

وصف البرنامج الأكاديمي

لقسم تقنيات المساحة

للعام الدراسي 2023/2022

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

## Academic description form for colleges and institutes

**Name Of University:** Northern Technical University  
**Collage/Institute:** Kirkuk Technical Institute  
**Department:** Surveying Techniques Department  
**File Filled Date:**

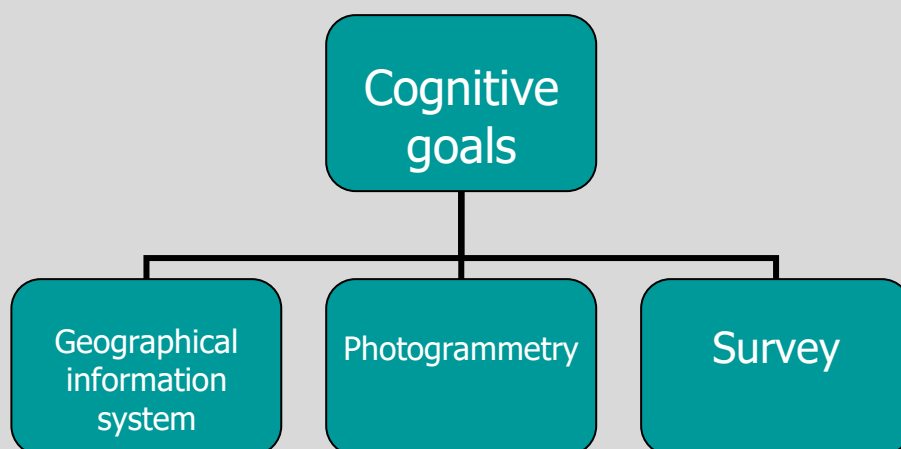
# Academic Program Description

## Academic Program Description

This description of the academic program provides a brief summary of the most important characteristics of the program and the learning outcomes expected of the student to achieve, demonstrating whether he has made maximum use of the available opportunities. It is accompanied by a description of each course within the program

<b>1. Name of university</b>	Northern Technical university
<b>2. Name of Department</b>	Kirkuk Technical Institute
<b>3. Name of academic program</b>	Surveying Techniques Department
<b>4. Name of Final certificate</b>	Technical Diploma
<b>5. Study system</b>	courses
<b>6. Accredited Academic Program</b>	ABET
<b>7. Other external influences</b>	There is a close relationship between the department's output and the labor market, and a market opinion is taken to create curriculum study
<b>8. Description creation date</b>	2023 /5/30
<b>9. Academic Program Objectives:</b>	
The Surveying Techniques department aims to graduate qualified technical staff with high skills and qualifications to carry out the following tasks:	
1- Calculating areas and determining properties.	
2- Triangulation, Traversing and level works.	
3- Preparing general survey maps also drawing maps according to Iraqi and international networking.	
4- preparing Maps using GIS program.	

## 10- Required program outcomes and teaching and learning methods:



### B - Skills objectives of the program

B1 - How to conduct field surveys.

B2 - How to use modern surveying equipment.

B3 - Getting to know aerial photography devices and reading aerial photographs.

### Teaching and learning methods

1. Electronic lectures method (blended education)
- 2- Conducting field surveys.
3. Giving lectures through the Google meet program.
- 4- Using computer programs to produce maps.
5. Conducting laboratory experiments
6. Summer training.
7. Training in specialized workshops .

### Evaluation methods

- |  |                                |
|--|--------------------------------|
| 1- Daily evaluation of electronic attendance           |                                |
| 2- Reports   |                                |
| 3- First semester exams electronically via Google form | 6- Homework                    |
| 4- Second semester exams electronically.               | 7- Oral exams.                 |
| 5- Surprise written exams.                             | 8- Final exams electronically. |

### **C- Emotional and moral goals**

C1 - linking computer programs with field data.

C2 - Using the computer to prepare the maps.

C3 - Using a GPS device to determine locations, elevations and coordinates

C4 - Analysis of aerial photographs.

### **Teaching and learning methods**

1- The method of electronic lectures and attendance (blended education).

2- Qualitative ceremonies.

3- Applications of field surveys on the modern survey interface electronically and in person.

4- Using workshops (mechanical and civil).

5- Specialized laboratories.

6- computer apps.

### **Evaluation methods**

1- Written exams electronically

2- Semester exams

3- Reports

4- Drawing boards

5-Testing the use of devices

6- Evaluate the use of surveying devices in the field.

### **D - General and transferable skills (other skills related to employability and personal development).**

D1 - Using surveying software.

D2 - reading maps

D3 - Training in civil and mechanical workshops (for turning, welding, carpentry).

D4 - Filling the maps with the implemented modern urban development lab.

### **Teaching and learning methods**

1- Scientific laboratories

2- Practical workshops

3- The ceremony

4- The lecture

5- Field training

6- Summer training

### Evaluation methods

- 1-written exams.
- 2- Oral exams
- 3- Daily evaluation.
- 4- Field laboratory reports.
- 5- First semester exams.
- 6- Second semester exams.
- 7- Final exams.

### 11. Program Structure:

Credit hours		Name department	code	year
practical	theoretical			
37	28	Surveying Techniques Department	Two-stage materials first and ) (second	-2021 2022

### 12- Personal development planning

- 1- provide training courses outside Iraq
- 2- provide training courses inside Iraq.
- 3- Organizing specialized seminars.
- 4- Training workshops
- 5- Scientific conferences.
- 6- Sessions for presenting scientific developments.
- 7- Scientific research.

### 13. Admission Standard (setting rules for admission to a college or institute)

- 1- rate condition
- 2- A graduate of the scientific branch (applied, biological).
- 3- The physical fitness of the student.

## 14. The most important sources of information about the program

- Engineering Geology, Miqdad Hussein Ali, Bassem Rushdi Hijab, Sinan Hashem Al-Jassar, University of Baghdad, 1990.
- Foundations of Geology for Engineers, Kenana Muhammad Thabet, Muhammad Omar Al-Ashho, University of Mosul, 1993
- Principles of Engineering Geology and its applications, authored by Majeed Aboud Jassim Al-Tai, University of Basra, 2001
- Principles of Geology and Geomorphology, Ghada Muhammad Salim, Muhammad Mahdi Abbas, Fadel Nomas Al-Saadouni, Institute of Technical Institutes, 1984
- Dr. Hashem Yahya Al Masraf, Principles of Cartography, First Edition, 1982, Baghdad
- Dr. Hashem Yahya Al Masraf, applied exercises in cartography, 1986. Baghdad86
- Dr. Khader Al-Abadi, Cartography, Maps, 1980, Baghdad
- Robinson, J, S., "Elements of cartography", 5th Ed., 1980
- Keats, J, S., "Cartography Design and Production", 3rd Ed., 1980

Paper sources (what books and resources are available in the institute's library).

- Electronic resources (what is available from books in the electronic library of the institute)
- The resources available in the virtual library of the Ministry of Higher Education and Scientific Research.
- Specialized sites on the Internet (Internet).

# Study plan 2021-2020

## first school year

Notes	Subject type	Units	No. of hours			Subject name	No.
			total	P	Theo.		
Study in English	Specialty	20	10	6	4	Survey (1)	1
	Specialty	10	5	3	2	Photogrammetry	2
Study in English	assistance	4	2		2	Mathematics and Spherical Trigonometry	3
	Specialty	4	2		2	Remote sensing	4
	assistance	2	1		1	Geology	5
	assistance	8	4	2	2	computer applications	6
	Specialty	4	2		2	Quantitative survey	7
	Public	6	3	3		Workshop	8
	Public	4	2		2	Human rights and democracy	9
	Public	2	1		1	English	10
		64	32	14	18	<b>Total</b>	

**Total annual hours 32 x 30 weeks = 960 hours**



## Second school year:

notes	Subject types	Units	No. of hours			Subject name	No.
			total	P	Theo.		
Study in English	Specialty	16	8	6	2	( 2 ) Survey	1
	Specialty	8	4	2	2	Photogrammetry	2
Study in English	Specialty	10	5	3	2	Map technology	3
	Specialty	10	5	3	2	Engineering and Cadastral Survey	4
	Specialty	6	3	3		computer applications	5
	Specialty	8	4	3	1	GIS ground control techniques	6
	Specialty	6	3	3		Projects	7
	Public	2	1		1	English language	8
		66	33	23	10	total	

**Total hours 33 x 30 weeks = 990 hours**

1. Total hours for the two years	1950	6. Percentage of assistant hours for the two years	14
2. Total units	130	7. Ratio of general hours for the two years	9
3. Percentage of theoretical hours for the two years %	43	8. Summer Training	270
4. Percentage of working hours for the two years %	57	9. The total hours plus the hours of summer training	2220
Percentage of specialized hours .5 % for the two years	77		

## Curriculum Skills Outline

### Department of Surveying Techniques / First Stage

					Learning outcomes required of the program														
General and Transferable Skills (or) Other skills related to employability and personal development					Emotional and value goals			Program specific objectives				Cognitive goals				Basic or optional	Subject Name	code	Year
4D	3D	D 2	D 1	C 4	C 3	C 2	C 1	B 4	B 3	B 2	B 1	A 4	A 3	A 2	A 1				
↗		↗	↗		↗	↗	↗			↗	↗				↗	Basic	1/Survey		2021 - 2022
↗		↗	↗	↗	↗		↗		↗		↗			↗		Basic	Photogrammetry		
↗		↗	↗	↗	↗	↗	↗			↗	↗				↗	Not basic	Mathematics and Spherical Trigonometry		
↗		↗	↗		↗		↗		↗		↗			↗		Basic	Remote sensing		
↗		↗	↗	↗	↗	↗	↗			↗	↗				↗	Not Basic	Geology		
↗		↗	↗		↗		↗		↗		↗			↗		Not Basic	computer applications		
↗		↗	↗	↗	↗	↗	↗			↗	↗				↗	Basic	Quantitative survey		
↗		↗	↗		↗		↗		↗		↗			↗		Not Basic	Workshop		
↗		↗	↗	↗	↗	↗	↗			↗	↗				↗	Not Basic	Human rights and democracy		
↗		↗	↗	↗	↗	↗	↗			↗	↗				↗	Not Basic	English		

## Curriculum Skills Outline

### Department of Surveying Techniques / Second Stage

					Learning outcomes required of the program														
General and Transferable Skills (or) Other skills related to employability and personal development					Emotion al and value goals			Program specific objectives				Cognitive goals				Basic or optional	Subject Name	co de	Year
4D	3D	D 2	D 1	C 4	C 3	C 2	C 1	B 4	B 3	B 2	B 1	A 4	A 3	A 2	A 1				
↗		↗	↗		↗	↗	↗			↗	↗				↗	Basic	Survey ( 2 )		2021 - 2022
↗		↗	↗	↗	↗		↗		↗		↗			↗		Basic	Photogrammetry		
↗		↗	↗	↗	↗	↗	↗			↗	↗				↗	Basic	Map technology		
↗		↗	↗		↗		↗		↗		↗			↗		Basic	Engineering and Cadastral Survey		
↗		↗	↗	↗	↗	↗	↗			↗	↗				↗	Basic	computer applications		
↗		↗	↗		↗		↗		↗		↗			↗		Basic	GIS		
↗		↗	↗		↗		↗		↗		↗			↗			Basic	ground control techniques	
↗		↗	↗		↗		↗		↗		↗			↗		Basic	Projects		
↗		↗	↗		↗	↗	↗			↗	↗				↗	Not Basic	English language		

## Course description form (1)

### Course description:

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, demonstrating whether he has made maximum use of the available opportunities. It must be linked to the description of the program.

1- Educational Institution	Northern Technical University / Kirkuk Technical Institute
2. University Department / Technical	Surveying technology department
3. Course name/code	Survey 1
4. Forms of attendance available	Blended Learning (Presented + Online)
5. The semester / year	yearly
6. Number of study hours (total)	10 semesters * 30 weeks = 300 hours (annual)
7. The date this description was prepared	30/5/2021
8. Course objectives	
The survey course aims to educate and train students to:	
1- Carry out triangulation, traversing and leveling work.	
2- Using the survey equipment currently available in the department.	
3- How to calculate areas and determine properties.	

## **9. Course outcomes and methods of teaching, learning and assessment**

### **A - knowledge goals**

- A1- Field and cadastral surveys
- A2- Projecting engineering drawings
- A3- Raising buildings and geographical features
- A4- Use of surveying equipment
- A5- Calculations for curves, areas and volumes

### **B- The objectives and skills of the program**

- B1 - Using modern surveying equipment.
- B2 - Projecting curves, structures and engineering works.
- B3 - Read maps of all kinds.

### **Teaching and learning methods**

- 1- Electronic lectures.
- 2- Attended field training.
- 3- Use of surveying equipment.
- 4- Student projects.

### **Evaluation methods**

- 1- First semester exams presented and electronically.
- 2- Second semester exams presented and electronically.
- 3- Written and electronic written exams.
- 4- Oral and electronic exams.
- 5- Reports.
- 6- Field applications.
- 7- Final exams presented and electronically.

### **C- Emotional and moral goals**

- C1- Using the Gap device to determine the coordinates
- C2 - Transferring information to the calculator.
- C3 - Projecting data on maps.

### **Teaching and learning methods**

- 1- The style of presented and electronic lectures.
- 2- Field training
- 3- summer training

### **Evaluation methods**

- 1- First semester exams presented and electronically.
- 2- Second semester exams presented and electronically.
- 3- Written exams presented and electronically.
- 4- Oral exams presented and electronically.
- 5- Reports
- 6- Field applications
- 7- Final exams presented and electronically.

### **D - General and transferable skills (other skills related to employability and personal development).**

- D 1- Using surveying equipment
- D2 - reading maps
- D 3- Dropping and lifting engineering works
- D4-Field surveys.

## 10. Course Structure

Evaluation methods	Education method	Unit/course or topic name	Required learning outcomes	Hours	Weeks
Electronic and attendance exams	theoretical + practical	Introduction to survey, definition, and units of measurement	Technical Diploma	10 hours a week	5-1
Electronic and attendance exams	theoretical + practical	Distance on flat land, distance on sloping land, engineering processes.	Technical Diploma	10 hours a week	10-6
Electronic and attendance exams	theoretical + practical	Obstacles, clear area details, leveling, purpose of leveling.	Technical Diploma	10 hours a week	15-11
Electronic and attendance exams	theoretical + practical	Methods for calculating levels, vertical closing error, permissible error, longitudinal and transverse sections.	Technical Diploma	10 hours a week	20-16
Electronic and attendance exams	theoretical + practical	Drawing longitudinal and transverse sections, calculating areas, calculating volumes	Technical Diploma	10 hours a week	25-21
Electronic and attendance exams	theoretical + practical	Contour period, preparation of contour maps, measurement of horizontal and vertical angles.	Technical Diploma	10 hours a week	30-26

<b>13- Infrastructure</b>	
<b>1- Required prescribed books</b>	Surveying Book - Dr. Ziyad Abdul-Jabbar Al-Bakri. Surveying Engineering Book - Dr. Abbas Zeidan Khalaf.
<b>2- Main references (sources)</b>	Chilani, c. and wolf elementary surveying. Shank V. surveying engineers and instrument.
<b>A- Books and references that he recommends (scientific journals, reports, ...)</b>	<b>Technical Magazine - Publications of the University Journal in Kirkuk - University of Technology - University of Baghdad - Tikrit University</b> <b>The virtual library of the Ministry of Higher Education and Scientific Research</b>
<b>b- Electronic references, websites, ...</b>	<b>1- Leica delex line T.S06 plus manual total station</b> <b>2- The virtual library of the Ministry of Higher Education and Scientific Research</b> <b>3- What books are available in the institute's electronic library</b>

<b>12- Curriculum development plan</b>
<p><b>1- Studies to develop curricula through the recommendations of the sectoral committees.</b></p> <p><b>2- Take advantage of the virtual library of the Ministry of Higher Education and Scientific Research.</b></p> <p><b>3- Making use of scientific websites in developing the course by showing scientific films and developments in the field of the course.</b></p> <p><b>4- Linking the theoretical and practical part of the course through the student project.</b></p>



## Course description form (2)

### Course description:

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, demonstrating whether he has made maximum use of the available opportunities. It must be linked to the description of the program.

1- Educational Institution	Northern Technical University / Kirkuk Technical Institute
2. University Department / Technical	Surveying technology department
3. Course name/code	Survey 2
4. Forms of attendance available	Blended Learning (Presented + Online)
5. The semester / year	yearly
6. Number of study hours (total)	8 semesters * 30 weeks = 240 hours (annual)
7. The date this description was prepared	30/5/2021
8. Course objectives	
The survey course aims to educate and train students to:	
1- Carry out triangulation, traversing and leveling work.	
2- Using the survey equipment currently available in the department.	
3- How to calculate areas and determine properties.	

#### **4. Course outcomes and methods of teaching, learning and assessment**

##### **A - knowledge goals**

- A1- Field and cadastral surveys
- A2- Projecting engineering drawings
- A3- Raising buildings and geographical features
- A4- Use of surveying equipment
- A5- Calculations for curves, areas and volumes

##### **B- The objectives and skills of the program**

- B1 - Using modern surveying equipment.
- B2 - Projecting curves, structures and engineering works.
- B3 - Read maps of all kinds.

##### **Teaching and learning methods**

- 1- Electronic lectures.
- 2- Attended field training.
- 3- Use of surveying equipment.
- 4- Student projects.

##### **Evaluation methods**

- 1- First semester exams presented and electronically.
- 2- Second semester exams presented and electronically.
- 3- Written and electronic written exams.
- 4- Oral and electronic exams.
- 5- Reports.
- 6- Field applications.
- 7- Final exams presented and electronically.

##### **C- Emotional and moral goals**

- C1- Using the Gap device to determine the coordinates
- C2 - Transferring information to the calculator.
- C3 - Projecting data on maps.

### **Teaching and learning methods**

- 1- The style of presented and electronic lectures.
- 2- Field training
- 3- summer training

### **Evaluation methods**

- 1- First semester exams presented and electronically.
- 2- Second semester exams presented and electronically.
- 3- Written exams presented and electronically.
- 4- Oral exams presented and electronically.
- 5- Reports
- 6- Field applications
- 7- Final exams presented and electronically.

### **D - General and transferable skills (other skills related to employability and personal development).**

- D 1- Using surveying equipment
- D2 - reading maps
- D 3- Dropping and lifting engineering works
- D4-Field surveys.

## 5. Course Structure

Evaluation methods	Education method	Unit/course or topic name	Required learning outcomes	Hours	Weeks
Electronic and attendance exams	theoretical + practical	Identify the types of modern survey instruments, their uses, how to setup them, ribbing, measuring digital angles	Technical Diploma	8 hours a week	5-1
Electronic and attendance exams	theoretical + practical	Types of polygons, uses of the polygon in the process of lifting, projecting on the map, choosing the scale.	Technical Diploma	8 hours a week	10-6
Electronic and attendance exams	theoretical + practical	Identifying the integrated station devices, their parts, divisions, types, carrying out surveying works, projecting through fossils	Technical Diploma	8 hours a week	15-11
Electronic and attendance exams	theoretical + practical	Implementation of a program for measuring areas and volumes, measuring the heights of targets, a program for road works	Technical Diploma	8 hours a week	20-16
Electronic and attendance exams	theoretical + practical	Implementation of the free stations program, locating the descending column, forward and reverse calculations.	Technical Diploma	8 hours a week	25-21
Electronic and attendance exams	theoretical + practical	Implementation of the Reference Elements program in dividing the plot, learning to survey the transmission towers of electric power.	Technical Diploma	8 hours a week	30-26

<b>6- Infrastructure</b>	
<b>4- Required prescribed books</b>	Engineering and cadastral survey book - Ziyad Abdul-Jabbar Al-Bakr Practical Surveying Book - Hori Sirop - Basil Ahmed The Flat Area Book - Fawzia Al-Khalisi.
<b>5- Main references (sources)</b>	Leica delex line T.S06 plus manual total station
<b>C- Books and references that he recommends (scientific journals, reports, ...)</b>	<b>Technical Magazine - Publications of the University Journal in Kirkuk - University of Technology - University of Baghdad - Tikrit University</b> <b>The virtual library of the Ministry of Higher Education and Scientific Research</b>
<b>D- Electronic references, websites, ...</b>	<b>1- The virtual library of the Ministry of Higher Education and Scientific Research</b> <b>2- What books are available in the institute's electronic library</b>

<b>7- Curriculum development plan</b>
<p><b>5- Studies to develop curricula through the recommendations of the sectoral committees.</b></p> <p><b>6- Take advantage of the virtual library of the Ministry of Higher Education and Scientific Research.</b></p> <p><b>7- Making use of scientific websites in developing the course by</b></p> <p><b>8- The link between the theoretical and practical part of the course through the student project. Showing scientific films and developments in the field of the course.</b></p>

## Course description form (3)

### Course description:

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, demonstrating whether he has made maximum use of the available opportunities. It must be linked to the description of the program.

1- Educational Institution	Northern Technical University / Kirkuk Technical Institute
2. University Department / Technical	Surveying technology department
3. Course name/code	Quantitative survey
4. Forms of attendance available	Online (electronic)
5. The semester / year	yearly
6. Number of study hours (total)	2 semesters * 30 weeks = 60 hours (annual)
7. The date this description was prepared	30/5/2021
8. Course objectives	
The survey course aims to educate and train students to:	
1. Identifying the types of materials, machines and equipment.	
2. Methods of executing various engineering projects (buildings, roads and railways, agreement, ports, airports).	

## **5. Course outcomes and methods of teaching, learning and assessment**

### **A - knowledge goals**

Calculation of quantitative areas.

A2- Raising buildings and geographical features

A3- Using the laws of calculating quantities.

A4- Calculation of areas and volumes.

### **B- The objectives and skills of the program**

B1 - Use the laws related to quantitative computation.

B2 - Projecting curves, structures and engineering works.

### **Teaching and learning methods**

9- Electronic lectures.

10- Student projects.

### **Evaluation methods**

1- First semester exams presented and electronically.

2- Second semester exams presented and electronically.

3- Written and electronic written exams.

4- Oral and electronic exams.

5- Reports.

6- Final exams presented and electronically.

### **C- Emotional and moral goals**

C1- Using the Gap device to determine the coordinates

C2 - Transferring information to the calculator.

C3 - Projecting data on maps.

### **Teaching and learning methods**

- 7- The style of presented and electronic lectures.
- 8- summer training

### **Evaluation methods**

- 1- First semester exams presented and electronically.
- 2- Second semester exams presented and electronically.
- 3- Written exams presented and electronically.
- 4- Oral exams presented and electronically.
- 5- Reports
- 6- Final exams presented and electronically.

### **D - General and transferable skills (other skills related to employability and personal development).**

- D 1- Using surveying equipment
- D2 -Dropping and lifting engineering works



## 6. Course Structure

Evaluation methods	Education method	Unit/course or topic name	Required learning outcomes	Hours	Weeks
Electronic exams	theoretical	Types of construction materials, raw materials, calculating quantities, bricks, types, types of mortar, blocks, cache, moisture-blocking materials.	Technical Diploma	2 hours a week	6-1
Electronic exams	theoretical	Plaster, construction machinery, estimation, bills of quantities, calculating the amount of earthworks, calculating the quantity of construction paragraphs, brickwork	Technical Diploma	2 hours a week	12-7
Electronic exams	theoretical	Calculation of the amount of concrete, the schedule of special units, the calculation of the quantities of concrete for the ceiling, the calculation of the amount of finishing works, the calculation of the amount of flooring works	Technical Diploma	2 hours a week	18-13
Electronic exams	theoretical	Application on the calculator, types of foundations for buildings, their forms and their use, types of roads, estimation and arms for road works, calculating the volumes of earthworks	Technical Diploma	2 hours a week	24-19
Electronic exams	theoretical	Types of joints in roads, guesses and booms, railways, airports, traffic signs.	Technical Diploma	2 hours a week	30-25

<b>7- Infrastructure</b>	
<b>3- Required prescribed books</b>	<p>Quantitative survey - Muwaffaq Nasser Al-Saour - Ministry of Education - Institute of Technical Institutes.</p> <p>Quantitative Survey - Sami Miri Kazem, Abdul Karim Al-Shammaa - Ministry of Education - Institute of Technical Institutes, 1994.</p> <p>Structural materials - Jalal Bashir Sarsam - Ministry of Education - Institute of Technical Institutes, 1992.</p>
<b>4- Main references (sources)</b>	Leica delex line T.S06 plus manual total station
<b>C- Books and references that he recommends (scientific journals, reports, ...)</b>	<p>Technical Magazine - Publications of the University Journal in Kirkuk - University of Technology - University of Baghdad - Tikrit University</p> <p>The virtual library of the Ministry of Higher Education and Scientific Research</p>
<b>D- Electronic references, websites, ...</b>	<p>1- The virtual library of the Ministry of Higher Education and Scientific Research</p> <p>2- What books are available in the institute's electronic library</p>

<b>8- Curriculum development plan</b>
<p>9- Studies to develop curricula through the recommendations of the sectoral committees.</p> <p>10- Take advantage of the virtual library of the Ministry of Higher Education and Scientific Research.</p> <p>11- Making use of scientific websites in developing the course by showing scientific films and developments in the field of the course.</p> <p>12- Linking the theoretical and practical part of the course through the student project.</p>

## Course description form (4)

### Course description:

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, demonstrating whether he has made maximum use of the available opportunities. It must be linked to the description of the program.

1- Educational Institution	Northern Technical University / Kirkuk Technical Institute
2. University Department / Technical	Surveying technology department
3. Course name/code	Mathematics and Spherical Trigonometry
4. Forms of attendance available	Online (electronic)
5. The semester / year	yearly
6. Number of study hours (total)	2 semesters * 30 weeks = 60 hours (annual)
7. The date this description was prepared	30/5/2021
8. Course objectives	
The survey course aims to educate and train students to:	
<b>2. Application of mathematical equations and methods and their uses.</b>	
<b>3. The use of mathematical methods in the fields of land surveying, aerial surveying, maps, and geodesy surveys are among the fields of surveying engineering.</b>	

#### **4. Course outcomes and methods of teaching, learning and assessment**

##### **A - knowledge goals**

- A1- Calculate areas and volumes.
- A2- Using equations and mathematical methods to calculate areas.
- A 3- Calculation of areas and volumes.

##### **B- The objectives and skills of the program**

- B1 - The use of mathematical methods in the areas of surveying.
- B2 - Application of mathematical equations and methods and their uses

##### **Teaching and learning methods**

- 11- Electronic lectures.
- 12- Student projects.

##### **Evaluation methods**

- 1- First semester exams presented and electronically.
- 2- Second semester exams presented and electronically.
- 3- Written and electronic written exams.
- 4- Oral and electronic exams.
- 5- Reports.
- 6- Final exams presented and electronically.

##### **C- Emotional and moral goals**

- C1- Using the Matlab program in the application.
- C2- Apply the equations in the calculator.
- C3 - Laws of spherical triangles in geodesic spaces.

### **Teaching and learning methods**

- 9- The style of presented and electronic lectures.
- 10- summer training

### **Evaluation methods**

- 1- First semester exams presented and electronically.
- 2- Second semester exams presented and electronically.
- 3- Written exams presented and electronically.
- 4- Oral exams presented and electronically.
- 5- Reports
- 6- Final exams presented and electronically.

### **D - General and transferable skills (other skills related to employability and personal development).**

- D1- Using equations and mathematical methods to calculate land areas, aerial surveys and maps and geodesic surveying is one of the fields of survey engineering.
- D2- Applying the laws of spherical triangles in geodesic spaces.

## 5. Course Structure

Evaluation methods	Education method	Unit/course or topic name	Required learning outcomes	Hours	Weeks
Electronic exams	theoretical	A review of solving equations, matrices, their types, operations on matrices, the transpose of the matrix, its inverse, multiplying matrices, determinants, solving simultaneous equations, equation of the line.	Technical Diploma	2 hours a week	6-1
Electronic exams	theoretical	Trigonometry, laws used in solving a triangle, circular sector, derivative, derivative of trigonometric functions.	Technical Diploma	2 hours a week	12-7
Electronic exams	theoretical	Derivative applications, integration, integration of algebraic and trigonometric functions, definite integration, area under the curve, numerical methods in integration.	Technical Diploma	2 hours a week	18-13
Electronic exams	theoretical	Simpson's rule to find area, statistical operations, graphs, spherical triangle, Napier's rules.	Technical Diploma	2 hours a week	24-19
Electronic exams	theoretical	Right spherical triangle, equilateral spherical triangle, oblique spherical triangle, spherical preferences, area of spherical triangle, Matlab software. Applications on the Matlab program.	Technical Diploma	2 hours a week	30-25

<b>6- Infrastructure</b>	
<b>5- Required prescribed books</b>	Applied Mathematics book, written by Jacob Sabbagh. Spherical triangles book, written by Jacob Sabbagh.
<b>6- Main references (sources)</b>	CALCULUS, George B. Thomas. TRICONOMETRY, P. ABBOTT, B.A..
<b>C- Books and references that he recommends (scientific journals, reports, ...)</b>	<b>Technical Magazine - Publications of the University Journal in Kirkuk - University of Technology - University of Baghdad - Tikrit University</b> <b>The virtual library of the Ministry of Higher Education and Scientific Research</b>
<b>D- Electronic references, websites, ...</b>	<b>1- The virtual library of the Ministry of Higher Education and Scientific Research</b> <b>2- What books are available in the institute's electronic library</b>

<b>7- Curriculum development plan</b>
<p><b>13- Studies to develop curricula through the recommendations of the sectoral committees.</b></p> <p><b>14- Take advantage of the virtual library of the Ministry of Higher Education and Scientific Research.</b></p> <p><b>15- Making use of scientific websites in developing the course by showing scientific films and developments in the field of the course.</b></p> <p><b>16- Linking the theoretical and practical part of the course through the student project.</b></p>