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.

Academic Program Description Form

University Name: **Baghdad**
Faculty/Institute: **science**
Scientific Department: **remote sensing and GIS**
Academic or Professional Program Name: **.semesters**
Final Certificate Name: **BSC IN remote sensing and gis**
Academic System: **BSC IN remote sensing and gis**
Description Preparation Date:**1/10/2024**
File Completion Date: **1/10/2024**

Signature:
Head of Department Name:

Date:

Signature:
Scientific Associate Name:

Date:

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Date:
Signature:

Approval of the Dean

1. Program Vision

The program vision is articulated in the university's catalogue and website, emphasizing the commitment to excellence in education and research in the fields of remote sensing and GIS.

2. Program Mission

The program mission, as stated in the university's documentation, outlines the goals of providing quality education, fostering research, and promoting the application of remote sensing and GIS technologies.

3. Program Objectives

The objectives of the program include:

- To equip students with theoretical and practical knowledge in remote sensing and GIS.
- To prepare graduates for careers in various sectors utilizing spatial data and analysis.
- To encourage critical thinking and problem-solving skills in real-world applications.
- To promote lifelong learning and professional development in the field.

4. Program Accreditation

The program is accredited by [insert accreditation agency name], ensuring that it meets national and international educational standards.

5. Other external influences

Is there a sponsor for the program? no

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution	6	30	100%	Core program
Requirements	4	20	67%	Basic requirements
College Requirements	2	10	33%	Optional courses

Department Requirements	3	15	50%	Advanced topics
Summer Training	1	3	10%	Practical experience required

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
Third/first	RSGI301	Geographic information system–3	•	•
Third/first	EN303	English –3	•	
Third/first	RSEP305	Environmental pollution air and water	•	
Third/first	RSGP307	Geophysics	•	•
Third/first	RSMT309	mathmatics–5	•	
Third/first	RSAP311	aerial photography and photogrammetry	•	•
Third/first	RSRT313	Remote sensing in agriculture (soil and land cover)	•	
Third/first	RSRH315	Remote sensing with thermal and microwave imaging	•	
Third/first	RSDS302	Remote sensing in human settlement analysis	•	
Third/second	RSRA304	Data structure and management in gis	•	•
Third/second	RSEP306	Environmental pollution (air and groundwater)	•	
Third/second	RSSA308	Spatial Analysis	•	•

Third/second	RSHG310	Hydrogeology	•	
Third/second	RSRI312	Remote Sensing with Imaging Radar	•	
Third/second	RSGP314	Satellites & GPS	•	
Third/second	RSIP316	Advanced Image Processing	•	•
Third/second	RSSS318	Optional Subject	•	
Fourth/first	RSNR401	Natural Resource	•	
Fourth/first	RSOP403	Selective subject	•	
Fourth/first	RSWF405	Mathematics of waves and fields	•	
Fourth/first	RSEP407	Environmental pollution treatment	•	•
Fourth/first	RSRW409	Remote sensing in water resources	•	
Fourth/first	RSLC411	Land cover planning	•	
Fourth/first	EN413	English 4	•	
Fourth/first	RSP415	Graduation Project	•	
Fourth /second	RSEA402	Environmental application in remote sensing and geographic information systems	•	•
Fourth /second	RSRG404	Remote sensing in geology	•	•
Fourth /second	RSLU406	Land use planning	•	
Fourth /second	RSPL408	Environmental planning	•	
Fourth /second	RSHC410	Hydrochemistry	•	
Fourth /second	RSSF412	Sensors: concepts and applications	•	•

Fourth /second	**RSST416**	**Remote sensing techniques**	•	
Fourth /second	**RSP415**	**Graduation Project**	•	

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	A1- Developing his analytical abilities to reach logical solutions to various issues A2- His ability to evaluate the academic program A3- Creating and organizing statistical tables A4- Recognize the basic characteristics of the nature of the scientific material
Skills	
Learning Outcomes 2	B1 - Ability to listen effectively and contribute constructively to the discussion
Learning Outcomes 3	B2 - Ability to make decisions and take responsibility
Ethics	
Learning Outcomes 4	D1-Developing the student's ability to dialog and discussion.
Learning Outcomes 5	D2 - Develop the student's ability to deal with the Internet.

9. Teaching and Learning Strategies

Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods

Presentation of scientific materials with projectors: Datashow, explanation and clarification by the lecturer, online and mini-projects within the lectures

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
PROFESSOR	physics	Remote sensing			YES	
PROFESSOR	Astronomy	Digital image processing			YES	
PROFESSOR	astronomy	astronomy			YES	
PROFESSOR	physics	Digital image processing			YES	
PROFESSOR	astronomy	astronomy			YES	
PROFESSOR	Physics	Remote sensing			YES	
PROFESSOR	Physics	Remote sensing and image processing			YES	
Assistant professor	Physics	physics			YES	
Assistant professor	Physics	Remote sensing			YES	
Assistant professor	Physics	Physics			YES	
Lecturer	Physics	Thin film			YES	

lecturer	astronomy	astronomy			YES	
lecturer	computer	computer			YES	
lecturer	astronomy	astronomy			YES	
lecturer	astronomy	astronomy			YES	
lecturer	Atmospheric sciences	Atmospheric sciences			YES	
lecturer	computer	computer			YES	
lecturer	Civil engineering	Soil mechanics			YES	
lecturer	mathematics	Pure mathematics			YES	
Assistant lecturer	Physics	Remote sensing and image processing			YES	
Assistant lecturer	Physics	Remote sensing and image processing			YES	
Assistant lecturer	Physics	Remote sensing and image processing			YES	
Assistant lecturer	Physics	Remote sensing and image processing			YES	
Assistant lecturer	Physics	Remote sensing and image processing			YES	
Assistant lecturer	Physics	Remote sensing and image processing			YES	

Assistant lecturer	Physics	Remote sensing and image processing			YES	
Assistant lecturer	Physics	Thin film and image processing			YES	
Assistant lecturer	mathematics	mathematics			YES	
Assistant lecturer	chemistry	chemistry			YES	
Assistant lecturer	physics	physics			YES	
Assistant lecturer	geography	Urban and regional planning			YES	
Assistant lecturer	physics	Laser and optoelectronics			YES	
Assistant lecturer	astronomy	astronomy			YES	
Assistant lecturer	computer	computer			YES	
Assistant lecturer	computer	computer			YES	
Assistant lecturer	computer	computer			YES	
Assistant lecturer	computer	computer			YES	
Assistant lecturer	physics	materials			YES	
Assistant lecturer	Physics	Thin film and image processing			YES	
Assistant lecturer	geology	geophysics			YES	

Professional Development

Mentoring new faculty members

Mentoring New Faculty Members

The mentoring process for new, visiting, full-time, and part-time faculty members involves:

- **Orientation Sessions**: New faculty are introduced to the department, its culture, and resources.

- **Assigned Mentors**: Each new faculty member is paired with an experienced mentor who provides guidance on teaching practices, research opportunities, and departmental expectations.
- **Regular Check-ins**: Scheduled meetings between mentors and mentees to discuss progress, challenges, and professional development goals.
- **Feedback Mechanisms**: Opportunities for new faculty to receive constructive feedback on their teaching and research from peers and mentors.

Professional development of faculty members

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. Acceptance Criterion

(The acceptance criteria for enrollment in the college include:

- **Academic Qualifications**: Minimum GPA requirements or equivalent qualifications for prospective students.
- **Entrance Exams**: Performance on standardized entrance exams as determined by the college.
- **Central Admission Policies**: Adherence to university-wide admission regulations and criteria set by the Ministry of Education or relevant authorities.
- **Interview Process**: For certain programs, an interview may be conducted to assess the applicant's suitability.

13. The most important sources of information about the program

Key sources of information about the program include:

- **University Website**: Official details on program structure, courses, and faculty.
- **Program Handbook**: A comprehensive guide outlining curriculum, policies, and resources.
- **Advising Office**: Direct consultations with academic advisors for personalized information.
- **Alumni Networks**: Insights and experiences shared by former students regarding the program and career paths.

14. Program Development Plan

The academic and professional development plan includes:

- **Workshops and Seminars**: Regularly scheduled sessions on effective teaching strategies, assessment methods, and the integration of technology in the classroom.
- **Research Support**: Access to resources for research funding, collaboration opportunities, and publishing guidance.
- **Peer Review Opportunities**: Encouraging faculty to participate in peer evaluations to enhance teaching quality and share best practices.
- **Continuous Learning**: Support for faculty pursuing further education, certifications, or attending conferences to stay updated in their fields.
- .

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Third/first	RSGI301	Geographic information system−3	C	※	※	※	※	※	※	※	※	※	※	※	※
Third/first	EN303	English −3	O	※	※	※	※	※	※	※	※	※	※	※	※
Third/first	RSEP305	Environmental pollution air and water	C	※	※	※	※	※	※	※	※	※	※	※	※
Third/first	RSGP307	Geophysics	C	※	※	※	※	※	※	※	※	※	※	※	※
Third/first	RSMT309	mathmatics−5	O	※	※	※	※	※	※	※	※	※	※	※	※

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Third/first	**RSAP311**	**aerial photography and photogrammetry**	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Third/first	**RSRT313**	**Remote sensing in agriculture (soil and land cover)**	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Third/first	**RSRH315**	Remote sensing with thermal and microwave imaging	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Third/first	**RSDS302**	Remote sensing in human settlement analysis	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Third/second	**RSRA304**	Data structure and management in gis	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Third/second	**RSEP306**	Environmental pollution (air and groundwater)	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Third/second	**RSSA308**	**Spatial Analysis**	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Third/second	**RSHG310**	Hydrogeology	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Third/second	**RSRI312**	**Remote Sensing with Imaging Radar**	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Third/second	**RSGP314**	**Satellites & GPS**	C	※	※	※	※	※	※	※	※	※	※	※	※	※

Third/second	**RSIP316**	**Advanced Image Processing**	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Third/second	**RSSS318**	**Optional Subject**	O	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth/first	**RSNR401**	**Natural Resource**	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth/first	**RSOP403**	**Selective subject**	O	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth/first	**RSWF405**	**Mathematics of waves and fields**	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth/first	**RSEP407**	**Environmental pollution treatment**	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth/first	**RSRW409**	**Remote sensing in water resources**	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth/first	**RSLC411**	**Land cover planning**	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth/first	**EN413**	**English 4**	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth/first	**RSP415**	**Graduation Project**	C	※	※	※	※	※	※	※	※	※	※	※	※	※

Fourth /second	RSEA402	Environmental application in remote sensing and geographic information systems	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth /second	RSRG404	Remote sensing in geology	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth /second	RSLU406	Land use planning	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth /second	RSPL408	Environmental planning	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth /second	RSHC410	Hydrochemistry	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth /second	RSSF412	Sensors: concepts and applications	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth /second	RSST416	Remote sensing techniques	C	※	※	※	※	※	※	※	※	※	※	※	※	※
Fourth /second	RSP415	Graduation Project	C	※	※	※	※	※	※	※	※	※	※	※	※	※

Recommended Required Texts (if available)	• Remote Sensing and Image Interpretation" • Thomas M. Lillesand, Ralph W. Kiefer, Jonathan W. Chipman • Digital Image Processing for Remote Sensing" • Ioannis Kanellopoulos, George G. Wilkinson
Main References for Sources	• Remote Sensing of Environment • International Journal of Remote Sensing • IEEE Transactions on Geoscience and Remote Sensing
Supporting Books and References Recommended	Hyperspectral Remote Sensing: Principles and Applications" Microwave Remote Sensing: Active and Passive"
Recommended Required Texts (if available)	• NASA Earthdata: يوفر بيانات مجانية من الأقمار الصناعية مثل Landsat و MODIS. • USGS Earth Explorer: مصدر للحصول على بيانات وصور من الأقمار الصناعية.

(3rd stage/first course)

1. Course Name:	
Environmental pollution	
2. Course Code:	
RSEP305	
3. Semester / Year:	
Semester	
4. Description Preparation Date:	
1/10/2024	
5. Available Attendance Forms:	
Weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30/2units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Khalid Hussein Abbas	
8. Course Objectives	
Course Objectives	**The student's awareness of the importance of environmental planning variables and the importance of their use, in addition to the applied fields in which this field falls.** **Make the student able to be a researcher in the field of environmental planning and employ that in his field of specialization** **Make the student able to employ remote sensitivity variables and how to use the results obtained from the laboratory in measurement.**
9. Teaching and Learning Strategies	
Strategy	Achieve a deep understanding of the basic concepts of remote sensing applications in the field of pollution, including understanding the principles of remote sensing and the techniques used in remote data collection. - Acquiring remote image processing and expanded analysis skills to interpr data extracted from satellite images. - Following up on modern technologies and developments in the field of remote sensing to detect the concentration of pollutants and being able to integrate them into specialized research. - Enabling students to conduct independent research and produce scientific works on topics related to remote sensing.

	- Skills in graphical analysis of data recorded from satellites and how to extrac relevant information - Providing students with research skills through preparing scientific reports ar using scientific sources - Presenting the scientific problem and asking to think about solving it - Stimulating critical thinking and developing scientific thinking among studer - Improving oral and written communication skills

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
	٢	General Introduction	Modeling of Environmental Pollutio	Show slides through the screen 2- Use the whiteboard 3- Participate through dialog	Written exams and homework
	٢	statistical modeling: Mass balar Calibration and verification of models		Show slides through the screen 2- Use the whiteboard 3- Participate through dialogue	Written exam and homewor
	٢	Exam	Introduction to Modelir	Show slides through the screen 2- Use the whiteboard 3- Participate through dialogue	Written exam and homewor
	٢	Transport phenomena,		Show slides through the screen 2- Use the whiteboard 3- Participate through dialogue	Written exam and homewor
	٢	Reaction Order Relation to Rate Law, law of mass action	Modeling Concepts	Show slides through the screen 2- Use the whiteboard 3- Participate through dialogue	Written exam and homewor
	٢	Environmental Pollution AIR POLLUTION	Air quality	Show slides through the screen	Written exam and homewor

				2- Use the whiteboard 3- Participate through dialogue	
	٢	Exam			Written Exa
	٢	Dissolved Oxygen, Lakes according to water chemistry, dissolved nitrogen gas	Water quality modellin	Show slides through the screen 2- Use the whiteboard 3- Participate through dialogue	Written exam and homewor
	٢	dissolved phosphorus, Suspende Solids, Metals, Nutrient Modell	Water quality modellin	Show slides through the screen 2- Use the whiteboard 3- Participate through dialogue	Written exam and homewor
١٠	٢	Exam		Show slides through the screen 2- Use the whiteboard 3- Participate through dialogue	Written exam and homewor
١١	٢	Air quality laws, standards, Ind air quality (IAQ), Air Quality Models, Air quality models Sources	Air quality	Show slides through the screen 2- Use the whiteboard 3- Participate through dialogue	Written exam and homewor
١٢	٢	Earth moisture, surface water biophysical traits, monitoring th surface water		Show slides through the screen 2- Use the whiteboard 3- Participate through dialogue	Written exam and homewor
١٣	٢	Exam	Remote sensing of wate	Show slides through the screen 2- Use the whiteboard 3- Participate through dialogue	Written exam and homewor
١٤	٢	Secchi disk, suspended minerals,chlorophyll,		Show slides through the screen 2- Use the whiteboard 3- Participate through dialogue	Written exam and homewor

١٥	٢	Water pollution scources, factor effects on water quality potentia model output	Spectral response of wa		Written exan

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 any)	١-Environmental Science – Astudy of Inter relationships, E. D. Enger, B. E .Smith 5th ed, WCB publication Thomas M. Lilesand, Ralph W. Kiefer an Tonathan W. chipman,"Remote sensing and Image interpretation", 7th edition,2015. 1. Emilio chuvieco and Alfredo huete," Fundamentals of satellite remote sensing", 1st edition,2015. Published papers.
Main references (sources)	Approval of a lieutenant prepared by the teacher
Recommended books and references (scientific journals, reports…)	All research published on Scopus and accredited journals
Electronic References, Websites	Earthdata.nasa.gov Appliedsciences.nasa.gov Usgs.gov

1. Course Name: **Remote Sensing In Human Settlement Analysis**

2. Course Code: **RSRH315**

3. Semester / Year: First /2023-2024

4. Description Preparation Date: 1/10/2024

5. Available Attendance Forms: Attendance /mandatory

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

60 hours /2: units

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

Name: Dr.Sundus A.Abdullah Albakry
Email: sundus.abdullah@sc.uobaghdad.edu.iq

Course Objectives .٨

Course Objectives	Developing the student's scientific and applied skills in the following areas: ● The student's awareness of the importance of settlement science variables and the importance of their use, in addition to the applied fields in which this field falls. ● Make the student able to be a researcher in the field of remote sensing in settlements and employ that in his field of specialization ● Making the student able to employ remote sensitivity variables and how to use the results obtained from the laboratory in measurement.

Teaching and Learning Strategies .٩

Strategy	A graduate of remote sensing sciences has the ability to think critically on his own, solve problems, manage resources and time, describe the general remote sensing specialty and its concepts in a scientific way, and make appropriate changes for that. A2- The ability to perform scientific analysis and scientific thinking by applying laws in science and mathematics and adhering to guidelines and instructions for any activity in the organizational and administrative framework in implementing a project or confronting a scientific problem, solving and evaluating it, submitting a proposal or plan, reformulating it, translating it, or interpreting it. A4- He must be familiar with international remote sensing standards, estimate market needs, apply quality management concepts in scientific and analytical work, and acquire skills in information technology.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1		Definition Basic of human settlements and with explain the urban planning and indicate the important elements of RS with the fields of land sat	1.Introduction to Human settlement 1-1Urban planning 1-2 Elements of remote sensing 1-3 Fields of land sat حيث يشمل الاسبوع الاول ومرفق مع فايل ببالون الأحمر	Power point, Presentation screen Google classroom	Quizzes Oral and writ exam w monthly exar Homework
2	2	The types and components will explain and all the roles that depend it List the land models with the l use classificat estimating.	**2-Components of remote sensing** **2-1Land us models** **-The concentric models include the following:** **- -Zone in Transiting** **-Working Class Zone** **- Middle Class Zone** **- Commuter Zone-** **2-2 Theory sectors** **-Classification of land use**	Power point, Presentation screen Google classroom	Quizzes and C and written ex with mont exam Homework
3	2	Physical properties of the electromagnetic and spectrum will be explain The bands that witch adopted in the remote sensing will be describe with details	3-Characteristic of electromagnetic radiation **3-1** Interactions between Matter and Electro-magnetic Radiation **3-2** Wavelength Regions of Electro-magnetic Radiation 3-3 Types of Remote Sensing with Respect to Wavelength Region	Power point, Presentation screen Google classroom	Quizzes and C and written ex with mont exam Homework

		Tables of w lengths classificat will be listed	3-4 Definition of Radiometry		
4	2	Basic definition of Information extraction for the phenomena that will be study by remote sensing techniques . Classification of image processing will be explain. Interpretation Elements The following eight elements are mostl Types of corrections will be listed with examples	4-Information extraction Classification techniques 4-1 -Image reading 4-2 Image measurement 4-3 Image analysis 5- Interpretation Elements y -Geometric Distortions of Image	Power point, Presentation screen Google classroom	Quizzes and C and written ex with mont exam Homework
5	2	This chapter will list the method tha adopted classification human settlements	6-Statistics and Human settlement 6-1 methods and improvements	Power point, Presentation screen Google classroom	Quizzes and C and written ex with mont exam Homework
6	2	In this chapter will be study :The most commonly criteria for the spatial delimitation of settlements can be grouped into three broad categories. Then can be endicate that Remote sensing technology and information extraction techniques have improved steadily in the most recent years	7-Human settlements using Earth Observation **8** Mapping and measuring human settlements from remote **sensing** 9- Remote sensing applications in human settlements	Power point, Presentation screen Google classroom	Quizzes and C and written ex with mont exam Homework

7	2	The details to shown on a regio land use also dep upon whether, it based on field sur or compiled fr other second sources or based interpretation Satellite images aerial photograp While using Rem Sensing Technic image interpretat offers the possibi of extract information with actually going to field	10-Classification of settlements Rural and urban 10-1 Classification of Land use (Regional)	Tv (52 inch Google classroom youtube	Quizzes and C and written ex with mont exam Homework
8	2	Rural settlements are most closely and directly related to land. They are dominated by primary activities such as agriculture, animal, fishing etc. The settlements size is relatively small. Some factors affecting	11-CLASSIFICATION OF SETTLEMENTS RURAL URBAN DICHOTOM 11-1 Types and pattern of settlements 1-1- Compact human settlements 1-2- Dispersed Settlements	Power point, Presentation screen Google classroom	Quizzes and C and written ex with mont exam Homework
9	2	Rural settlements the develop countries are large number and poo equipped w infrastructure. Th represent a gr challenge opportunity planners. Supply water to ru settlements developing count is not adequa People in villag	12-Problem of ru settlements	Tv (52 inch Google classroom youtube	Quizzes and C and written ex with mont exam Homework

		particularly mountainous and a areas have to w long distances to fe drinking water. Wa borne diseases such cholera and jaund tend to be a comm problem. countries of So Asia face conditi of droug			
10	2	The definition urban areas va from one country another. Some of common basis classification are s of populati occupational struct and administrative	13-Planning of Urban settlements 13-1- Population Size 13-2- Occupational Structure 13-3-- Location	Power point, Presentation screen Google classroom	Quizzes and C and written ex with mont exam Homework
11	2	The earliest towns were centres of administration, trade, industry, defence and religious importance. The significance of defence and religion as differentiating functions has declined in general, but other functions have entered the list. Today, several new functions, such as,	14-Functions of Urban cent	Tv (52 inch Google classroom youtube	Quizzes and C and written ex with mont exam Homework
12	2	A mega city megalopolis is general term for ci together with th suburbs with population of m than 10 mill	15- Human settlements developing countries	Power point, Presentation screen Google classroom	Quizzes and C and written ex with mont exam Homework

		people. New Y was the first to att the status of a m city by 1950 witl total population about 12.5 million			
13	2	The settlements developing countr suffer from vari problems, such unsustainable concentration population, conges housing and stre lack of drinking wa facilities.	16-Problem of url settlements with econor problems	Tv (52 inch Google classroom youtube	Quizzes and C and written ex with mont exam Homework
14	2	In this lecture reports of stude will be presented discus problems	17- Discussion the reports students	Tv (52 inch Google classroom youtube	Quizzes and C and written ex with mont exam Homework
15		In this chapter thee growth cities will explaining with details f models Urban environmer will be adopted presented	4.5 Urban growth process of cities 4.6 Urban environmental and social stress 4.7 Urban microclimates; modification and management 4.8 Urban Growth projections ; Smart cities design **UNIT-6** **6-1 Practical Applications of GIS in Urban planning** **6-2 Analysis socials economics and environmental data evaluation** **6-3 Updating syllabus :** **;Environmental impacts of climate change** **Environmental impacts of climate change: Water** •	Power point, Presentation screen Google classroom	Final exam

			Environmental impacts of climate change: Carbon •		

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)	**Human Settlements in the Arctic. An Account of the ECE Symposium on Human Settlements Planning and Development in the Arctic,** By: Joseph Awange, John Kiema, Pergamon Press, 1st ed., 1980 Free downloaded from the site: https://b-ok.asia Human settlement(book). 2003.vol2
Main references (sources)	All lectures
Recommended books and references (scientific journals, reports…)	Urban planning with geographic information system 2015, third edition ALL journals that interest with the remote sensing techniques in human settl ements , Remote sensing journals
Electronic References, Websites	all new bulletins and programs are published through approved websites.

1. Course Name: **Aerial Photography and Photogrammetry**

2.Course Code: **RSAP311**

3 .Semester / Year: 1st Semester / 3rd year

4.Description Preparation Date: 10-10-2024

5.Available Attendance Forms:

Weekly Attendance in the classroom

6.Number of Credit Hours (Total) / Number of Units (Total) 60 / 45

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

Name: Faisel Ghazi Mohammed
Email: faisel.mohammed@sc.uobaghdad.edu.iq

8.Course Objectives

- Learn about aerial photography and aerial photography equipment and plan aerial photography flight missions
- Extract required data (areas, heights, dimensions and many other standard data) from aerial photography using field devices such as aerial photo 3D mirrors
- Design and implement mapping projects
- Know the basic theories of aerial photography and common applications of remote sensing using vertical aerial photography.
- • After completing the designed laboratory exercises, students will acquire skills in processing aerial images, extracting 3D information, producing skeletal images, and creating digital terrain using current photogrammetry techniques.

9.Teaching and Learning Strategies

Teaching and learning strategies include lectures, discussions, hands-on activities, group work, case studies, multimedia resources, technology integration, formative assessments, personalized learning, reflection, experiential learning, scaffolding, feedback and assessment, active learning, and differentiated instruction. These strategies aim to engage students, promote critical thinking, and enhance understanding and skills acquisition.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Write precise definitions to differentiate clearly among the following terms: remote sensing, photogrammetry, and photo interpretation.		Common learning methods include active	Common evaluation methods include

		Fully define the following terms: electromagnetic spectrum, atmospheric window, f-stop, film exposure, depth of field, and fiducial marks. Draw a diagram and write a paragraph to explain fully reflectance, transmittance, absorption, and refraction of light. List the wavelengths (bands) that can be detected by the human eye, film, and terrestrial digital cameras (both visible and photographic infrared bands). Draw complete diagrams of the energy-flow profile (a) from the sun to the sensor located in an aircraft or spacecraft and (b) within the camera. Draw a diagram of a simple frame camera (film or digital), showing the lens shutter, aperture, focal length, and the image captured. Given the first and subsequent photographs taken by a typical, large-format, aerial film camera in the Un States, thoroughly explain meaning of the informa printed on the top of n photographs.	**Introduction to GEOMETRY AND PHOTO MEASUREMENTS** 1.1 THE IMAGING PROCESS 1.2 Components of a Simple Film Camera 1.2.1 Exposing the Film 1.2.2 Depth of Field 1.3 Types of Cameras 1.3.1 Film Cameras 1.3.2 Digital Cameras 1.3.3 Resolution	learning (engaging students in discussions and practical activities), cooperative learning (promoting collaboration among students), problem-based learning (solving real-world problems), project-based learning (applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	tests/exams (written or oral assessments), assignments/projects, presentations/demonstrations, performance assessments, portfolios (collection of work samples), observations, and self-assessment/reflection. These methods are used to measure student progress and assess understanding, skills, and application of knowledge.
2	2	Identify different types of aerial photographs—whether they are vertical, high, or low oblique, or horizontal—and sketch the shapes of the ground area covered by each type. Give precise definitions for camera focal length and angle of coverage and classify narrow-, normal-, wide-, and super-wide-angle lenses according to focal length and angle of coverage. Identify on an aerial photograph or sketch the fiducial marks,	**Geometry of a Vertical Aerial Photograph** 2.1 CLASSIFICATION OF PHOTOGRAPHS 2.1.1 Advantages of Vertical as Compared 2.1.2 Advantages of Oblique as Compared 2.2 FOCAL LENGTH AND ANGLE OF COVERAGE 2.3 The Coordinate Axes 2.4 THE THREE PHOTO CENTERS 2.4.1 Principal Point 2.4.2 Nadir 2.4.3 Isocenter		

		coordinate axes, and the three different photo centers on an "unintentionally tilted" vertical aerial photograph. State the difference betw photo distortion and pl displacement.			
3	2	List the type of distortion or displacement that radiates from the three photo centers and know how to remove or avoid them. List four other types of distortion or displacement. Define rationed and rectified prints and explain how each is obtained. Compute the unknown variable given the equation for image displacement due to relief and any four of the five variables involved. State five inferences that ca made from the im displacement equation topography and solve probl based on these inferences.	**<u>Geometry of a Vertical Aerial Photograph</u>** 2.5 Distorsion and Displacement 2.5.1 Lens Distorsion 2.5.2 Tilt Displacement 2.5.3 Topographic Displacement 2.6 NUMERICAL EXAMPLES 2.7 Inferences Based on the R Displacement equation		
4	2	Define stereoscopy, stereoscopic pair, stereogram, stereoscope, and absolute parallax of a point. List four types of stereosco and state the primary advant of each.	**<u>Principles of Stereoscopic Vision</u>** 3.1 Definitions 3.1.1 Stereoscopy 3.1.2 Stereoscopic Pair of Photographs 3.1.3 Stereogram 3.1.4 Stereoscope		
5	2	Explain how the x and y axes are defined on a stereoscopic pair of aerial photographs, as compared to a single photo. Determine the absolute parallax of a single point on a stereopair.	**<u>Principles of Stereoscopic Vision</u>** 3.2 Geometry of Stereoscopy 3.2.2 Absolute Parallax 3.2.3 Flight-Line Location 3.3 Theory of Stereoscopy 3.3.2 Depth Perception 3.3.3 The Floating-Dot Princip		
6	2	Revision	Revision		
7	2	1st exam	1st exam		
8	2	Explain why two eyes are needed to see depth on a stereopair. Define vertical exaggeration and state two ways of increasing or decreasing the exaggeration.	**<u>Principles of Stereoscopic Vision</u>** 3.3.4 Vertical Exaggeration 3.3.5 The Pseudoscopic Stereo Model 3.4 PROPER ORIENTATION A STEREO MODEL		

		Calculate the ver exaggeration of a spe stereoscopic pair of a photos given the pr equation and the neces data.			
9	2	Define photographic scale and list the three most common methods of expressing it. Convert between these three methods. Define average scale and point scale. List the two primary causes of variation in photo scale within a single photograph. List two general equations that can be used to calculate photo scale. Compute the average scale of a single photo or photo project, given the focal length and the flying height above the average elevation of the ground. Compute the average photo scale between two points, given the photo distance PD and the corresponding ground or map distance MD (and map scale MS) between the same two points.	**Scale of a Vertical Aerial Photograph** 4.2 The Theory of Scale 4.1 SCALE CLASSIFICATION 4.2.1 Representative Fraction 4.2.2 Photo Scale Reciprocal 4.2.3 Equivalent Scale 4.3 TYPES OF SCALE 4.3.1 Average Scale 4.3.2 Point Scale 4.4 VARIATION IN SCALE 4.5 BASIC SCALE EQUATIONS		
10	2	Revision 2nd exam	Revision 2nd exam		
11	2	Compute the photo scale at a point, given the focal length and the flying height above the point. Compute the flying height above mean sea level, given a point photo scale, the focal length of the camera lens, and the ground elevation above mean sea level at the point of known scale. Compute the scale at a point, given the focal length, the scale	**Scale of a Vertical Aerial Photograph** 4.6 PHOTO SCALE DETERMINATION Example 1 Example 2 Example 3 Example 4 Example 5 Example 6 Example 7 4.6.1 Assumptions		

		at another point, and the elevations of both points			
12	2	Determine ground distances between two points on an aerial photo of known scale, using either an engineer's scale or the multiple scale template. Define bearing and azimuth and be able to convert from one to the other. Establish a photo baseline, for the purpose of determining a bearing, using (a) land ownership lines on the photo, (b) a compass line established in the field, and (c) an existing map of the same area and (d) GPS. List five methods of area determination for irregularly shaped areas on an aerial photograph or map and describe how each works. Measure and compute acreage on the ground of area imaged on an aerial ph or a map knowing the scal that area on the photograp map.	**Horizontal Measurements - Distance, Bearings, and Areas** 5.1 Ground Distance 5.2 Horizontal Angles 5.2.2 Azimuths 5.2.3 Back Angles 5.2.4 Measuring Angles Effects of Tilt and Topographic Displacement on Bearings 5.3 Area Measurements 5.3.1 Planimeter 5.3.2 Electronic Digitizer 5.3.3 Weight Apportionmer		
13	2	Draw a diagram illustrating the effects of ground slope, tree lean, tree crown shape, and the presence of snow or brush on height measurements using the sun-angle shadow method of determining tree heights. Calculate the height of an object using the proportional shadow-length method and state the conditions under which this method gives accurate results. Identify each of the terms in all three of the parallax height equations given for stereoscopic pairs of photographs and state the conditions under which each of the equations is valid. Make the required measurements of P, Pb, and dP on a stereoscopic pair of aerial photographs and calculate the	**VERTICAL MEASUREMENTS** 6.1 MEASURING HEIGHTS ON SINGLE AERIAL PHOTOS 6.1.1 The Topographic Displacement Method 6.1.2 The Shadow Methods 6.2 Measuring Heights by Parallax Differences 109 6.2.1 The Parallax Height Equations 6.2.2 Units of Measure		

		height of an object using any of the parallax height equations. Calculate the percent error caused by using the short-cut height equation. Show on a sketch the absc parallax of a point and differe in absolute parallax betw two points on a stereosc pair of overlapp photographs.			
14	2	1. The ability to know and calculate the necessary elements to design aerial photography flights to obtain the appropriate aerial photographs. 2. Count number of steps in aerial photography flights 3. Calculate number of airlines 4. Calculate number of imaging stations for each flight line 5. Draw and design a flight map Prepare detailed topographic maps of an using aerial photographs.	**Aerial Photography Flight Planning** • Arial photography approach • Basic elements in flight planning • Aerial photography flight planning steps 1- Gathering information about the area to be photographed 2- Determining the average scale of the image 3- Camera device choosing 4- Determining the flying high above the sea level Determining the direction of f line		
15	2	The ability to know: • Photo Interpretation: The examination of aerial photographs/images for the purpose of identifying objects and judging their significance. Observation & Infere Observation provides the data for interpretation. Infere is the logical process by w observation and interpreta are made.	**Elements of Arial Image Interpretation** **1.** x,y location **2.** Size **3.** Shape **4.** Shadow **5.** Tone/color **6.** Texture **7.** **Pattern** **8.** **Height/Depth**		

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student as in the following:-
daily preparation :- 5 %
daily oral :- 5%
monthly exams :- 10%
reports : 5%
Laboratory : 15 %
Final Exam : 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	***AERIAL PHOTOGRAPHY AND IMAGE INTERPRETATION "David P. Paine and Jar D. Kiser , 3rd ed. Copyright © 2012 John Wiley & Sons, Inc***
Main references (sources)	***Elements of Photogrammetry: with Applications in GIS*** , Paul R. Wolf, Bon A. Dewitt, @ McGraw-Hill Professional, 4th ed , 2014.. ***Photogrammetric Computer Vision: Statistics, Geometry, Orientation & Reconstruction,*** Wolfgang Förstner , Bernhard P. Wrobel ,@ Springer Internatic Publishing Switzerland 2016.
Recommended books and references (scientific journals, reports…)	• **"Digital Photogrammetry" by Wolfgang Förstner and Bernhard Wrobel:** While technically not a beginner book in the strictest sense, it provides a good foundation and is more accessible than some highly specialized texts. It covers fundamental concepts clearly. • **Books on GIS and Remote Sensing:** Many introductory GIS and remote sensing textbooks include chapters on photogrammetry and aerial photography. Look for those with strong visual components and practical exercises. Search for titles including "Introduction to GIS," "Remote Sensing and Image Interpretation," or similar keywords. The specific authors and editions will vary depending on current publications. • **Textbooks on Computer Vision:** Advanced topics in photogrammetry often overlap significantly with computer vision. Look for advanced textbooks in computer vision that cover topics like 3D reconstruction, camera calibration, and bundle adjustment. • **Conference Proceedings:** Conferences like the ISPRS (International Society for Photogrammetry and Remote Sensing) conferences publish proceedings with the latest research and advancements. • **Research Papers:** Search academic databases like IEEE Xplore, ScienceDirect, and Web of Science using relevant keywords. Focus on papers published in high-impact journals.
Electronic References, Websites	**1. Software Vendor Websites:** • **Agisoft Metashape:** Agisoft's website offers tutorials, documentation, and examples related to their popular photogrammetry software. This is an excellent resource for learning practical workflows. • **Pix4D:** Similar to Agisoft, Pix4D provides extensive documentation, tutorials, and case studies on their software. • **RealityCapture:** Another major player in the photogrammetry software market, RealityCapture also offers online resources for users. • **Other Software Providers:** Many other companies offer specialized photogrammetry software. Check their websites for tutorials and documentation. **2. University and Research Institution Websites:** • Many universities with strong remote sensing or geomatics programs have online resources, including lecture notes, research publications, and datasets. Searching for "[University Name] remote sensing" or "[University Name] photogrammetry" will often yield relevant results.

	• Look for websites of research groups specializing in photogrammetry and related fields. These often contain publications and data. **3. Government Agencies:** • Agencies like the USGS (United States Geological Survey) and equivalent organizations in other countries often provide aerial imagery and related data, along with documentation on their acquisition and processing methods. **4. Open-Source Projects and Communities:** • There are open-source photogrammetry projects and online communities (e.g., forums, discussion groups) dedicated to photogrammetry. These can be valuable sources of information and support, but always critically evaluate the information you find. **5. Online Courses and Tutorials:** • Platforms like Coursera, edX, and Udemy offer courses on photogrammetry and related topics. The quality of these courses can vary, so check reviews before enrolling. • YouTube channels dedicated to photogrammetry and drone mapping often provide helpful tutorials and demonstrations. Again, critically evaluate the source's credibility. **6. Academic Databases:** • While not strictly websites, academic databases like Google Scholar, IEEE Xplore, ScienceDirect, and Web of Science are essential for finding research papers and conference proceedings on photogrammetry. These are crucial for staying up-to-date with the latest advancements.

Course Description Form

1.course name
Geographic information system −3
2.Course code :
RSGI301
3. Semester / Year:
First semester 2024−2025
4.Description Preparation Date:
1/10/2024
13.نموذج Available Attendance Forms:

Attendance

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

60 hours/3

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

Name: Ebtesam F. khanjer

Email: Ebtesam.khanjer@sc.uobaghdad.edu.iq

8.Course Objectives

Course Objectives	• **Preparing specialized graduates in remote sensing to contribute to the development of the country.** • **Meeting the needs of state sectors with highly qualified personnel.** • **Encouraging outstanding individuals to work in the department.** • **Promoting research programs and participation in scientific conferences and seminars.** • **Achieving quality and academic accreditation.**

9.Teaching and Learning Strategies

Strategy	• **Managing lectures in a way that emphasizes the importance of time.** • **Assigning students some group tasks.** • **Utilizing websites and virtual classrooms.**

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	1) The ability to perform scientific analysis and scientific thinking by applying laws in science and mathematics and adhering to guidelines and instructions for any - Effectiveness in the organizational and administrative framework in implementing a project or confronting a scientific problem, solving and evaluating it, and presenting a proposal or plan or reformulating it.	About GIS components of a GIS	lectures	General questions and discussions

		Or translate or interpret it. 2) To be familiar with international remote sensing standards, estimate market needs, apply quality management concepts in scientific and analytical work, and acquire skills in information technology. 3) Analyzing scientific problems, arriving at a solution, and being able to propose appropriate alternatives, conduct constructive scientific discussions, and express opinions			
2	2	=	**Geospatial data**	lectures	General questions and discussions
3	2	=	**Attribute Data Management**	lectures	General questions and discussions
4	2	=	Aplications GIS1	lectures	General questions and discussions
5	2	=	Aplications GIS2		
6	2	=	Datum accuracy	lectures	General questions and discussions
7	2	مراجعة	مراجعة		
8	2	امتحان	امتحان اول	lectures	General questions and discussions
9	2		Types of projections used in GIS	Lectures	General questions discussions

10	2	=	Mericoter projection system network	lectures	General questions and discussions
11	2	=	Topology, integrated geocoding, and references	lectures	General questions discussions
12	2	=	**A triangulated irregular network (TIN),** Remotely sensed satellite	lectures	General questions and discussions

(3rd stage /second course)

1.Course Name:
Thermal & Microwave Sensing
2.Course Code:
RSRT313
3.Semester / Year:
1st / 2024
4.Description Preparation Date: 1-10-2024
• The course reviews the most important techniques Thermal & Microwave Sensing. • Describe the Thermal & Microwave Spectrums. • Describe the devices of Thermal & Microwave Spectrums. • Connect these spectrum with the operational Satellites.
5.Available Attendance Forms:
Attendance in the classroom
6.Number of Credit Hours (Total) / Number of Units (Total)
30/2
7.Course administrator's name (mention all, if more than one name)

Name: Dr. Mohammed Ismail Abd-Almajied
Email: Mohammed.ismael@sc.uobaghdad.edu.iq

8.Course Objectives

Developing the student's scientific and applied skills in the following areas:

- Identifying Thermal & Microwave Spectrums
- Show and learn the devices
- Study the operational Satellite.

9.Teaching and Learning Strategies

Teaching and learning strategies include lectures, discussions, hands-on activities, group work, case studies, multimedia resources, technology integration, formative assessments, personalized learning, reflection, experiential learning, scaffolding, feedback and assessment, active learning, and differentiated instruction. These strategies aim to engage students, promote critical thinking, and enhance understanding and skills acquisition.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Physical Basis of Thermal Radiation	Common learning methods include active learning (engaging students in discussions and practical activities), cooperative learning (promoting collaboration among students), problem-based learning (solving real-world problems), project-based learning (applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	Common evaluation methods include tests/exams (written or oral assessments), assignments/ projects, presentations /demonstrations, performance assessments, portfolios (collection of work samples), observations, and self-assessment/reflection. These methods are used to measure student progress and
2	2		Radiation and Heat Transfer in the Atmosphere		
3	2		Radiation and Heat Transfer in the Atmosphere, Thermo Point Devices		
4	2		Thermal Imaging		
5	2		Study of Thermal Operational Satellites		
6	2		Microwave Spectrum		
7	2		Radar Basic		
8	2		Radar Polarimetry		
9	2		Radar Geometry & Spatial Resolution		
10	2		Radar Imagery		
11	2		Advance Applications of Radar Sensing		
12	2		Radar Data Calibration		
13	2		Air Borne And Space Borne Radars		
14	2		Study of Radar Operational Satellites		

15	2		Application Project		assess understanding, skills, and application of knowledge.

11.Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student as in the following:- daily preparation :- 5 % dailyoral :- 5% monthly exams :- 10% reports : 5% Laboratory : 15 % Final Exam : 60	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if ar	Not
Main references (sources)	A lot...
Recommended books and references (scientific journals, reports…)	Lilesand, Remote Sensing & Ima Interpretation, last edition
Electronic References, Websites	A lot...

1.Course Name
Hydrogeology
2.Course Code:
RSHG310
3.Semester / Year:
2st / 2025
4.Description Preparation Date: 1/10/2024
This course covers the fundamentals of subsurface flow and transport, emphasizing the role of groundwater in the hydrologic cycle, the relation of groundwater flow to geologic structure, and the management of contaminated groundwater. Also, the course focuses on the experimental comprehensive to evaluate the groundwater aquifer properties and the different processes that control groundwater production. Besides, this course outlines the important application of remote sensing techniques in groundwater hydrology.
5.Available Attendance Forms:
Attendance in the classroom
6.Number of Credit Hours (Total) / Number of Units (Total)

30 six units

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

Name: Dr. Hind Fadhil Abdullah

Email: hind.abdullah1108@sc.uobaghdad.edu.iq

8.Course Objectives

• An understanding of hydrogeology, especially understanding the effect of geology on the distribution of groundwater.

• Understanding the water cycle in nature and the importance of groundwater as a major part of this cycle.

• Understanding the factors affecting groundwater, whether geological or environmental.

• Understanding how groundwater moves and the factors affecting groundwater recharge and drainage.

• Knowing the types of underground reservoirs and rock layers that carry and store groundwater and other Groundwater producers.

• Knowledge of the environmental, geological and climatic conditions that affect groundwater storage.

• Applying hydrogeological knowledge in managing water, maintaining it and preserving it from pollution.

• How to adopt remote sensing techniques to determine the locations of groundwater and monitor its pollution.

9.Teaching and Learning Strategies

Teaching and learning strategies include lectures, discussions, hands-on activities, group work, case studies, multimedia resources, technology integration, formative assessments, personalized learning, reflection, experiential learning, scaffolding, feedback and assessment, active learning, and differentiated instruction. These strategies aim to engage students, promote critical thinking, and enhance understanding and skills acquisition.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
	2	Learn the principals of hydrogeology	Introduction and concepts in hydrogeology	Common learning methods include active learning	Common evaluation methods include tests/exams (written or

	2	Learn and understand the Global water cycle	Introduction and concepts in hydrogeology	(engaging students in discussions and practical activities), cooperative learning (promoting collaboration among students), problem-based learning (solving real-world problems), project-based learning (applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	oral assessments), assignments/projects, presentations/demonstrations, performance assessments, portfolios (collection of work samples), observations, and self-assessment/reflection. These methods are used to measure student progress and assess understanding, skills, and application of knowledge.
	2	Learn and differentiate between hydrogeological terms	Introduction and concepts in hydrogeology		
	2	Learn and understand the hydrological budget	Hydrological budget		
	2	Calculating the groundwater storage	Hydrological budget		
	2	Learn, distinguish and compare the types of porosity	Properties of rock materials that store ground-water		
7	2	Understanding of permeability and its types	Properties of rock materials that store groundwater		
8	2	Exam			
9	2	Learn and understand the properties of water, viscosity and compressibility	Water and fluid properties		
10	2	Learn and understand the properties of water, density	Water and fluid properties		
11	2	Learn and understand Darcy's law	Movement of groundwater		
12	2	Learn and understand groundwater movement the flow network.	Movement of groundwater		
13	2	Calculating the discharge rate of groundwater movement determining the direction of movement	Movement of groundwater		
14	2	Learn the applications of remote sensing by determining the presence of	Applications of rer sensing in hydrogeology		

		groundwater and its impact on pollutants			
15	2	Exam			

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student as in the following:-
daily preparation : 5 %
daily oral : 10%
monthly exams : 20%
reports : 5%
Final Exam : 60

12.Learning and Teaching Resources

Required textbooks (curricular books any)	Groundwater Hydrology, 3rd Edition, David Keith Todd, Larry W. Mays
Main references (sources)	-Groundwater Hydrology, 3rd Edition, David Keith Todd, Larry W.Mays -Montgomery, C., W., 2006; Environmental Geology. McGraw Hill, -Companies Inc., Boston, 7th ed., 346 P. -Fitts, C.R. (2002). Groundwater Science, 2nd Edition. U.S. Environmental Protection Agency | US EPA Ground Water_GIP (usgs.gov)
Recommended books and references (scientific journals, reports…)	All research published in Scopus and approved journals within a specialty in Hydrogeology and remote sensing applications in hydrogeology and geological journals Related to remote sensing, discreet geographic information systems, and reports published by Authority The Iraqi National Groundwater Office and the I Geological Survey.
Electronic References, Websites	U.S. Environmental Protection Agency | US EPA Ground Water_GIP (usgs.gov)

Research methodology

1.Course Name: **Research methodology**	
2.Course Code:	
RSRM307	
3.Semester / Year:3RD STAGE/2ND COURSE	
4.Description Preparation Date:1/10/2024	
5.Available Attendance Forms: WEEKLY	
6.Number of Credit Hours (Total) / Number of Units (Total)	
15/1 unit	
7.Course administrator's name (mention all, if more than one name)	
Name: Zehraa najim abdul-ameer Email: zehraa.najim@sc.uobaghdad.edu.iq	
8.Course Objectives	
Course Objectives	**The ability to scientific analysis and scientifi thinking through the application of laws in science and mathematics and adherence to t guidelines and instructions for any effectiveness in the organizational and administrative framework in implementing a project or facing a scientific problem, solvin and evaluating it, submitting a proposal or plan, reformulating, translating or interpretin it.**
9.Teaching and Learning Strategies	
Strategy	1-Analyzing scientific problems and reaching their solution and t ability to propose appropriate alternatives.

	2- - Scientific investigation and evaluation. 3- – Constructive scientific discussions and expressing an opinion.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	A review of the Fundamentals Definitions of Research Objectives of Research Motivation in Research General Characteristics of Research Types of Research	**Research Methodology**:	Common learning methods include active learning (engaging students in discussions and practical activities), cooperative learning (promoting collaboration among students), problem-based learning (solving real-world problems), project-based learning (applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	Oral or written exam
2	1	What is a Research Problem Selecting the Problem Sources of the Problem Statement of a Problem Evaluation of a Problem	**The Research Problem**	applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	Oral or written exam
3	1	Meaning of Review of Literature Objectives of Review of Literature Sources of Literature Reporting the Review of Literature	**The Review of Literature**	applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking	Oral or written exam

				initiative in learning independently).	
4	**1**	**revision**	**revision**		**Oral or written exam**
5	**1**	exam	exam		**exam**
6	**1**	The Qualitative Approach The Quantitative Approach The Mixed-Methods Approach Criteria for Selecting a Research Approach	**The Research Approach**	applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	**Oral or written exam**
7		(a) Questionnaires (b) Interviews (c) Focus Groups (d) Observation	**Data Collection Methods**	applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	Oral or written exam
8		Meaning and Definition of Sampling	**Sampling**	applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	Oral or written exam
9		Functions of Population and Sampling	**Methods of sampling**	applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	Oral or written exam
10		Characteristics of a Good Research Title Structure of research paper: Abstract,Introductions Review of the literature	**Good research**	applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking	Oral or written exam

				initiative in learning independently).	
11		Methodology,Result & Discussions ,	**results**	applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	Oral or written exam
12		Conclusions	**conclusions**	applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	Oral or written exam
13		References	**Preparation of the Research**	applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	Oral or written exam
14		exam	xam		Oral or written exam
15		revision	revisio	**Oral or written exa**	Oral or written exa

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)	Research methods the bas book(Nicolas Walliams,2010)
Main references (sources)	Accreditation of lieutenants prepare by the teacher
Recommended books and references (scientific journals, reports…)	All research published on Scopus journals and accredited journals .

Electronic References, Websites	All new bulletins and prograi published through approved websit

spatial analysis

1.Course Name:
spatial analysis
2.Course Code:
RSSA308
3.Semester / Year: semester
2nd /2025
4.Description Preparation Date: 1-10-2024
• Spatial Analysis is a course that focuses on the principles and techniques of analyzing spatial data. The course covers the following topics: • Introduction to Spatial Analysis: Understanding the basic concepts of spatial analysis, including spatial data types, coordinate systems, and spatial relationships. • Spatial Data Acquisition and Management: Learning about the different methods of acquiring and managing spatial data, including remote sensing, GPS, and GIS. • Spatial Statistics: Understanding the principles of spatial statistics, including spatial autocorrelation, spatial interpolation, and spatial regression analysis. • Spatial Analysis Techniques: Learning about the different techniques of spatial analysis, including spatial clustering analysis, spatial pattern analysis, and spatial optimization. • Spatial Decision Support Systems: Understanding the principles of spatial decision support systems, including multi-criteria decision analysis, spatial decision trees, and spatially-explicit modeling. • Spatial Analysis Applications: Understanding the diverse applications of spatial analysis, including environmental modeling, urban planning, transportation analysis, and emergency management. • Spatial Analysis Software: Learning how to use GIS software packages, such as ArcGIS, QGIS, and GRASS GIS, to conduct spatial analysis and create maps. • Overall, a course in Spatial Analysis will provide students with a strong foundation in the principles and techniques of spatial analysis, enabling them to analyze and interpret spatial data, identify spatial patterns, and make informed decisions based on spatial information.
5.Available Attendance Forms:
Attendance in the classroom
6.Number of Credit Hours (Total) / Number of Units (Total)
30/2
7.Course administrator's name (mention all, if more than one name)
Name: Prof.Dr. Auday Hattem Shaban **Email: auday.h@sc.uobaghdad.edu.iq**
8.Course Objectives
Developing the student's scientific and applied skills in the following areas:

- Ability to collect, process, analyze, and interpret spatial data using remote sensing and GIS tools and techniques.
- Ability to design, develop, and manage spatial databases and GIS applications.
- Ability to apply remote sensing and GIS technologies to solve complex spatial problems in a range of fields, including environmental management, urban planning, natural resource management, and disaster response.

9.Teaching and Learning Strategies

Teaching and learning strategies include lectures, discussions, hands-on activities, group work, case studies, multimedia resources, technology integration, formative assessments, personalized learning, reflection, experiential learning, scaffolding, feedback and assessment, active learning, and differentiated instruction. These strategies aim to engage students, promote critical thinking, and enhance understanding and skills acquisition.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Significance of spatial analysis. Overview of tools for analysis	Introduction to Spatial analysis	Common learning methods include active learning (engaging students in discussions and practical activities), cooperative learning (promoting collaboration among students), problem-based learning (solving real-world problems), project-based learning (applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	Common evaluation methods include tests/exams (written or oral assessments), assignments/projects, presentations/demonstrations, performance assessments, portfolios (collection of work samples), observations, and self-assessment/reflection. These methods are used to measure student progress and assess understanding, skills, and application of knowledge.
2	2	Buffer by vector and pattern types	Buffering Vector Data		
3	2	Buffer by Raster and pattern types	Buffering Raster Data		
4	2	Concepts, evaluation of network complexity	Network analysis		
5	2	Methods for evaluating point patterns	Point pattern analysis		
6	2	Correlation techniques behavior	Auto Correlation		
7	2	Curvilinear Correlation	Correlation		
8	2	Role of spatial model	Spatial modeling		
9	2	The operations of cell-based analysis available in the ArcGIS	The types of operations in Spatial Analyst		
10	2	Overlay operations	Spatial analysis		

			Vector based		
11	2	Map algebra, grid based operations	Spatial analysis Raster based		
12	2	predicting the human and physical patterns and the connections of various locations	Topology & geometry		
13	2	Operation analysis for vector maps	vector analysis		
14	2	Operation analysis for Raster maps	Raster analysis		
15	2	Exam	Exam		

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student as in the following:-
daily preparation :- 5 %
daily oral :- 5%
monthly exams :- 25%
Quiz : 5%
Final Exam : 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if ar	1. Roy P. S (2000), Geographical Information Science, Vol. I, IIRS. 2. Demers M.N (2000), Fundamentals of Geographic Information Systems,Second Edition, John Wiley & Sons. 3. Burrough P. A. MacDonneli R. A. (2000), Principles of Geographical Information Systems, Oxford University Press. 4. Makrewski Jacek (1999), GIS and Mu criteria Analysis, USA
Main references (sources)	Lectures
Recommended books and references (scientific journals, reports…)	All papers that published in scientific journals
Electronic References, Websites	WEB ArcGIS WEB MATLAB

Remote sensing with imaging Radar

1.Course Name:
Remote sensing with imaging Radar
2.Course Code:
RSRI312
3.Semester / Year:
2nd semester/2024−2025
4.Description Preparation Date:
1/10/2024
5.Available Attendance Forms:
Attendance in the classroom
6.Number of Credit Hours (Total) / Number of Units (Total)
30/3
7.Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Ban A. ALrazaq Email: Ban.abbas@sc.uobaghdad.edu.iq

8.Course Objectives	
Course Objectives	Developing the student's scientific and applied skills in the following areas: • Identifying aerial photographs and aerial photography machines and planning aerial photography flight missions • Extracting the required data (areas, heights, dimensions, and many other standard data) from the aerial image using field devices such as 3D mirror devices for aerial images. • Design and implement mapping projects • Knowledge of the basic theories of aerial photography and common applications of remote sensing using vertical aerial photography. • After completing designed labora exercises, students will acquire skill processing aerial images, extracting information, producing orthophotos, creating digital terrain using cur photogrammetry techniques…..

9.Teaching and Learning Strategies	
Strategy	

	Teaching and learning strategies include lectures, discussions, hands-on activities, group work, case studies, multimedia resources, technology integration, formative assessments, personalized learning, reflection, experien learning, scaffolding, feedback and assessment, active learning, and differentiated instruction. These strategies aim to engage students, promote critical thinking, and enhance understanding and skills acquisition.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Imaging Radar system	Introduction, Description, Physical size,	Common learning methods include active learning (engaging students in discussions and practical activities), cooperative learning (promoting collaboration among students), problem-based learning (solving real-world problems), project-based learning (applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in	Common evaluation methods include tests/exams (written or oral assessments), assignments/projects, presentations/demonstrations, performance assessments, portfolios (collection of work samples), observations, and self-assessment/reflection. These methods are used to measure student progress and assess understanding, skills, and application of knowledge.
2	2	Radiation framework	EMR spectrum Solar radiation Radiation from the earth remote sensing using EMR		
3	2	Technology o of Radar imaging	Radar frequencies Doppler effect Basic principl radar		
4	2	Radar equa	Simple form of Radar equation Measurement of range, Power density from antenna		
5	2	Radar rece noise and	Thermal noise Cosmic and Background noise, Atmospheric absorption noi		
6	2	Correcting and Calibrating rad imagery	Geometric correction Radiometric correc		
7	2	The target	Tracking with Radar, Target reflection, Examples		
8	2	Scattering from earth surface features	Scattering definition, Types of Scattering		
9	2	Exam	Exam		
10	2	Target Characteristic, Angular accuracy	Amplitude fluctuation, Angle fluctuation, Low angle tracking		

1	2	Interferometric And Tomographic SAR	Introduction Biostatic SAR	learning independently).	
1	2	Radar image interpretation	Introduction Radar image properties		
1	2	Passive microwav imaging	Introduction Microwave radiatic		
1	2	Review	Review		
1	2	Exam	Exam		

11.

12.Learning and Teaching Resources	
Required textbooks (curricular books, if an	Microwave and radiowave radiation Edward2013
Main references (sources)	Journals
Recommended books and references (scientific journals, reports…)	Scientific journals
Electronic References, Websites	All websites such as IEEE

Remote sensing in Agriculture

1.Course Name:	
Remote sensing in Agriculture	
2.Course Code:	
RSRA304	
3.Semester / Year:	
2nd /third stage	
4.Description Preparation Date:	
1/10/2024	
5.Available Attendance Forms:	
Physical attendance	
6.Number of Credit Hours (Total) / Number of Units (Total)	
30/2	
7.Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Ahmed Asaad Zaeen Email: ahmed.asaad@sc.uobaghdad.edu.iq	
8.Course Objectives	
Course	1. Preparing graduates specialized in remote sensing to contribute to the development

Objectives	2. Meeting the country's winter needs with highly qualified personnel 3. Encouraging outstanding individuals to work in the department 4. Promoting research programs and assignments at scientific conferences and **5.** Achieving quality and academic accreditation

9.Teaching and Learning Strategies

Strategy	1. Managing the lecture in a way that emphasizes the importance o 2. Assigning students some group assignments 3. Websites and online classes

10.Course Structure

Weel	Hour	Required Learning Outcomes	Unit or subje name	Learning met	Evaluation m
1	2	• Student will learn some e definitions related to rem sensing principles. • Student will learn about types	**Introduction of sensing**	Lectures	General d and discu
2	2	• Student will learn energy that must be available to data reception process, a the interactions between energy and other environ factors. • Student will be in touch advantages and limitatio remote sensing.	**Energy Sources Interaction**	Lectures	General question discussion
3	2	• Student will learn some remote sensing paramete on which satellites are cl and distinguished from e other.	**Sensors Charac**	Lectures	General question discussion
4	2	• Students will learn remote sensing applicatio agricultural, forestry, geo and hydrological fields.	**Remote Sensing Applications**	Lectures	General question discussion
5	2	• Student will learn a precision agriculture term it is different from the conventional agriculture s	**Precision agricu**	Lectures	General question discussion

6	2	• Student will learn a some of the sensors used agricultural soil analysis, measuring soil salinity, sc acidity, and soil moisture.	**Remote sensing tests**	Lectures	General question discussion
7	2	• The purpose of the exam urge the student to review has been learned material avoid overloading, which difficult to review at the e semester.	**Exam 01**	Lectures	General question discussion
8	2	• Student will learn ab map concepts and the role remote sensing in their preparation. Student will well about GPS applicatio how they can be used in agricultural field operatio	**Remote sensing map, and GPS applications in**	Lectures	General question discussion
9	2	• Student will deal w evidence or indicators ext from the remote sensing c their role in describing the state of plants.	**Remote sensing plant-biomass t**	Lectures	General question discussion
10	2	• Students will deal v evidence or indicators ext from the remote sensing c their role in describing the condition of water bodies moisture in particular.	**Remote sensing water bodies**	Lectures	General question discussion
11	2	• Student will learn a uses of remote sensing tec in detecting plant diseases assessing the area of the a area.	**Remote sensing plant-diseases c**	Lectures	General question discussion
12	2	• Student will learn a drones (unmanned drones their important role in the	**Drones**	Lectures	General question discussion

		agricultural field, such as fertilizing, and pest contr			
13	2	• This test aims to get the to review the scientific m after the first exam; the accumulation may make i to review in the last test.	**Exam 02**	Lectures	General question discussion
14	2	• Student will learn a using remote sensing tech research applied on the gr only written in books. • Sruden will learn al reviewing related articles to see how sensors are uti the agricultural field.	**Going through articles and summarizing th idea.**	Lectures	General question discussion
15	2	• The final exam a distinguish the studen on their effort spent d the semester.	**Final Exam**	Lectures	General question discussion

11.Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student daily preparation, daily oral, monthly, or written exams, reports .... etc	
12.Learning and Teaching Resources	
Required textbooks (curricular b any)	Not yet
Main references (sources)	Lillesand, T. M., 2002, Remote sensing and interpretation, Fourth Edition, pp. 23, 374-37 434. Bhatta, B., 2010, Remote Sensing and GIS, (University Press, New Delhi, pp. 7-8, 64-96. Joseph, G., 2005, Fundamentals of Remote S Universities Press, pp. 13-21. Chen, J.M., 1996, Evaluation of vegetation i and a modified simple ratio for boreal applic Canadian Journal of Remote Sensing, 22, 22 Chen J., G. P., H. C., P. R., S. P., April 2003 Use/Land-Cover Change Detection Using In Change-Vector Analysis, Photogrammetric Engineering & Remote Sensing.
Recommended books and re (scientific journals, reports...)	Sensors journal, Remote sensing journal, Ag journal

Electronic References, Websites	https://www.cibotechnologies.com/pathway is-remote-sensing-in-agriculture/

Environmental Pollution2 (Soil and Ground water)

1.Course Name:
Environmental Pollution2 (Soil and Ground water)
2.Course Code:
RSEP306
3.Semester / Year:
Semester
4.Description Preparation Date:
1/10/2024
5.Available Attendance Forms:
Weekly
6.Number of Credit Hours (Total) / Number of Units (Total)
30 hours/2units
7.Course administrator's name (mention all, if more than one name)
Name: Khalid Hussein Abbas Email: Khalid.h@gmail.com Name: Muna Hussein Ahmed Email: muna.h@sc.uobaghdad.edu.iq
8.Course Objectives

Course Objectives	• **Studying pollution in** • **Groundwater** • **soil**

9.Teaching and Learning Strategies	
Strategy	Using gis techniques for knowledge of pollution in groundwater and soil

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	General Introduction	Modeling of Environmental Pollution	Lectures	General questions and discussion
2	2	statistical modeling: Mass balance, Calibration and verification of models	Introduction to Modeling	Lectures	General questions and discussion
3	2	Transport phenomena, Reaction Order Relation 2to Rate Law, law of mass action	Modeling Concepts	Lectures	General questions and discussion
4	2	Hydrological transport model, The Streeter Phelps equation	Water quality	Lectures	General questions and discussion
5	2	Dissolved Oxygen, Lakes according to water chemistry, dissolved nitrogen gas	Water quality model	Lectures	General questions and discussion
6	2	dissolved phosphorus, Suspended Solids, Metals, Nutrient Modelling		Lectures	General questions and discussion
7	2	Exam			Quiz
8	2	Air quality laws, standards, Indoor air quality (IAQ), Air Quality Models, Air quality models Sources	Air quality	Lectures	General questions and discussion
9	2	Earth moisture, surface water biophysical traits, monitoring the surface water	Remote sensing of water	Lectures	General questions and discussion
10	2	Secchi disk, suspended minerals, chlorophyll,		Lectures	General questions and discussion
11	2	water pollution sources, factors effects on water quality potential model output	Spectral response of water	Lectures	General questions and discussion
12	2	Types and Sources of ground water	Introduction to ground water	Lectures	General questions and discussion
13	2	Sources and consequences of ground water pollution	Ground water pollution	Lectures	General questions and discussion

14	2	Management, control policy	Ground water sustainability	Lectures	General questions and discussion
15	2	Exam			Midterm

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)	Environmental Science- A study of Inter relationships, E. D. Enger, B. E. Smith 5th ed, WCB publication
Main references (sources)	Approval of a lieutenant by the teacher
Recommended books and references (scientific journals, reports…)	All research published on scopus and accredited journals
Electronic References, Websites	• Reliable websites • Virtual library • Usgs.gov

1.Course Name:
Satellites & GPS
2.Course Code:
RSGP314
3.Semester / Year:
Semester
4.Description Preparation Date:
1/10/2024
5.Available Attendance Forms:
6.Number of Credit Hours (Total) / Number of Units (Total)
45 /3 units
7.Course administrator's name (mention all, if more than one name)
Name: Lecture Dr. Mohammed Ismail Abd-Almajied + Lecture Reem Shihab Hameed Email: Mohammed.ismael@sc.uobaghdad.edu.iq+ Reem.Hameed1204@sc.uobaghdad.edu.iq

8.Course Objectives

Course Objectives	• **The objective of this course is to study student** • **artificial satellite and GPS (its fundamental, operational and sometimes its malfunction) so** • **as the student make a full knowledge about it.** **It is a basic subject in department of remote Sensing & GIS in define any point above Earth surface by using artificial satellite.**

9.Teaching and Learning Strategies

Strategy	Using the available technology (ex. Power point, television and Electronic class)

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Describing the basic concept that relate to the concepts of GPS and its orbital. Also, the operatio GPS equipment.	Introduction to GPS with its details	Microsoft power point or 52" TV.	Oral quiz or writing
2+3	4	Conic Section Orbits, the Swap area rate and times with its orbits.	Kepler's Law	Microsoft power point or 52" TV.	Oral quiz or writing
4	2	The Ratio of the two mair forces dependency.	Time & velocity dependency.	Microsoft power point or 52" TV.	Oral quiz or writing
5	2	A simulation of that force and their effects on the orbits.	Kinetic Energy and Gravitational Energy Variations.	Microsoft power point or 52" TV.	Oral quiz or writing
6	2	Simulation of orbital type	Orbital types with its advantage and disadvantages, examp of GPS satellite's	Microsoft power point or 52" TV.	Oral quiz or writing
7+8	4	The error relates to its sending to receiving the signal with its error in the orbits of satellites. The type of signals used in GPS system.	GPS Errors and signal	Microsoft power point or 52" TV.	Oral quiz or writing

9	2	Examples of some of the global GPS system used in the world.	Global Positioning Systems	Microsoft power point or 52" TV.	Oral quiz or writing
10	2	Training of Using GPS device.	GPS device	Microsoft power point or 52" TV.	Oral quiz or writing
11+12	4	Using GPS and Arc-map for calculating distance.	Distance measuremen types	Microsoft power point or 52" TV.	Oral quiz or writing
13	2	Sphere, ellipse and geoid model.	Earth model.	Microsoft power point or 52" TV.	Oral quiz or writing
14+15	4	The coordinate types and its projections on surface of Earth	Datums, Coordinate Systems, and Map Projections.	Microsoft power point or 52" TV.	Oral quiz or writing
16		Quiz	Revision		

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)	• Ahmed El-Rabbany "Introduction to GPS The Global Positioning System" Artech House Boston . London 2002, INC. • Elliott D. Kaplan and Christopher J. Hegarty "Understanding GPS, Principles and Applications", Second Edition, 2006 ARTECH HOUSE, INC. • Mohinder S. Grewal and et. al., " Global Positioning, Inertial Navigation, and Integration", 2001 Johan Wily & Sons Inc.
Main references (sources)	Depends of sheets prepared by the teacher
Recommended books and references (scientific journals, reports…)	Depends on all scientific paper published by scoups and depends journal
Electronic References, Websites	Internet & all new publish and programs that publish through electronic sites

(4th stage/first course)

1.Course Name:
Environmental planning
2.Course Code:
RSPL408
3.Semester / Year:
1st Semester
4.Description Preparation Date:
1-10-2024
5.Available Attendance Forms:
Attendance in the classroom
6.Number of Credit Hours (Total) / Number of Units (Total)
60/3 units
4.Course administrator's name (mention all, if more than one name)
Name: Faisel Ghazi Mohammed Email: faisel.mohammed@sc.uobaghdad.edu.iq
5.Course Objectives
• Understand the principles and concepts of environmental planning. • Familiarize students with environmental laws, regulations, and policies. • Develop skills in conducting environmental assessments and impact evaluations. • Explore strategies for sustainable development and resource management. • Gain knowledge of land use planning techniques and comprehensive planning processes. • Develop effective stakeholder engagement and communication skills. • Address climate change and integrate resilience planning into environmental planning. • Analyze real-world case studies to understand challenges and best practices. • Consider ethical considerations and decision-making frameworks in environmental planning. • Gain practical project development and implementation skills..
6.Teaching and Learning Strategies
Teaching and learning strategies include lectures, discussions, hands-on activities, group work, case studies, multimedia resources, technology integration, formative assessments, personalized learning, reflection, experiential learning, scaffolding, feedback and assessment, active learning, and differentiated instruction. These strategies aim to engage students, promote critical thinking, and enhance understanding and skills acquisition.
7.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	1. Understanding the principles of environmental planning, including the role of science, policy, and stakeholder engagement in the planning process. 2. Analyzing and interpreting environmental data, such as air and water quality, land use patterns, and ecological systems. 3. Applying quantitative and qualitative methods to assess the impacts of human activities on the environment, and to develop strategies for mitigating those impacts. 4. Developing environmental plans and policies that balance environmental, social, and economic goals, and that take into account the needs and perspectives of diverse stakeholders. 5. Communicating effectively with various audiences, including policymakers, community groups, and the public, about environmental issues and solutions. 6. Applying ethical professional standards environmental plann including principles sustainability, equity, and sc justice.	**Introduction** • Conceptual framework for environmental planning • The concept of environmental planning • planning elements Characteristics of a successful plan	Common learning methods include active learning (engaging students in discussions and practical activities), cooperative learning (promoting collaboration among students), problem-based learning (solving real-world problems), project-based learning (applying knowledge to practical projects), technology-based learning (utilizing digital resources), and self-directed learning (taking initiative in learning independently).	Common evaluation methods include tests/exams (written or oral assessments), assignments/projects, presentations/demonstrations, performance assessments, portfolios (collection of work samples), observations, and self-assessment/ reflection. These methods are used to measure student progress and assess understanding, skills, and application of knowledge.
2	2	1. Understanding the history, theory, and practice of planning, including the role of planning in shaping communities and regions over time. 2. Analyzing and interpreting data and information related to land use, transportation, housing, economic development, and other planning topics. 3. Applying quantitative and qualitative methods to assess the impacts of planning decisions and to develop strategies for addressing complex planning problems. 4. Developing plans and policies reflect the values and needs of var stakeholders, including commu	**Planning** • Planning concept • Planning Obstacles • Planning principles Planning objectives		

		members, government officials, private sector actors..			
3	2	5. Communicating effectively with diverse audiences, including through written reports, oral presentations, and visual media. 6. Applying ethical and professi standards in planning, inclu principles of social equ environmental sustainability, democratic participation	• Planning types • Planning models Kaufman model for strategic planning		
4	2	1. Understanding the basic concepts and principles of environmental science, including ecosystems, biodiversity, climate change, and pollution. 2. Analyzing and interpreting data and information related to environmental issues, including scientific data, policy documents, and media reports. 3. Applying critical thinking and problem-solving skills to address complex environmental challenges, and to develop solutions that balance environmental, social, and economic considerations. 4. Communicating effectively ab environmental issues and soluti including through written reports, presentations, and visual media.	• Fundamentals of Environment • Ecology • Ecosystem • Environmental system • Environmental equilibrium Environmental problems		
5	2		**Review and 1st Exam**		
6	2	1. Applying quantitative and qualitative methods to assess the environmental impacts of planning decisions, and to develop strategies for mitigating those impacts. 2. Developing environmental plans and policies that balance environmental, social, and economic considerations, and that reflect the needs and perspectives of diverse stakeholders. 5. Communicating effectively with various audiences, including policymakers, community groups, and the public, about the environmental implications of planning decisions. 3. Applying ethical and professi standards in environmental plann	• The Role of the Planner in Environmental Planning Zoning		

		including principles of sustainabi equity, and social justice.			
7	2	1. Collaborating with others, including peers, community members, and experts, to address environmental challenges and to develop innovative solutions. 2. Applying ethical and professi standards in environmental stuc including principles of social just sustainability, and scientific integr	Steps in the Environmental Planning Process		
8	2	1. Understanding the legal and regulatory framework for EIA, including national and international laws, policies, and guidelines. 2. Analyzing and interpreting environmental data and information, such as air and water quality, land use patterns, and ecological systems, to assess the potential environmental impacts of proposed projects or activities. 3. Applying quantitative and qualitative methods to evaluate the potential environmental impacts of proposed projects or activities, and to develop strategies for mitigating those impacts. 4. Developing EIA reports documentation that meet regula requirements and that effecti communicate the pote environmental impacts of propc projects or activities.	Environmental impact assessment		
9	2	5. Communicating effectively with various stakeholders, including project developers, government officials, and the public, about the potential environmental impacts of proposed projects or activities, and the strategies for mitigating those impacts. 6. Applying ethical and professi standards in EIA, including princi of scientific integrity, transpare and public participation.	Environmental Impact Assessment Form		
0	2	1. Understanding the history, theory, and practice of environmental planning, and the role of planners in shaping environmental policy and decision-making.	Environmental planning (the capital of Islamic civilization Baghdad as a model)		

		2. Analyzing and interpre environmental data, such as air water quality, land use patterns, ecological systems, and using information to inform plan decisions.			
1	2	1. Understanding the key concepts and principles of environmental law, including the precautionary principle, polluter pays principle, and sustainable development. 2. Analyzing and interpreting national and international environmental laws, regulations, and policies, and their implications for environmental protection and improvement. 3. Applying legal research and analysis skills to assess the adequacy and effectiveness of existing environmental laws and policies. 4. Developing legal strategies and solutions for addressing environmental challenges, such as climate change, pollution, and biodiversity loss. 5. Communicating effectively with various stakeholders, including policymakers, government officials, and the public, about the legal implications of environmental issues and solutions. 6. Applying ethical and professi standards in environmental including principles of social just environmental ethics, and legal eth	Iraqi Environment Protection and Improvement Law No. (27) of 2009		
2	2		**Review and 2nd Exam**		
3	2	1. Understanding the principles and requirements of the ISO 14001 standard, including the Plan-Do-Check-Act (PDCA) cycle and the process approach to environmental management. 2. Analyzing and interpreting environmental data and information, such as energy use, greenhouse gas emissions, and waste generation, to identify opportunities for improving environmental performance.	ISO 14000 environmental management group International standard for environmental management system ISO 14001 ISO (International Organization for Standardizati on)		

		3. Applying the ISO 14001 standard to develop and implement an environmental management system that meets the requirements of the standard and is tailored to the needs and objectives of a specific organization. 4. Developing and implementing environmental policies, procedures, and controls that are designed to reduce environmental impacts and improve environmental performance. 5. Conducting internal audits and management reviews to assess the effectiveness of an organization's environmental management system and to identify opportunities for improvement. 6. Applying ethical and professi standards in environme management, including principle transparency, accountability, continuous improvement.			
4	2	1. Understanding the principles and requirements of the ISO 14001 standard, including the Plan-Do-Check-Act (PDCA) cycle and the process approach to environmental management. 2. Analyzing and interpreting environmental data and information, such as energy use, greenhouse gas emissions, and waste generation, to identify opportunities for improving environmental performance. 3. Applying the ISO 14001 standard to develop and implement an environmental management system that meets the requirements of the standard and is tailored to the needs and objectives of a specific organization. 4. Developing and implementing environmental policies, procedures, and controls that are designed to reduce environmental impacts and improve environmental performance. 5. Conducting internal audits and management reviews to assess the effectiveness of an	Environmental Management ISO 14001		

		organization's environmental management system and to identify opportunities for improvement. 6. Applying ethical and professi standards in environme management, including principle transparency, accountability, continuous improvement.			
5	2	1. **Effective Communication:** Students will be able to present their ideas clearly and concisely to their peers, using appropriate language and visual aids to enhance understanding. 2. **Team Collaboration:** Students will demonstrate the ability to work effectively within a group, contributing to discussions, valuing diverse perspectives, and supporting each other's learning throughout the session. 3. **Critical Feedback:** Students will develop the skills to provide constructive feedback to their peers, focusing on strengths and areas for improvement, and articulating their thoughts respectfully and supportively. 4. **Application of Knowledge:** Students will apply concepts learned in the course to assess and critique their peers' presentations, demonstrating an understanding of environmental planning principles and methodologies. 5. **Problem Solving:** Students will engage in collective problem-solving by discussing challenges and proposing potential solutions during the evaluation sessions, fostering an environment of collaborative learning. 6. **Reflection and Self-Assessment:** Students will reflect on their own contributions and learning	**Group Assessment:** Design a group evaluation session where students can present their ideas and provide feedback to each other, promoting teamwork.		

		experiences in the group assessment, identifying personal strengths and areas for further development in teamwork and presentation skills..			

8.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student as in the following:-
daily preparation :- 5 %
daily oral :- 5%
monthly exams :- 10%
reports : 5%
Laboratory : 15 %
Final Exam : 60

9.Learning and Teaching Resources

Required textbo (curricular books, if any	• Tom Daniels, "THE ENVIRONMENTAL PLANNING HANDBOOK FOR SUSTAINABLE COMMUNITIES AND REGIONS", 2nd Ed., Copyright © 2014 Taylor & Francis JUDITH PETTS , "Handbook of Environmental Impact Assessment", University Birmingham, 1999
Main references (sourc	ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENT MANAGEMENT PLAN
Recommended books and references (scientific journals, reports…)	Books: • "Environmental Land Use Planning and Management" by Jo Randolph and Gilbert M. Masters • "Environmental Planning Handbook" by Tom Daniels and Kather Daniels • "Environmental Impact Assessment: Theory and Practice" by Pe Morris and Riki Therivel • "Sustainable Urban Development Reader" edited by Stephen Wheeler and Timothy Beatley • "Principles and Practice of Urban Planning" by Alan M. Berger a Joel Kotkin • "Introduction to Environmental Impact Assessment: A Guide Principles and Practice" by John Glasson, Riki Therivel, and Andr Chadwick • "Sustainable Communities: Planning for the 21st Century" Woodrow W. Clark II • "Environmental Planning: Policies, Perception, and Practice" by Thomas and Mike J. Morley • "Land Use Planning and the Environment: A Casebook" by Robert Wright and Gary N. Young • "Planning Sustainable Cities and Regions: Towards More Equita Development" by Karen Chapple Scientific Journals and Reports:

	• Environmental Impact Assessment Review • Journal of Environmental Planning and Management • Environmental Planning and Management • Sustainable Cities and Society • Journal of Environmental Management • Environmental Science & Policy • Environmental Planning B: Planning and Design • Global Environmental Change • Environmental Research Letters • United Nations Environment Programme (UNEP) reports a publications
Electronic Referenc Websites	• United Nations Environment Programme (UNEP): The UNEP website offers a wealth of resources on environmental planning, sustainable development, and policy frameworks. It provides access to reports, publications, and tools related to environmental planning and management. Website: https://www.unep.org/ • World Resources Institute (WRI): WRI focuses on research and initiatives related to sustainable development, including urban planning and land use. Their website offers publications, data platforms, and tools that can inform environmental planning practices. Website: https://www.wri.org/ • Environmental Protection Agency (EPA): The EPA website provides information on environmental regulations, policies, and planning approaches. It offers resources on environmental impact assessment, land use planning, and sustainable development practices. Website: https://www.epa.gov/ • International Association for Impact Assessment (IAIA): IAIA is a professional organization dedicated to environmental impact assessment. Their website provides access to publications, guidelines, and resources related to impact assessment and planning. Website: https://www.iaia.org/ • Global Environment Facility (GEF): GEF funds various environmental projects worldwide. Their website offers publications, reports, and resources on sustainable development and environmental planning. Website: https://www.thegef.org/ • ICLEI - Local Governments for Sustainability: ICLEI is a global network of local and regional governments committed to sustainable development. Their website provides resources, case studies, and tools for local-level environmental planning and implementation. Website: https://iclei.org/ • European Environment Agency (EEA): The EEA website provides environmental information, data, and reports for Europe. It covers topics such as land use, spatial planning, and sustainable development strategies. Website: https://www.eea.europa.eu/

	• National Renewable Energy Laboratory (NREL): NREL focuses on renewable energy research and planning. Their website offers tools, reports, and publications related to energy planning and sustainable development. Website: https://www.nrel.gov/ • The Nature Conservancy: The Nature Conservancy website provides resources and case studies on conservation planning, ecosystem management, and sustainable land use practices. Website: https://www.nature.org/ • Environmental Planning and Management online journals: Access online journals such as "Environmental Impact Assessment Review," "Journal of Environmental Planning and Management," and "Sustainable Cities and Society" for research articles and publications in the field of environmental planning.

Natural resources

1.course name
Natural resources
2.CourseCode :
RSNR401
3.Semester / Year:
First semester 2024-2025
4.discription Preparation Date:
1/10/2024
5.forms of attendance
Attendance
6.Number of Credit Hours (Total) / Number of Units (Total)
30 Hours/2 units
7.Course administrator's name)mention all, (if more than one name
:Namezehraa najim abdul-ameer Email: zehraa.najim@sc.uobaghdad.edu.iq
8.Course Objectives

Course Objectives	• **Preparing specialized graduates in remote sensing to contribute to the development of the country.** • **Meeting the needs of state sectors with highly qualified personnel.**

	• **Encouraging outstanding individuals to work in the department.** • **Promoting research programs and participation in scientific conferences and seminars.** • **Achieving quality and academic accreditation.**

9.Teaching and Learning Strategies

Strategy	• **Managing lectures in a way that emphasizes the importance of time.** • **Assigning students some group tasks.** • **Utilizing websites and virtual classrooms.**

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Land is the important valuable for mankind	Land Resources	**lectures**	**General questions and discussions**
2	2	Land degradation of deterioration of soil of fertility and effects of Land degradation	Land degradation and soil erosion	**lectures**	**General questions and discussions**
3	2	Desertification It is a form of land degradation it is a progressive destruction or degradation of arisen maid lands to destruct	Desertification	**lectures**	**General questions and discussions**
4	2	Land is on food most precious assets and its use in malri-faceted . it provides food and shelter , it stores and filter water , Land derives its from the vegetation and crops that can be grown on it . land cover and land use	Land use and Land cover	**lectures**	**General questions and discussions**
5	2	Land is on food most precious assets and its use in malri-faceted . it provides food and shelter , it stores and filter water , Land derives its from the vegetation and crops that can be grown on it . land cover and land use,	Soil sciences & Water Resources		

		Earth s water resource including rivers takes and underground a quivers are under stressing many regions			
6	2	**Duplication of Fries Water**	**The Habitable plant**	**lectures**	**General questions and discussions**
7	2	مراجعة	مراجعة		
8	2	امتحان	امتحان اول	**lectures**	**General questions and discussions**
9	2	It is a natured substance of organic or inorganic with definite chemical and physical properties and the basis of chemical physical properties , miners many by ground under two main categories of metallic non- metallic	Minerals Resources & Types of Minerals Resources		
10	2	Total discovered and un discovered resources discovered sure yet and economically recoverable	Recourses and Reserves	**lectures**	**General questions and discussions**
11	2	Mined fuels are for generations of power , required by agriculture industry transport and other sector of the economy , a forest complex ecosy stem which is predominantly composed of three shrubs and is usually a closed canopy	Energy Resources & Forests		
12	2	Forests proved an environment for many species of plants and animals that protects and sustains the diversity of nature	Ecological Role of Forests	**lectures**	**General questions and discussions**
13	2	Types , importance and conservation methods , the term Biodiversity was coined and contraction of biological diversity	Biodiversity		
14	2		**Renewable and non Renewable energy**	**lectures**	**General questions**

		Types and sources of nonrenewable Energy sources			**and discussions**
15	2	امتحان	امتحان نهاية الفصل الاول		

11.Course Evaluation
according to the tasks assigned to the student such as daily ١٠Distributing the score out of preparation, daily ،oral, monthlyor written exams, reports…. etc

12.Learning and Teaching Resources	
) Required textbookscurricular books(if any ،	Natural resources ,williams 2nd edition 1989
Main references (sources)	Natural resources , Richardson ,new york 1994
Recommended books and references (…scientific journals, reports)	All researches that are published in scientific scopus journals
Electronic References, Websites	Reputable websites. Virtual library. Library websites of some international universities.

Treatment environment pollutants

1.Course Name:	
Treatment environment pollutants	
2.Course Code:	
RSEP407	
3.Semester / Year:	
1st /fourth stage	
4.Description Preparation Date : (2024-2025)	
1-10-2024	
5.Available Attendance Forms:	
attendance	
6.Number of Credit Hours (Total) / Number of Units (Total):	
30/2 units	
7.Course administrator's name (mention all, if more than one name)	
Name: Dr.Sundus A.Abdullah Albakry Email: sundus.abdullah@sc.uobaghdad.edu.iq	
8.Course Objectives	
Course Objectives	• -Knowledge of the foundations of environmental science

	• Knowing the future foundations of environmental engineering and how to measure the foundations • Knowing the importance of linking environmental science to urban planning and its connection to knowledge of sensitivity • Study the sustainable development and the main Goals .....

9.Teaching and Learning Strategies

Strategy	• Ability to apply remote sensing data analysis techniques while taking into account global and local technological constraints. • Analyzing scientific problems, arriving at their solution, and being able to suggest appropriate alternatives • Scientific investigation and evaluation • Constructive scientific discussions and expressing opinions. •

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 2	Definition Introduction Basic difintions	Treatment environmental pollutants	Power point, Presentation scre Google classroom	Quizzes and Oral and wri exam with monthly exa Homework
2	2	Soil and water remediation and Remediation technologies scientific contents - Historical View - Definitions of remediation.	Treatment environmental pollutants	Power point, Presentation scre Google classroom	Quizzes and Oral and wri exam with monthly exa Homework

		- In Situ Treatment Technologies. - Ex situ Treatment Technologies.			
3	2	Types of pollution 1-Primary of pollutants SO and Co2 Pollutions	Treatment environmental pollutants	Power point, Presentation scre Google classroom	Quizzes and Oral and wri exam with monthly exa Homework
4	2	Soil and water remediation and remediation technologies	Treatment environmental pollutants	Power point, Presentation scre Google classroom	Quizzes ar Oral and wri exam wit monthly exa Homewor
5	2	Air pollution control devices -Cyclone, setti chamber and fabric filters	Treatment environmental pollutants	Power point, Presentation scre Google classroom	Quizzes ar Oral and wri exam wit monthly exa Homewor
6	2	Physical treatments of pollutants'	Treatment environmental pollutants	Power point, Presentation scre Google classroom	Quizzes ar Oral and wri exam wit monthly exa Homewor
7	2	Biological treatments of pollutants'	Treatment environmental pollutants	Tv (52 inch Google classroom youtub	Quizzes ar Oral and wri exam wit monthly exa Homewor
8	2	Limitations of Biological technology Bioremediation. - Bioventing. Biosorption -pathways of hydrocarbon metabolism.	Treatment environmental pollutants	Power point, Presentation scre Google classroom	Quizzes ar Oral and wri exam wit monthly exa Homewor
9	2	Thermal technology treatments -Advantages a disadvantage	Treatment environmental pollutants	Tv (52 inch Google classroom youtub	Quizzes ar Oral and wri exam wit monthly exa Homewor
10	2	Chemical extraction treatments	Treatment environmental pollutants	Power point, Presentation scre Google classroom	Quizzes ar Oral and wri exam wit monthly exa Homewor

11	2	Technology applicability fo biological and thermal	Treatment environmental pollutants	Tv (52 inch Google classroom youtube	Quizzes ar Oral and wri exam wit monthly exa Homewor
12	2	Separation Technology description	Treatment environmental pollutants	Tv (52 inch Google classroom youtube	Quizzes ar Oral and wri exam wit monthly exa Homewor
13	2	Remediation o Wastewater by using biofilms	Treatment environmental pollutants	Tv (52 inch Google classroom youtube	Quizzes ar Oral and wri exam wit monthly exa Homewor
14	2	Remediation of Wastewater by using biofilms ***Updating Syllabus(2025)*** **-The ecological impacts of urban centers** **-Uncontrolled Physical Expansion**	Treatment environmental pollutants	Tv (52 inch Google classroom youtube	Quizzes ar Oral and wri exam wit monthly exa Homewor
15	2	Types of pollution 1-Primary of pollutants SO and Co2 Pollutions ***Updating Syllabus (2024)*** **1- Reflectance properties and physiological metal and petroleum contamination** **2-Study reflectance curves of pollutants**	Treatment environmental pollutants	Power point, Presentation scre Google classroom	Final exar

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)	-Thirumurthy A 2004, Principles of Environmental Science and Management. Shroff Publishers. Essentials of Ecology Third Edition by - -٢ Colin Michael,
Main references (sources)	All lectures

Recommended books and references (scientific journals, reports…)	Ecology with geographic information system 201
Electronic References, Websites	ll new bulletins and programs are published through approved websites.

(Fourth stage /second course)

1.Course Name:
remote sensing techniques
2.Course Code:
RSST414
3.Semester / Year:
Semester/2024−2025
4.Description Preparation Date:
1-10-2024
5.Available Attendance Forms:
Attendance /mandatory
6.Number of Credit Hours (Total) / Number of Units (Total):
60 hours /2 units
7.Course administrator's name (mention all, if more than one name)
Name:Israa Jameel Muhsin Email:israa.mohsen@sc.uobaghdad.edu.iq
• 8.Course Objectives

Course Objectives	-Developing the student's scientific and applied ski in the following areas: - The student's awareness of the importance of rem sensing techniques and the importance of using the in addition to the applied fields in which this field included. -Making the student able to be a researcher in the f of remote sensing and how to harness these techniques and employ them in his field of specialization. - Making the student able to employ remote sensin variables and how to use the results obtained from laboratory in measurement. - Teaching the student how to benefit from these techniques in practical and functional life..... • ..... • .....

• 9.Teaching and Learning Strategies

Strategy	• Managing the lecture in a way that indicates the importance of time • Assigning the student some group assignments • Websites and electronic classes • Direct questions and discussions about the lecture content • Linking theoretical concepts with practical ones.

• 8.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
		-Remote sensing definition. -satellite images - true and false colors.	General introduction about satellite image capture	lectures	Questions and discussions on the topic
		1.Preprocessing in remote 2.. Radiometric Calibration 3. Geometric Correction 4. Atmospheric Correction.	How to use preprocessing methods such as calibration and corrections.	lectures	Questions and discussions on the topic
3	2	-Noise reduction -data fusion -Cloud and Shadow Removal - Mosaicking -resampling -data compression	The types preprocessing	lectures	Questions and discussions on the topic
4	2	- Steps in Change Detection -Types of Change Detection Techniques. - Pixel-based Change Detection.	Principles Change Detect	lectures	Questions and discussions on the topic
5	2	-Change Detection in Remote Sensing Using NDVI. -urbanization effect on vegetation. - Change Vector Analys	Application change detec with examples	lectures	Questions and discussions on the topic
6	2	Monthly Test	First theory te	lectures	Questions and discussions on the topic

7	2	-Vegetation Monitoring -Land Use and Land Cover (LULC) Monitoring. - Climate and Weather Monitoring. - Hydrological and Water Resources Monitoring.	Monitoring techniques remote sensing	lectures	Questions and discussions on the topic
8	2	- Urban Monitoring. - Disaster Monitoring. - Forest Monitoring.	Application monitoring techniques	lectures	Questions and discussions on the topic
9	2	- Agricultural Monitoring. - Coastal and Marine Monitoring. - Air Quality and Pollu Monitoring	Other applic in monito methods	lectures	Questions and discussions on the topic
10	2	Monthly test	Second test	lectures	Questions and discussions on the topic
11	2	-important and types of classification. Unsupervised classification types. -k-mean algorithm. -ISO data algorithm.	Image classification techniques	lectures	Questions and discussions on the topic
12	2	-Supervised classification -types of supervised classification. -minimum distance classifier. -maximum likelih classifier.	Image classification techniques	lectures	uestions and discussions on the topic
13	2	Apply supervised meth mathematically.	Image classification techniques	lectures	uestions and discussions on the topic
14	2	Practice training using E program.	Image classification techniques	lectures	uestions and discussions on the topic
15	2	Review Course information	review	lectures	uestions and discussions on the topic

10.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

11.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	- Schowengerdt, Robert A. (2007). *Remote sensing: models and methods for image processing* (3rd ed.). Academic Press. p. 2. ISBN 978-0-12-369407-2. Archived from the original on 1 May 2016. Retrieved 15 November 2015.

Recommended books and references (scientific journals, reports…)	All research published in Scopus journals and accredite journals
Electronic References, Websites	• Reliable websites. • Virtual library. • Websites of libraries in some international universities

Hydrochemistry

1. Course Name:
Hydrochemistry
2. Course Code:
3. Semester / Year:
2 nd/ 2024- 2025
4. Description Preparation Date:
10/3/2025
5. Available Attendance Forms:
attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30hours/2
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Iman Ahmed Mohamed Ali Email: iman.ali@sc.uobaghdad.edu.iq
8. Course Objectives

Course Objectives	**Preparing graduates specialized in remote sensing to contribute to the development of the coun Meeting the needs of the state sectors with highly qualified cadres Encouraging distinguished people to work in the department Encouraging research programs referred to in scientific conferences and seminars Achieving quality and academic accreditation.**

9. Teaching and Learning Strategies

Strategy	**Managing the lecture in a way that indicates the importance of time Assigning the student some group duties Websites and electronic classes**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Creating a generation capa of dealing wisely with wa resources as the prim source of life and identify the most important fact affecting water pollution.	GIS Application in water management	General questions and discussions	Oral exam and seminar
2		Identify the most important modern methods for identifying land uses and the distribution of pollutants therein and determining their source and fate in both soil and water through the application of geographic information systems techniques and software.	Types of plots commonly used to visualize water hydrochemistr y	General questions and discussions	Oral exam and
3	2	Study of the molecular structure of water as it exists in nature as an aqueous solution, but a study Chemicals and chemical formula and the resulting form of bonding geometry of the electron orbitals involved in bonding n.	.Water molecule geometry	General questions and discussions	seminar
4	2	Understanding the links between water quality and health in development highlights potential new health crises: from the effects of infectious diseases caused by known pollutants. .Focus on water that is treated for portability, industrial/domestic use, or restoration	.Water molecule geometry	General questions and discussions	Oral exam and

		(environmental/ecosystem, generally for the health of human/aquatic life).			
5	2	Study of Inorganic Components of Water and Their Impact on Its Quality and Uses	Types of concentration units	General questions and discussions	seminar
6	2	review	review	General questions and discussions	Oral exam and
7	2	exam	exam	General questions and discussions	seminar
8	2	Water quality plays a crucial role in human health and ecosystem balance. Poor water quality can lead to various health issues, particularly infectious diseases caused by known pollutants. This section highlights the potential health crises associated with waterborne pathogens and emphasizes the importance of treating water for transportation, industrial/domestic use, and environmental restoration.	Water Quality Uses	General questions and discussions	Oral exam and
9	2	Understanding the relationship between water quality and health is crucial for addressing emerging health crises. Effective water treatment and management strategies are essential for ensuring safe water for human consumption, industrial	Problems related to Water Sampling	General questions and discussions	Oral exam and

		use, and environmental sustainability. By focusing on these aspects, we can mitigate the risks associated with waterborne diseases and pollutants, ultimately protecting human health and ecosystems			
10	2	Study of Inorganic Components of Water and Their Impact on Quality and Uses	Chemical Component of water	General questions and discussions	seminar
11	2	inorganic components in water affect its quality and suitability for human consumption, industrial, and agricultural use. Ensuring safety requires adopting precise analytical standards (such as ion chromatography) and following health and environmental guidelines.	Chemical Analysis	General questions and discussions	Oral exam and
12	2	Removing these pollutants through technologies like reverse osmosis is crucial for protecting public health and ecosystems.	Problems related to Water Sampling	General questions and discussions	seminar
13	2	exam	exam	General questions and discussions	Oral exam and
14	2	report	report	General questions and discussions	seminar
15	2	review	review	Gener questi and discus ns	Oral exam and
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)			Todd, D.K., 1980 Hem J.D., 1971		

Main references (sources)	Groundwater hydrology, 2nd addition, J Wiley, NewYourk, pp. 535 Hem, J.D., 1985 Study and interpretatio chemical analysis of natural water, addition, U.S.G.S. Water supply, paper 2254, 263
Recommended books and references (scientific journals, reports...)	Google , Library Genesis , Scient American ,Research Gate, Scholar artic and journals
Electronic References, Websites	Todd, D.K., 1980 Hem J.D., 1971

Sensors and concepts

• 1.course name
Sensors and concepts
• 2.Course code:
RSSF412
• 3.Semester /year:
First semister 2024-2025
• 4. Description Preparation Date:
1/10/2024
• 5.Forms of attendance
Attendance
• 6.Number of Credit Hours (Total) / Number of Units (Total)
30 hours/3 units
• 7.Course administrator's name)mention all, (if more than one name
hasan jaber alatta zehraa najim abdul-ameer Email: zehraa.najim@sc.uobaghdad.edu.iq
• 8.Course Objectives

Course Objectives	• **Preparing specialized graduates in remote sensing to contribute to the development of the country.** • **Meeting the needs of state sectors with highly qualified personnel.** • **Encouraging outstanding individuals to work in the department.**

	• **Promoting research programs and participation in scientific conferences and seminars.** • **Achieving quality and academic accreditation.**

9.Teaching and Learning Strategies

Strategy	• **Managing lectures in a way that emphasizes the importance of time.** • **Assigning students some group tasks.** • **Utilizing websites and virtual classrooms.**

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Measures temperature changes.	Thermal Sensor (Temperature Sensor):	lectures	General questions and discussions
2	2	Detects smoke or fire.Used in fire alarm	Smoke Sensor	lectures	General questions and discussions
3	2	Distance Sensor: Measures the distance between the sensor and an object. Used in robotics, automotive parking systems, and drones.	Distance Sensor:	lectures	General questions and discussions
4	2	Detects movement in its field of view.	Motion Sensor:	lectures	General questions and discussions
5	2	Measures the water content in soil. Used in agriculture and irrigation systems.	Soil Moisture Sensor: .	lectures	General questions and discussions
6	2	Measures the level of moisture in the air. Used in weather monitoring and HVAC systems	Humidity Sensor:	lectures	General questions and discussions
7	2	review	review	lectures	General questions and discussions
8	2	exam	exam	lectures	General questions and discussions
9	2	Used in security systems, automatic	Smoke sensor		

		doors, and lighting control.			
10	2	Measures the water content in soil. Used in agriculture and irrigation systems.	Soil Moisture Sensor:	lectures	General questions and discussions
11	2	Uses sound waves to measure distance or detect objects.	Ultrasonic Sensor:	lectures	General questions and discussions
12	2	Detects motion or heat using infrared radiation.	infrared Sensor:	lectures	General questions and discussions
13	2	Detects the presence of specific gases (e.g., CO2, methane).	Gas Sensor:		
14	2	review	review	lectures	General questions and discussions
15	2	exam	final exam		

11.Course Evaluation

this course use exam and experimental laboratory to evaluate students

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	SENSORS ,williams 2nd edition 2004
Main references (sources)	Sensors ,Davidson ,new york 2015
Recommended books and references (scientific journals, reports...)	All researches that are published in scientific scopus journals
Electronic References, Websites	Reputable websites. Virtual library. Library websites of some international universities.