid, border, title, layout, index, scale, map source, legend	Theoretical + Practical	Theoretical and Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• *GIS Step by Step* • *Principles of Geodetic Surveying and GPS* by Dr. Jumaa Mohammed Dawood • *Fundamentals of Global Positioning System* – Ministry of Higher Education and Scientific Research • *Complete Scientific Guide to GIS / AecVIEW* – Dr. Haitham Youssef • *Remote Sensing and GIS Basics* – Center for Remote Sensing, University of Mosul
Main references (sources)	• *GIS: Fundamentals and Applications* – Dr. Abdulrahman Mohammed Al-Sadiq • *Getting to Know ArcGIS Pro* – Michael Law & Amy Collins

Recommended books and references (scientific journals, reports…)	Virtual Library of the Ministry of Higher Education and Scientific Research
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Global Positioning System (GPS)
2. Course Code:
SUT 205
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 4 hours per week = 60 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Farman Saed ghaleb- Omar Falah Mardan Raouf Email: farmanghaleb@ntu.edu.iq - omer-falah@ntu.edu.iq
8. Course Objectives

Course Objectives	• • Provide students with essential skills to understand the basics of GPS systems, their types, components, and the software used for location identification. • • Explain the working principle of GPS and how to use navigation devices, understand sources of error in the GPS system, recognize currently available satellites around the Earth, and understand coordinate systems including UTM. • • Enable students to capture point/location coordinates (X, Y, Z) and transfer them into GIS software for processing and map production. • • Teach the components and types of GPS systems and how to utilize smartphone applications for capturing specific location points.
9. Teaching and Learning Strategies	
Strategy	• **Introductory Theoretical Explanation:** • Define GPS and GIS concepts, differences, and functions. • Explain GPS system components: satellites, ground stations, receivers. • Clarify GIS principles and how data is stored and analyzed. • **Use of Visual Aids and Videos:** • Show videos on how satellites operate and enable location tracking. • Practical explanation of GIS maps and layer types. • **Field Application (GPS):** • Train students to use handheld or mobile GPS devices. • Capture coordinates from the field and convert them into GIS maps. • **GIS Software Use:**

	• Teach students to use software such as: • **ArcGIS** • **QGIS** (open-source) • Practice data entry, layer creation, data analysis, and map generation. • **Student Projects:** • Assign students to create a map showing the distribution of services or environmental features using both GPS and GIS. • Conduct mini-studies (e.g., mapping waste sites, parks, road networks). • **Real Map Analysis:** • Download and analyze maps from Google Earth or OpenStreetMap. • Train students in interpreting coordinates, directions, and scales. • **Continuous Assessment:** • Assign short exercises for location tracking. • Evaluate a final GIS-based project at the end of the semester.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	Introduction to GPS Devices Apps	Introduction to GPS – system types – availab satellites – GPS components – GPS principle geodesy – coordinate systems	Theoretical + Practical	Theoretical and Practical Exam
7–9	4hours weekly	Coordinate Capturing	GPS observation methods – system compone – creating a job	Theoretical + Practical	Theoretical and Practical Exam
10–12	4hours weekly	Processing Captured Points	Creating ground control points – processing d using GIS	Theoretical + Practical	Theoretical and Practical Exam
13–15	4hours weekly	Coordinate Estimation and Correction	Determining unknown point coordinates (X, Z) – online correction methods	Theoretical + Practical	Theoretical and Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• *GIS Step by Step* • *Principles of Geodetic Surveying and GPS* – Dr. Jumaa Mohammed Dawood • *Fundamentals of Global Positioning System* – Ministry of Higher Education and Scientific Research, University of Mosul, Remote Sensing Center – Prepared by Sabah Hussein Ali

Main references (sources)	*Introduction to GPS: The Global Positioning System* – Ahmed El-Rabba
Recommended books and references (scientific journals, reports…)	Virtual Library of the Ministry of Higher Education and Scientific Research
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Digital Photogrammetry
2. Course Code:
SUT 213
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 3 hours per week = 45 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name Nihad Davut Hassan Hussein - Abbas Mohammed Nouri Email: nihadhassan@ntu.edu.iq -
8. Course Objectives

Course Objectives	• Equip students with basic skills to understand aerial and satellite imagery. • Familiarize students with photogrammetric surveying and visual interpretation of Earth's surface phenomena. • Develop student skills in analyzing aerial photographs. • Teach the fundamentals of digital processing and evaluation of remote sensing data. • Introduce students to aerial and satellite sensors and how digital terrain models (DTMs) are formed.
9. Teaching and Learning Strategies	
Strategy	• **Theoretical Explanation:** • Basics of digital imaging and types of cameras used. • Principles of aerial and satellite photography. • Differences between digital and traditional photogrammetric surveying. • **Visual Aids and Videos:** • Videos on aerial image acquisition and image processing software. • Step-by-step demonstration of image processing through specialized programs. • **Practical Software Application:** • Training students on tools such as **Pix4D** and **Agisoft Metashape**. • Hands-on projects involving aerial image processing and converting them into maps or 3D models. • **Field Applications:** • Real data collection using digital cameras or drones. • Applying photogrammetric surveying steps on field data. • **Student Projects:** • Projects such as mapping a region or creating digital elevation models (DEMs).

	• Encouraging teamwork in image analysis and interpretation. • **Continuous Assessment:** • Practical exercises on image processing. • Final evaluation of student projects

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	3hours weekly	Identify Earth's surface phenomena	**Familiarization with stereo analyst feature toolbar – mapping from DSM – GIS data editing – aerial triangulation – 3D rectification – DSM auto extraction**	Theoretical + Practical	Oral and Practi Exams
7–9	3hours weekly	Understanding and merging digital images	**Using DTM in GIS – 3D model generation contour and profile drawing via ArcScene, Surfer, Global Mapper**	Theoretical + Practical	Oral and Practi Exams
10–12	3hours weekly	Selection and storage of digit imagery	**Image selection – guided model creation – integration – storage – inputting flight heig and focal length – model verification**	Theoretical + Practical	Oral and Practi Exams
13–15	3hours weekly	Extracting information and measurements	**Obtaining data from 3D models – stereo visualization – updating coordinates – drawing and measuring linear features**	Theoretical + Practical	Oral and Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• *Stereo Analyst Users Guide*, Leica Geospatial Imaging, USA, 2008 • *Digital Photogrammetry: A Practical Course* – Wilfried Linder, Springer, 2009
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Resear
Recommended books and references (scientific journals, reports…)	• *Digital Photogrammetry: A Practical Course* – Wilfried Linder • *Introduction to Modern Photogrammetry* – Edward M. Mikhail, James S. Bethel, J. Chris McGlone • *Remote Sensing and Image Interpretation* – Thomas M. Lillesand, Ralph W. Kiefer • *Photogrammetric Computer Vision and Image Analysis* – Wolfgang Förstner, Bernhard P. Wrobel
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Cadastral Surveying
2. Course Code:
SUT 256
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 4 hours per week = 60 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Ghada Hassan Mohammed Fateh Email: ghada66@ntu.edu.iq
8. Course Objectives

Course Objectives	• Equip students with foundational skills to understand unknown measurements and intersections in relation to cadastral surveying. • Introduce students to analytical geometry and coordinate rotation, with applications in road intersections and land subdivision. • Develop the ability to find unknown measurements (lengths and directions) in closed traverse and link polygons using various intersection techniques. • Familiarize students with back and forward intersections, polygon subdivision, and land partitioning techniques. • Train students to divide a polygon into two equal-area parts for a given project and draw corresponding longitudinal profiles

9. Teaching and Learning Strategies

Strategy

- **Theoretical Explanation:**
  - Definition and importance of cadastral surveying in legal and economic contexts.
  - Land registration systems and types of cadastral maps.
  - Surveying methods used in cadastral applications.
- **Visual Aids and Multimedia:**
  - Video presentations demonstrating field procedures of cadastral surveys.
  - Real cadastral maps used to explain boundary determination.
- **Field Practical Training:**
  - Student training with traditional surveying instruments (e.g., triangles, Total Station).
  - Execution of field projects to define sample property boundaries.
- **Use of Cadastral GPS Technology:**
  - Training on high-precision GPS devices for boundary determination.
  - Comparative analysis of traditional and modern surveying results.
- **Data Analysis and Documentation:**
  - Matching field data with legal documents.
  - Preparing cadastral reports and maps according to official standards.
- **Student Projects:**
  - Students conduct a complete cadastral survey for a small area or land parcel.
  - Presentation of survey steps, analysis, and results.
- **Assessment:**
  - Regular written and practical quizzes.
  - Evaluation of final student projects.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	Understanding unknown intersections and measureme	Intersections and unknown measurements in traversing and triangulation, using polygon la and analytical geometry	Theoretical + Practical	Oral and Practi Exams
7–9	4hours weekly	Apply analytical geometry to road intersections and land subdivision	Applications of analytical geometry and trian in solving unknown measurements using bacl and forward intersections	Theoretical + Practical	Oral and Practi Exams
10–12	4hours weekly	Divide polygons into two equ area parts using geometric methods	Polygon division: splitting a polygon into two parts with equal area using lines from known points	Theoretical + Practical	Oral and Practi Exams

13–15	4hours weekly	Conduct a mini-project for la area land subdivision	Design a project to subdivide large land areas including horizontal layout and longitudinal profile drawing	Theoretical + Practical	Oral and Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	*Engineering and Cadastral Surveying* by Prof. Abdul Jabbar Al-Bakr
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Resear
Recommended books and references (scientific journals, reports…)	• *Cadastral Surveying and Land Information Systems* – D. C. Fraser • *Principles of Cadastral Surveying* – R. G. Williamson • *Cadastral Surveying: A Complete Guide* – John O. Miller • *Land Registration Systems and Cadastral Surveying* – Dr. Ahmed Abdullah
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:	
Engineering Surveying	
2. Course Code:	
SUT 255	
3. Semester / Year:	
2024/2025	
4. Description Preparation Date:	
2025 / /	
5. Available Attendance Forms:	
Daily – In-Person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
15 weeks × 4 hours per week = 60 hours (for the semester)	
7. Course administrator's name (mention all, if more than one name)	
Name: Ghada Hassan Mohammed Fateh Email: ghada66@ntu.edu.iq	
8. Course Objectives	
Course Objectives	• Equip students with basic skills in surveying, measuring areas, and calculating earthwork volumes. • Introduce the use of Total Station and GPS devices for field surveying. • Enable students to compute missing lengths and directions of land parcel boundaries and determine corner coordinates. • Familiarize students with engineering operations related to area calculation using modern devices. • Train students in calculating and setting out horizontal and vertical curves, as well as laying out engineering structures.
9. Teaching and Learning Strategies	
Strategy	• **Theoretical Lectures:** o Introduction to engineering surveying, its importance, and types (topographic, construction, monitoring). o Explanation of survey instruments and their operating principles. • **Visual Demonstrations and Videos:** o Practical videos on using Total Station and GPS devices. o Steps of field data collection and processing. • **Practical Field Work:** o Hands-on training in topographic surveying using different equipment. o Practice in measuring distances, angles, and elevations.

	• **Software Training:** o Teaching software like AutoCAD Civil 3D and GIS for survey data analysis. o Map creation and results interpretation. • **Applied Projects:** o Assignments such as surveying a site for a building or road project. o Preparing engineering reports and execution drawings. • **Continuous Assessment:** o Oral and written exams. o Evaluation of final project work.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	Understanding surveying bas drawing scales, area division, and coordinates	Introduction to surveying principles, drawing scales, regular shapes, coordinate-based area calculation, road surveying	Theoretical + Practical	Oral and Practi Exams
7–9	4hours weekly	Learn horizontal & vertical curves, their layout, and coordinate calculations	Curve types: simple, compound, reverse; stati coordinates and points on curves	Theoretical + Practical	Oral and Practi Exams
10–12	4hours weekly	Layout of circular and transit curves, column-based layout methods	Curve layout using pegs and transition (spiral curves, station coordinates	Theoretical + Practical	Oral and Practi Exams
13–15	4hours weekly	Cross-section areas, earthwor quantities, layout of structure and utilities	Earthwork quantities, structure layout, level setting for buildings, pipes, canals, trenches, electrical lines	Theoretical + Practical	Oral and Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	*Engineering and Cadastral Surveying* by Prof. Abdul Jabbar Al-Bakr
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Resear
Recommended books and references (scientific journals, reports…)	• *Engineering Surveying* – W. Schofield • *Elementary Surveying: An Introduction to Geomatics* – Charles D. Ghilani • *Surveying for Engineers* – R. S. Kanetkar • *Principles and Practice of Engineering Surveying* – W. M. Anderson
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
English Language
2. Course Code:
NTU 200
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 2 hours per week = 30 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: lana Hamid Ahmed Email: lana.hameed23@ntu.edu.iq
8. Course Objectives

Course Objectives	1. Equip students with the core skills of pronunciation, reading, listening, and speaking. 2. Prepare students to use prefixes and suffixes effectively. 3. Develop understanding of essential vocabulary related to time, places, and daily life.
9. Teaching and Learning Strategies	
Strategy	• **Communicative Language Teaching:** Focuses on using English in real-life situations. Encourages pair work, role-playing, and group discussions. • **Task-Based Learning:** Assignments such as writing emails, preparing short presentations, or conducting interviews in English. Language is learned through meaningful activities. • **Listening and Speaking Practice:** Use of audio, podcasts, and video clips to enhance listening. Speaking practice through storytelling, dialogues, and pronunciation drills. • **Reading and Vocabulary Building:** Students are provided with leveled texts, articles, and short stories. Reading strategies taught include skimming, scanning, and contextual guessing. Vocabulary is introduced in context and reviewed regularly. • **Writing Skill Development:** Begin with guided writing (filling forms, short paragraphs), moving to free writing (emails, reports, essays). Peer review and feedback are used to improve writing.

	• **Educational Technology Use:** PowerPoint, videos, and interactive whiteboards to enhance engagement. • **Continuous Assessment and Feedback:** Quizzes, oral presentations, vocabulary logs, and language portfolios used to track progress.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	2hours weekly	Rooms and Furniture - Grammar: There is/are, Prepositions - Pronunciation: Word Stress - Translation - Speaking: How to Have a Good Time in Sydney - Reading & Writing: Our House - Everyday English: Directions - Grammar: was/were, Past Tense (Irregul Verbs) - Writing: Famous People - Vocabulary: Word Groups - Everyday English: When's Your Birthda		Theoretical + Practic (Oral)	Oral & Written Exams
7–9	2hours weekly	- Grammar: Past Simple (Regular & Irreg Verbs) - Listening: Mike's Day - Writing: Last Saturday - Pronunciation: Who Were They? - Vocabulary: Sports, Months - Questions: Where, What, Who... - Everyday English: Fill in Forms - Activities: We Can Do It! - Listening: Can I Be in Your Pop Group? - Pronunciation: Can / Can't - Requests and Offers - Vocabulary: Odd One Out - Everyday English: What Is the Problem'		Theoretical + Practic (Oral)	Oral & Written Exams
10–12	2hours weekly	- Asking Politely (I want / I would like) - Speaking: In the Restaurant (Food & Dr - Translation - Reading: You Are What You Eat - Everyday English: Going Shopping - Colors: Here and Now - Grammar: Present Simple & Present Continuous - Translation - Reading: Summer in Portugal - Vocabulary: Clothes - Everyday English: What's the Matter?		Theoretical + Practic (Oral)	Oral & Written Exams
13–15	2hours weekly	Holidays: Time to Go - Grammar: Present Continuous for Futur - Listening: Hannah's Diary - Pronunciation: Shifting Sentence Stress - Translation - Vocabulary: Transport and Travel - Reading & Speaking: The Smiths - Everyday English: Going Sightseeing		Theoretical + Practic (Oral)	Oral & Written Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricul books, if any)	• *New HEADWAY PLUS – Beginner Student Book* • Audio & Video Resources: https://elt.oup.com/student/headway/beg/download?cc=us&selLanguage=en
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	• *Oxford Word Skills* – Ruth Gairns & Stuart Redman • *ELT Journal*
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Map Design and Preparation
2. Course Code:
SUT211
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 5 hours per week = 75 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Zeina Hussein Shukor Mohammed Email: : zeena-hussin@ntu.edu.iq
8. Course Objectives

Course Objectives	• Equip students with the basic skills and understanding of mapping techniques and their relation to surveying. • Familiarize students with different types of maps. • Provide students with the skills necessary to draw various maps at different scales. • Teach students how to utilize geographic and grid coordinates effectively.
9. Teaching and Learning Strategies	

Strategy	• **Theoretical Explanation:**
	  • Define the concept of map design and its importance.
	  • Explain essential map components: title, scale, direction, legend.
	  • Overview of map types and their applications.
	• **. Demonstrations and Videos:**
	  • Show instructional videos on designing maps using GIS tools.
	  • Present examples of successful map designs.
	• **. Practical Application Using Software:**
	  • Train students on programs such as **ArcGIS** and **QGIS**.
	  • Apply to real-world projects (e.g., population distribution map, environmental map).
	• **. Student Projects:**
	  • Assign full map creation projects, including all design elements.

	• Encourage creativity with colors and symbols. • **. Assessment:** • Evaluate map designs based on **accuracy, clarity, and aesthetics**. • Conduct theoretical tests on design principles.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	5hours weekly	Introduction to map design principles	Understanding the design and preparation of drafts, copying, printing, and cartographic summarization	Theoretical + Practical	Oral Exams
7–9	5hours weekly	Introducing students to graph representation	Graph types, digital maps, and map errors	Theoretical + Practical	Oral Exams
10–12	5hours weekly	Teaching map editing technic	Contour, digital, and cadastral map modifications	Theoretical + Practical	Oral Exams
13–15	5hours weekly	Application in government departments	Use in public institutions, map updating, and mastering cadastral mapping	Theoretical + Practical	Oral Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Dr. Hashem Yahya Al-Masraf, *Principles of Cartography*, 1st Ed., 1982, Baghdad • Dr. Hashem Yahya Al-Masraf, *Practical Exercises in Cartography*, 1986, Baghdad • Dr. Khudhur Al-Abadi, *Cartography: Map Projections*, 1980, Baghdad • Robinson, J.S., *Elements of Cartography*, 5th Ed., 1980 • Keats, J.S., *Cartography Design and Production*, 3rd Ed., 1980
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Resear
Recommended books and references (scientific journals, reports…)	• *How to Lie with Maps* – Mark Monmonier • *Cartography: Visualization of Geospatial Data* – Menno-Jan Kraak & Ferjan Ormeling • *Fundamentals of Cartography* – William A. Robinson et al.
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Principles of Cartography
2. Course Code:
SUT 204
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 5 hours per week = 75 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Suzan Atta Bakr Mustafa Email: Suzan-atta@ntu.edu.iq
8. Course Objectives

Course Objectives	• Provide students with the fundamental skills related to cartographic techniques and their connection to surveying. • Introduce different types of maps and their uses. • Equip students with the ability to draw maps using various scales. • Teach students to utilize both geographic and grid coordinates effectively.
9. Teaching and Learning Strategies	
Strategy	• **Simplified Theoretical Explanation:** o Present basic concepts such as map definition, scale, symbols, and layout in a clear and organized manner. o Use simple language and everyday examples to aid comprehension. • **. Multimedia Use:** o Show educational videos explaining map components and design principles. o Use PowerPoint presentations with diverse map examples to highlight differences. • **. Interaction and Dialogue:** o Ask open-ended questions (e.g., *Why do we need a map legend?*) o Discuss real-world examples with students to analyze map elements. • **. Cooperative Learning:** o Assign group projects (e.g., mapping their school or neighborhood). o Peer review: groups exchange maps and give feedback. • **. Practical Application:** o Train students on reading various map types (topographic, political, thematic). o Teach distance measurement using map tools.

	• **. Continuous Assessment:** o Conduct short exercises on map interpretation. o Final project: design a map applying the learned principles.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	5hours weekly	Understand how to draw maps	Introduction to cartographic techniques, scal and geographic coordinates	Theoretical + Practical	Oral Exams
7–9	5hours weekly	Learn about map projections	Map projection types, classifications, color r in maps	Theoretical + Practical	Oral Exams
10–12	5hours weekly	Learn how to grid maps	Identifying and drawing topographic symbol	Theoretical + Practical	Oral Exams
13–15	5hours weekly	Learn how to scale maps	Designing and preparing maps	Theoretical + Practical	Oral Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Dr. Hashem Yahya Al-Masraf, *Principles of Cartography*, 1st Ed., 1982, Baghdad • Dr. Hashem Yahya Al-Masraf, *Practical Exercises in Cartography*, 1986, Baghdad • Dr. Khudhur Al-Abadi, *Cartography: Map Projections*, 1980, Baghdad • Robinson, J.S., *Elements of Cartography*, 5th Ed., 1980 • Keats, J.S., *Cartography Design and Production*, 3rd Ed., 1980
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scien Research
Recommended books and references (scientific journals, reports…)	• *Elements of Cartography* – Arthur H. Robinson • *Principles of Cartography* – Dr. Abdel Fattah El-Banna • *Basics of Cartography* – Dr. Magdy Abdo
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Photogrammetry II
2. Course Code:
SUT 206
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 4 hours per week = 60 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Nihad Davut Hassan Hussein - Suzan Atta Bakr Mustafa Email: nihadhassan@ntu.edu.iq -Suzan-atta@ntu.edu.iq
8. Course Objectives

Course Objectives	• Equip students with **basic skills to understand aerial and satellite imagery**. • Introduce **modern software** such as *Erdas Imagine*. • Develop student abilities in **geometric correction** and **systematic and irregular cropping** of images. • Train students on **mosaicking satellite images** using Erdas Imagine
9. Teaching and Learning Strategies	
Strategy	• **Interactive Theoretical Lectures:** • **Introduction to image types, scale, displacement, and parallax.** • **Use of visuals (PowerPoint, images, maps) to explain differences between vertical and oblique photos.** • **Practical Applications with Aerial Images:** • **Train students to read and interpret aerial imagery.** • **Exercises on calculating image scale, distances, and elevations.** • **Project-Based Learning:** • **Assign real-world projects such as generating maps from aerial image pairs using specialized software.** • **Use of Specialized Software:** • **Hands-on training using Erdas Imagine, Agisoft Metashape, and Photomod.** • **Demonstrate digital image processing and 3D model generation.** • **Video Lessons and Interactive Content:** • **Show videos illustrating aerial photography procedures, camera setup, and result analysis.** • **Collaborative Learning:** • **Divide students into groups to process real images and compare results.** • **Rotate group roles to reinforce each step of the process.** • **Theoretical and Practical Evaluation:** • **Conduct quizzes, practical assignments, and evaluate final project reports**

	based on real image analysis.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	Understand aerial imagery a its types; introduction to photogrammetry software an image formats	Introduction to Aerial Surveying Software Image Types – Calling images in ERDAS Digital Matrix Setup	Theoretical and Practical	Written & Practic Exams
7–9	4hours weekly	Understand geometric correction and satellite imag enhancement	Geometric Correction – Radiometric Enhancement – Edge Sharpening	Theoretical and Practical	Written & Practic Exams
10–12	4hours weekly	Understand types of aerial m and how to derive them	Classification Techniques – Visual Analys Map Extraction	Theoretical and Practical	Written & Practic Exams
13–15	4hours weekly	Learn various types of geometric corrections for satellite imagery	Types of Geometric Corrections for Optica Imagery	Theoretical and Practical	Written & Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Manual of Photogrammetry – American Society of Photogrammetry, by Moffitt Elements of Photogrammetry – by Paul R. Wolf, 2nd Edition Erdas Imagine Tour Guides – Leica Geosystems Geospatial Imaging, 2006 Aerial Photogrammetry – by Labib Nassif, Technical Education Authority, 2nd Edition, 1999
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	Photogrammetry, Vol. 1: Fundamentals – by Karl Kraus Introduction to Modern Photogrammetry – by Edward M. Mikhail and James Bethel
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Plane Surveying 2
2. Course Code:
SUT202
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 4 hours per week = 60 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Nihad Davut Hassan Hussein - Shelan Khaled Raouf Email: nihadhassan@ntu.edu.iq - shelan_khald@ntu.edu.iq
8. Course Objectives

Course Objectives	• Equip students with essential skills in triangulation, traversing, and leveling. • Introduce students to the use of surveying instruments such as the level and theodolite available in the department. • Develop students' skills in creating contour maps using indirect methods with leveling instruments. • Familiarize students with engineering procedures conducted during tape measurements. • Teach students how to calculate areas and define property boundaries.
9. Teaching and Learning Strategies	
Strategy	• **Lectures:** Easy explanations of ideas using pictures and videos to help students understand tools and problems. • **Practical Work:** Going outside to practice with real surveying tools like the level and theodolite. • **Mini Projects:** Working on small projects like measuring land or drawing a map to learn by doing. • **Problem Solving:** Giving real-life problems and helping students think and find the right solutions. • **Using Technology:** Using computer programs like CAD to draw and analyze surveying data. • **Ongoing Tests:** Giving short quizzes and questions to check student progress and understanding.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	Understand the fundamenta of surveying	introduction to surveying, measurement unit scale types, and distance measurement in the field	Theoretical and Practical	Oral and Practical Exams
7–9	4hours weekly	Perform horizontal and vertical component calculations in closed traverses, coordinate computation, and error corrections	Calculations of horizontal and vertical components in closed circular traverses, corrections, and coordinate determination	Theoretical and Practical	Oral and Practical Exams
10–12	4hours weekly	Learn how to select travers points, correct angles using Deflection and Angle to th Right methods	Traverse point selection, angle correction usi two methods: Deflection Angle and Angle to Right	Theoretical and Practical	Oral and Practical Exams
13–15	4hours weekly	Conduct closed traverse surveys, calculate coordina and corrections using comp and transit methods, and ap error closure corrections	Conducting a closed traverse, calculating horizontal and vertical components, coordinating computation, corrections using compass and transit methods, and dealing wi closure error	Theoretical and Practical	Oral and Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Raymond E. Davis & Joe Welly. Elementary Plane Surveying
Main references (sources)	The Virtual Library provided by the Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	"Plane Surveying" by Dr. Ibrahim Abdullah Al-Najjar "Elementary Surveying: An Introduction to Geomatics" by Charles D. Ghilani & Paul R. Wolf "Applied Surveying" by Dr. Younis Abdulrahman
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:

Specifications and Estimation

2. Course Code:

STU 208

3. Semester / Year:

2024/2025

4. Description Preparation Date:

2025 / /

5. Available Attendance Forms:

Daily – In-Person

6. Number of Credit Hours (Total) / Number of Units (Total)

15 weeks × 2 hours per week = 15 hours (for the semester)

7. Course administrator's name (mention all, if more than one name)

Name: Suzan Atta Bakr Mustafa
Email: Suzan-atta@ntu.edu.iq

8. Course Objectives

Course Objectives	• Introduce students to the **fundamentals of technical engineering specifications**. • Enable students to **prepare quantity and cost estimates** for engineering projects. • Familiarize students with **work items and the standard specifications** for each item.

9. Teaching and Learning Strategies

Strategy	• **Introduce students to the fundamentals of technical engineering specifications.** • **Enable students to prepare quantity and cost estimates for engineering projects.** • **Familiarize students with work items and the standard specifications for each item.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	2hours weekly	Understand general and specific specifications and distinguish between engineering work items	Introduction to Engineering Specifications	Theoretical	Oral and Written Exams
7–9	2hours weekly	Prepare detailed specificati for different work items according to standards	Technical Specifications of Work Items	Theoretical	Oral and Written Exams
10–12	2hours weekly	Understand the component BoQs and apply basic principles of estimation	Engineering Estimation and Bills of Quantiti	Theoretical	Oral and Written Exams
13–15	2hours weekly	Prepare a complete estimat study for a virtual project a perform cost analysis	Practical Application in Specifications & Estimation – Final Project	Theoretical	Oral and Written Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	General Specifications for Civil Works – Issued by the Ministry of Construction and Housing
Main references (sources)	Lectures prescribed by the Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	Project Management and Cost Estimation – Dr. Hassan Al-Bazzaz Quantities and Specifications – Eng. Tareq Al-Shammari
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:

computer–aided mapping

2. Course Code:

STU 207

3. Semester / Year:

2024/2025

4. Description Preparation Date:

2025 / /

5. Available Attendance Forms:

Daily – In-Person

6. Number of Credit Hours (Total) / Number of Units (Total)

15 weeks × 3 hours per week = 45 hours (for the semester)

7. Course administrator's name (mention all, if more than one name)

Name: Farman Saed Ghaleb
Email: farmanghaleb@ntu.edu.iq

8. Course Objectives

Course Objectives	• Enable students to use computer software to accurately and efficiently produce digital maps. • • Equip students with the skills to convert spatial and geographic data into digital maps. • • Introduce the types of maps and cartographic symbols used in map design.

9. Teaching and Learning Strategies

Strategy	• **Theoretical explanation of basic cartographic concepts and drawing techniques.** • **Hands-on training using programs such as AutoCAD Map or ArcGIS.** • **Applied projects to convert surveying data into digital maps.** • **Analysis of existing maps and interpretation of their content.** • **Class discussions on common mapping errors.** • **Periodic assessment through practical exams and assignments.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	3hours weekly	Identify map types and components of digital map	Introduction to Cartography and Mapping Software	Practical	Written & Practic Exams
7–9	3hours weekly	Input, analyze, and layer spatial data	Layer Creation, Symbols, and Scales	Practical	Written & Practic Exams
10–12	3hours weekly	Handle coordinate systems and data transformation	Coordinate Systems and Data Formatting	Practical	Written & Practic Exams
13–15	3hours weekly	Produce a complete map w accurate data and visual analysis	Final Project: Digital Map Production	Practical	Written & Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	User Guide for ArcGIS or AutoCAD Map
Main references (sources)	Principles of Digital Cartography – Dr. Nasser Al-Zubaidi
Recommended books and references (scientific journals, reports…)	Digital Maps and Geographic Information Systems (GIS) – Eng. Khalid Hassan
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Digital Surveying
2. Course Code:
SUT 213
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 3 hours per week = 45 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Nihad Dawoud Hassan Hussein Email: nihadhassan@ntu.edu.iq
8. Course Objectives

Course Objectives	• Equip students with essential skills to understand aerial and satellite imagery. • Introduce image-based surveying and radiometric reflection of Earth's surface features. • Enable students to analyze aerial images effectively. • Develop understanding of digital processing and evaluation of spatial data. • Train students in identifying remote sensing sensors and constructing digital terrain models (DTM).

9. Teaching and Learning Strategies	

Strategy	• **Theoretical Explanation:**
	  • Introduction to digital imaging and camera types.
	  • Basics of aerial and satellite photography.
	  • Comparison between digital photogrammetry and traditional surveying.
	• **Demonstrations & Videos:**
	  • Videos showing aerial image acquisition and image processing workflows.
	  • Explanation of digital image processing steps using specialized software.
	• **Practical Application with Survey Software:**
	  • Training on software such as *Pix4D* and *Agisoft Metashape*.
	  • Hands-on projects to process aerial photos into maps or 3D models.
	• **Field Work:**
	  • Collecting real-world data using digital cameras or drones.
	  • Applying digital surveying procedures to field-collected data.

	• **Student Projects:** • Creating maps of selected areas or generating digital terrain models. • Encouraging group work for image analysis and result interpretation. • **Continuous Assessment:** • Practical exercises in digital image processing. • Evaluation of student projects at semester end.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	3hours weekly	Understand Earth surface features and digital stereo tools	Introduction to stereo analyst feature toolbar DSM creation, GIS data editing, aerial triangulation, 3D image orientation, and automatic DSM extraction	Theoretical & Practical	Oral & Practical Exams
7–9	3hours weekly	Identify and integrate digit imagery	Applications of DTM in GIS, 3D modeling, contour mapping, longitudinal profiles using ArcScene, and other tools like Surfer & Glob Mapper	Theoretical & Practical	Oral & Practical Exams
10–12	3hours weekly	Select, store, and process imagery	Digital image selection, image orientation, storage, flight height input, focal length handling, and 3D model verification	Theoretical & Practical	Oral & Practical Exams
13–15	3hours weekly	Extract data and perform measurements	Acquiring information from stereo imagery, updating coordinates, drawing features, measuring distances	Theoretical & Practical	Oral & Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Stereo Analyst User's Guide – Leica Geospatial Imaging, USA, 2008 Digital Photogrammetry: A Practical Course – Wilfried Linder, Springer, 2009
Main references (sources)	Principles of Digital Cartography – Dr. Nasser Al-Zubaidi
Recommended books and references (scientific journals, reports…)	Digital Photogrammetry: A Practical Course – Wilfried Linder Introduction to Modern Photogrammetry – Edward M. Mikhail, James S. Bethel, J. Chris McGlone Remote Sensing and Image Interpretation – Thomas M. Lillesand & Ralph W. Kiefer Photogrammetric Computer Vision and Image Analysis – Wolfgang Förstner & Bernhard P. Wrob
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:
Geodetic Surveying
2. Course Code:
SUT209
3. Semester / Year:
2024/2025
4. Description Preparation Date:
2025 / /
5. Available Attendance Forms:
Daily – In-Person
6. Number of Credit Hours (Total) / Number of Units (Total)
15 weeks × 4 hours per week = 60 hours (for the semester)
7. Course administrator's name (mention all, if more than one name)
Name: Nihad Davut Hassan Hussein - Ghada Hassan Mohamed Fateh Email: nihadhassan@ntu.edu.iq - ghada66@ntu.edu.iq
8. Course Objectives

Course Objectives	• Introduce students to the fundamentals and concepts of geodetic surveying. • Familiarize students with geodetic coordinate systems and their applications in high-precision surveying. • Enable students to perform measurement operations using modern instruments such as Total Station and GPS.
9. Teaching and Learning Strategies	
Strategy	• **Theoretical Lectures:** Explaining the mathematical and geographical foundations of geodetic surveying. • **Practical Applications:** Field training on the use of GPS and Total Station instruments. • **In-Class Exercises:** Calculations related to coordinate transformations, arc measurements, and curvature. • **Map Discussions and Interpretations:** Analyzing field data samples. • **Continuous Assessment:** Weekly quizzes and exercises to measure understanding and progress.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	4hours weekly	Understand the concept, significance, and uses of geodetic surveying	Introduction to Geodetic Surveying	Theoretical and Practical	Written & Practic Exams
7–9	4hours weekly	Understand geodetic coordinate systems and perform transformations	Coordinate Systems and Transformations	Theoretical and Practical	Written & Practic Exams
10–12	4hours weekly	Apply arc, curvature, and reference surface calculatic	Arc and Curvature Calculations, Reference Surfaces	Theoretical and Practical	Written & Practic Exams
13–15	4hours weekly	Use modern measuring devices and analyze geodet data	Applications of GPS and Total Station in Geodetic Surveying	Theoretical and Practical	Written & Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	*Geodetic Surveying* – Dr. Abdulaziz Omar
Main references (sources)	• *Fundamentals of Geodetic Surveying* – James R. Smith • *Geodesy for the Layman* – U.S. Department of Defense
Recommended books and references (scientific journals, reports…)	*Engineering Geodesy* – Dr. Hashem Al-Taie *Science of Geodesy* – Dr. Kamal Mustafa
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:

Quantity Surveying

2. Course Code:

STU 215

3. Semester / Year:

2024/2025

4. Description Preparation Date:

2025 / /

5. Available Attendance Forms:

Daily – In-Person

6. Number of Credit Hours (Total) / Number of Units (Total)

15 weeks × 2 hours per week = 30 hours (for the semester)

7. Course administrator's name (mention all, if more than one name)

Name: Suzan Atta Bakr Mustafa
Email: Suzan-atta@ntu.edu.iq

8. Course Objectives

Course Objectives	• Introduce students to the fundamentals of engineering technical specifications. • Enable students to prepare quantitative and financial estimates for engineering projects. • Familiarize students with work items and standard specifications for each item.

9. Teaching and Learning Strategies

Strategy	• **Theoretical Lectures:** Explanation of standard specifications for various engineering items. • **Class Discussions:** Exchange of viewpoints on estimation methodologies and related challenges. • **Case Study Analysis:** Review of real-world projects and analysis of bill of quantities and specifications.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	2hours weekly	Familiarity with general and special specifications and distinguishing between differe engineering items	Introduction to Engineering Specification	Theoretical	Oral and Written Exams
7–9	2hours weekly	Preparing detailed specificatio for various work items in accordance with standards	Technical Specifications of Work Items	Theoretical	Oral and Written Exams
10–12	2hours weekly	Understanding components of bills of quantities and applying estimation principles	Engineering Estimation and Bills of Quantities	Theoretical	Oral and Written Exams
13–15	2hours weekly	Preparing a comprehensive estimation study for a hypothetical project and analyzing its costs	Practical Application in Specifications an Estimation – Final Project	Theoretical	Oral and Written Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• *General Specifications for Civil Works* – Ministry of Construction and Housing
Main references (sources)	Official lectures prepared and approved by the Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports…)	• *Project Management and Cost Estimation* – Dr. Hassan Al-Bazzaz • *Quantities and Specifications* – Eng. Tareq Al-Shammari
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:

Highway Design Using Computer Software

2. Course Code:

STU 214

3. Semester / Year:

2024/2025

4. Description Preparation Date:

2025 / /

5. Available Attendance Forms:

Daily – In-Person

6. Number of Credit Hours (Total) / Number of Units (Total)

15 weeks × 3 hours per week = 45 hours (for the semester)

7. Course administrator's name (mention all, if more than one name)

Name: Amal Nashat Shaker Zainal Omar Falah Mardan Raouf
Email: Umayaa75@ntu.edu.iq omer-falah@ntu.edu.iq

8. Course Objectives

Course Objectives	• Enable students to use computer software for highway design. • Familiarize students with the practical steps involved in designing and analyzing road alignments using software. • Prepare detailed plans for road projects in accordance with modern engineering standards.

9. Teaching and Learning Strategies

Strategy	• **Hands-on training** on software such as *Civil 3D*, *AutoCAD Civil*, or alternative programs. • Working on **realistic design projects** that simulate actual field conditions. • Performing **analytical applications** on road alignments, slopes, and curves. • **Ongoing assessment** based on student progress through different project phases.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	3hours weekly	Understanding software interfaces, creating surface points and ground data	Introduction to Road Design Software	Practical	Written and Pract Exams
7–9	3hours weekly	Creating horizontal and vertical alignments and integrating survey data	Horizontal and Vertical Road Alignment Design	Practical	Written and Pract Exams
10–12	3hours weekly	Slope analysis, designing vertical and horizontal curv applying design standards	Design of Curves and Intersections Using Software	Practical	Written and Pract Exams
13–15	3hours weekly	Preparing final execution drawings and exporting project files	Complete Road Design Project Using Softwa	Practical	Written and Practical Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	User Guide for Civil 3D or AutoCAD Civil
Main references (sources)	• *Highway Engineering* – Paul H. Wright • *Road Design Manual* – Ministry of Construction and Housing
Recommended books and references (scientific journals, reports…)	*Highway Engineering Design Using Modern Software* – Eng. Ahmed Jaber
Electronic References, Websites	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library

1. Course Name:

Quantity Surveying

2. Course Code:

STU 215

3. Semester / Year:

2024/2025

4. Description Preparation Date:

2025 / /

5. Available Attendance Forms:

Daily – In-Person

6. Number of Credit Hours (Total) / Number of Units (Total)

15 weeks × 2 hours per week = 30 hours (for the semester)

7. Course administrator's name (mention all, if more than one name)

Name: Idris Ihsan Star
Email: Idrees_ihsan@ntu.edu.iq

8. Course Objectives

Course Objectives	• Instill ethical concepts related to the profession in students' behavior. • Raise students' awareness of their professional and social responsibilities. • Introduce professional conduct laws and how to act in ethically conflicting situations.

9. Teaching and Learning Strategies

Strategy	• **Theoretical lectures** • **Classroom discussions** on real ethical situations • **Case studies** on professional misconduct and its societal impact • **Student presentations** • **Educational and awareness videos** • **Analytical reports** on selected ethical topics

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–6	2hours weekly	Understanding basic ethical concepts in the professional fiel	Introduction to Professional Ethics and Code of Conduct	Theoretical	Written Exams
7–9	2hours weekly	Analyzing scenarios requiring ethical decisions and handling ethical pressure	Individual and Social Responsibility	Theoretical	Written Exams
10–12	2hours weekly	Applying ethics rules in the workplace and managing confli of interest	Integrity and Transparency in Professio Performance	Theoretical	Written Exams

13–15	2hours weekly	Promoting ethical conduct and professional identity	Ethics in Various Professions and Gene Professional Conduct	Theoretical	Written Exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricula books, if any)	*Professional Ethics Guide* issued by the Ministry of Higher Education
Main references (sources)	*Professional Ethics and Work Behavior* – Dr. Kamal Al-Hajj Abd
Recommended books and references (scientific journals, reports…)	*Professional Conduct in Public Service* – Dr. Mohammed Abdul Aziz
Electronic References, Webs	The Virtual Library of the Ministry of Higher Education and Scientific Research Digital resources available in the institute's e-library