Ministry of Higher Education and Scientific Research

Scientific Supervision and Evaluation Authority

Department of Quality Assurance and Academic Accreditation

Description form of the academic program of the Department of Ecology

University Name : Basra

College/Institute Name: Science

Scientific Department Name : Ecology

File filling date : 1/9/2020

Signature : Signature:

Head of department : Prof. Dunya Ali Hussein

Scientific Associate Name : Prof. Alaa Hassan Abdullah

Date : Date :

Check the file before

Division of Quality Assurance and University Performance

Name of the Director of the Quality Assurance and University Performance Division:

Date

Signature

Approval of the Dean of the College

Academic Program Description

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

tute University of Basrah – College of Science	1. Educational institution
Department of Ecology	2. Scientific Department / Center
ecology	3. Name of academic or vocational program
Bachelor of Environmental Science	4. Final Certificate Name
Decisions	5. Academic System : Annual / Decisions / Other
We seek ABET accreditation	6. Accredited Accreditation Program
Support opportunities Training Courses Field visits Summer Training	7. Other external influences
1/9/2020	8. History of the preparation of the description
9. Objectives of the Academic Program - Qualifying specialized graduates who are familiar with the theoretical foundations of environmental sciences and their field applications .	

- Preparing a qualified cadre to engage in postgraduate studies in the future and the university education and scientific research to advance the educational process in the fields of environmental sciences.
- Supporting scientific and technical research in Iraq.
- Spreading awareness and knowledge in the fields of ecology.
- Responding to the requirements of the labor market and community service.

10. Required Program Outcomes and Teaching, Learning and Assessment Methods

A- Cognitive Objectives

A1- Enable students to obtain knowledge and understanding of the concept of ecology.

A2- Enabling students to obtain the concepts of the importance of the environment and its components for different neighborhoods.

A3- Identify the environmental and health impacts of natural and industrial pollutants.

A4- Identify fixed and mobile sources of environmental pollutants.

A5- Identify methods of treating and controlling industrial pollution.

A6- Identify the most important global environmental phenomena.

B- Program Skills Objectives

B1- Acquiring scientific skills in the examination and measurement of environmental pollutants.

B2- Acquire scientific skills in the treatment of environmental pollutants.

B3- Acquire the skills of remembering, analyzing and developing.

B4- Acquire the skills of collecting and analyzing environmental data

Teaching and learning methods

1- Theoretical and practical lectures.

2- Use of teaching aids (presentations and scientific films)

3- Practicality

4- Scientific trips and field work.

5- Encouraging students to visit scientific websites.

Evaluation methods

- Daily, quarterly and final theoretical and practical tests.
- Discuss graduation projects.

C- Emotional and value goals.

C1- The ability to communicate information after monitoring and collecting data.

C2- Linking information to the health reality of humans and influencing other neighborhoods.

C3- Laying the correct foundations for scientific research.

C4- Develop research project plans to solve environmental problems

Teaching and learning methods

1- Providing students with curriculum vocabulary and scientific resources.

2- Direct and electronic explanation and delivery.

3- The use of devices in measuring environmental pollutants.

4- Forming discussion groups during the lecture that require reflection and .analysis

Evaluation methods

1. Daily testing and reports.

2- Monthly tests.

3- Final exams.

d. General and qualifying-transfer skills (other skills related to employability and personal development).

.D1- Developing the mental abilities of the student

D2- Developing skill capabilities in the field of environment.

D3- Dealing with field and laboratory environmental measuring devices.

D4- Using computers to deal with environmental data.

D5- Enabling the student to pass job interviews and professional tests.

Teaching and learning methods

1- The method of explaining the lecture and discussion.

2- Urging the student to conduct research and reports.

3- Dividing students into groups in practical lessons.

Evaluation methods

1 - Practical training in the curricula

2- Follow-up reports

3- Final exams

11. Program Architecture

Credit Hours		Course Name	Course or Course Code	Grades
practical	theoretical			
0	3	Human Rights Principles	W101	The first
1	1	sport	SHD101	
0	2	Arabic literature	D101	
0	2	General Geologist	C100	
3	2	Calculators	H127	
0	4	Calculus	MATH101	
0	2	Statistics	MATH117	
3	3	Material Properties	PHY102	
3	2	Organic Chemistry	CHEM112	
3	3	Analytical Chemistry	CHEM131	
3	3	General Biology	Y101	
3	3	Environment Basics	Y102	
3	2	Molecular cell biology	Y110	
0	1	Photography & Nature	EE111	
0	3	Principles of Freedom and Democracy	W201	The second
3	2	Calculator Applications	H260	
3	2	biochemistry	CHEM240	
3	2	Plant classification	Y202	
3	2	Plant ecology	Y203	
3	2	Animal classification	Y204	
3	2	Animal ecology	Y205	
0	2	Climate changes	EE206	
3	2	Wanderers and productivity	Y207	
3	2	Biodiversity and sustainable development	Y208	
3	2	Microbiology environment	Y209	
3	2	Environmental Chemistry	Y210	
0	2	Environmental Geology	Y216	
0	2	English Literature	D301	
3	2	marine environment	Y302	
3	2	Automated separation and analysis methods	Y303	
3	2	Wetland environment	Y304	
3	2	Air pollution	Y305	

3	2	Water and soil pollution	Y306	Third
0	2	Nature Reserves	Y310	
3	2	Freshwater and estuaries environment	Y311	
0	2	Natural resources and energy sources	Y314	
0	2	Environmental modeling	Y317	
0	2	Survey and environmental maps	EE316	
0	2	Meteorology	Y333	
0	2	Environmental disasters	Y340	
3	2	Organic pollution	EE343	
3	2	Microbial contamination	Y347	
3	2	Water Treatment Technologies	Y351	
3	2	Aquatic plants	EE356	
0	2	Radioactive contamination	Y370	
0	2	Environmental awareness	and 400	Fourth
0	2	Waste Treatment & Recycling	Y401	
0	2	Environmental Laws and Legislations	Y402	
0	2	Research Project	Y405	
3	2	Environmental physiology	Y410	
3	2	Environmental toxins	Y421	
3	2	Molecular Environmental Biology	Y430	
0	2	Hydrologist	Y436	
0	2	Environmental Impact Assessment	Y444	
3	2	Intrusive plants and their environments	Y450	
0	2	Occupational Health and Safety	BIO452	
3	2	Plant Technologies	Y456	
0	2	Remote Sensing and GIS	Y465	
3	2	Industrial pollutants	Y476	
0	2	Environmental sanitation	EE487	

12.Planning for personal development
1- Know the components of the environment and its problems, biodiversity and the role of man in improving the environmental reality. 2- Encourage participation in workshops, seminars and scientific conferences.
13.Admission criterion (setting regulations related to admission to a college or institute)
– Scientific central admission according to the instructions of the Ministry of Higher Education and Scientific Research. – He holds a certificate of preparatory school, scientific branch.
14.The most important sources of information about the program
1- Books and methodological sources. 2- Books and auxiliary resources. 3- Skills of use and self-development. 4- Electronic library. 5- Internet.

Curriculum Skills Outline																		
Please tick the boxes corresponding to the individual learning outcomes from the program under evaluation.																		
Learning outcomes required from the program																		
General and qualifying skills transferred (other skills related to employability and personal development)				Emotional and value goals				Program Skills Objectives				Cognitive goals				fundamental Or optional	Course Name	Course Code	Year/Level
D4	D3	D2	D1	C4	C3	C2	C1	B4	B3	B2	B1	A4	A3	A2	A1				
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Human Rights Principles	W101	The first
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	sport	SHD101	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Arabic literature	D101	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	General Geologist	C100	

√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	**fundamental**	**Calculators**	**H127**	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	**fundamental**	**Calculus**	**MATH101**	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	**fundamental**	**Statistics**	**MATH117**	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	**fundamental**	**Material Properties**	**PHY102**	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	**fundamental**	**Organic Chemistry**	**CHEM112**	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	**fundamental**	**Analytical Chemistry**	**CHEM131**	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	**fundamental**	**General Biology**	**Y101**	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	**fundamental**	**Environment Basics**	**Y102**	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	**fundamental**	**Molecular cell biology**	**Y110**	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	**fundamental**	**Photography & Nature**	**EE111**	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	**fundamental**	**Principles of Freedom and Democracy**	**W201**	

√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Calculator Applications	H260	The second
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	biochemistry	CHEM240	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Plant classification	Y202	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Plant ecology	Y203	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Animal classification	Y204	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Animal ecology	Y205	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Climate changes	EE206	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Wanderers and productivity	Y207	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Biodiversity and sustainable development	Y208	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Microbiology environment	Y209	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Environmental Chemistry	Y210	

√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Environmental Geology	Y216	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	English Literature	D301	Third
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	marine environment	Y302	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Automated separation and analysis methods	Y303	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Wetland environment	Y304	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Air pollution	Y305	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Water and soil pollution	Y306	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Nature Reserves	Y310	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Freshwater and estuaries environment	Y311	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Natural resources and energy sources	Y314	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Environmental modeling	Y317	

√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Survey and environmental maps	EE316	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Meteorology	Y333	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Environmental disasters	Y340	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Organic pollution	EE343	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Microbial contamination	Y347	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Water Treatment Technologies	Y351	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Aquatic plants	EE356	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Radioactive contamination	Y370	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Environmental awareness	and 400	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Waste Treatment & Recycling	Y401	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Environmental Laws and Legislations	Y402	

√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Research Project	Y405	Fourth
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Environmental physiology	Y410	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	fundamental	Environmental toxins	Y421	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Molecular Environmental Biology	Y430	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Hydrologist	Y436	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Environmental Impact Assessment	Y444	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Intrusive plants and their environments	Y450	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Occupational Health and Safety	BIO452	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Plant Technologies	Y456	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Remote Sensing and GIS	Y465	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Industrial pollutants	Y476	

√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	elective	Environmental sanitation	EE487	

First Stage/ General Biology E101

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

1. Educational Institution	College of Science/ University of Basrah
2. Department	Ecology
3. Course name/Code	General Biology/ E101
4. Degree program	BSc.
5. Attendance Form Available	Weekly
6. Semester/ Year	First Semester/ 2020-2021
7. Total of study hours	30 hours + 60 practical hours
8. The course description was prepared in	01/09/2020
9. Aims of the Course	
Increase The student's ability to recognize the plants, their habitats, their appearance, how they relate to each other, where they grow, their importance, and how plants evolved. As well as to familiarize the student with the study of animals, their anatomy, habits, and behavior.	

10. Course outcomes and methods of teaching, learning and assessment

a- Knowledge and Understanding goals

a.1-To understand the scope of Botany.

a2- To understand the basic form of life.

a3- To understand the cell structure and identify the differences between animal and plant cells.

a4- To make the students exposed to the diverse plant life forms.

a5- To develop the ability of the students to identify the plants according to their evolution degree.

a6- To increase the student's ability to recognize the animals according to phyla, classes, orders, and species.

a7- To understand the evolution relationship[between animal phyla according to morphological and anatomical traits.

a8- To understand the importance of animal diversity.

a9- To understand the dynamic equilibrium within a community of organisms.

b- Subjective- Specific Skilles

b1- Recognize the position of the plant in the broad classification and phylogenetic level.

b2- Identifying the tissue construction of the animals from the simplest to the most complex.

Learning Methods

1. Explanation and Discussion of the Lectures
2. It is boosting the student to conduct research and reports.
3. Urging the student to make PowerPoint presentations.

Evaluating Methods

Theoretical and practical semester exams, in addition to the final exam

C- Emotional and evolutional goals

1. The ability to deliver information after monitoring and collecting data.
2. Linking knowledge to environmental reality

Learning Methods

1. Explanation and Discussion of the Lectures
2. Boosting the student to conduct research and reports.
3. Urging the student to make PowerPoint presentations

Evaluating Methods

1- Daily test and reports
2- Monthly exams
2- Final exams

d- General qualification skills transferred (other skills related to employability and personality development)

1. Developing the mental abilities of the student
2. Developing the skills
3. Dealing with field and laboratory

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

Sequencing of course content

Week	Hours	Course Outcomes	Unit name	Learning method	Evaluation method
1st week, 2ed, 3ed and 4th weeks	3 h. lect. 2h. lab.	Knowledge and understanding of lectures	General introduction about the plants The differences between living and non-living things Life dominoes and biological organization Cell and cell types Kingdome of Bacteria	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests
1st week, 2ed, 3ed and 4th weeks	3 h. lect. 2h. lab	Knowledge and understanding of lectures	First exam. Algae Fungi Lichens	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests
1st week, 2ed, 3ed and 4th weeks	3 h. lect. 2h. lab	Knowledge and understanding of lectures	Ferns Mosses Gymnosperms Angiosperms	Understand the evolving state of knowledge	Daily and monthly tests

				learn to carry out practical work, in the field and in the laboratory	
1st week, 2ed, 3ed and 4th weeks	3 h. lect. 2h. lab	Knowledge and understanding of lectures	Introduction to animals kingdom Living organisms (binomial &classification)	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests
1st week, 2ed, 3ed and 4th weeks	3 h. lect. 2h. lab.	Knowledge and understanding of lectures	Homeostasis and environment Basic tissues in different organisms(body structure(	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests
1st week, 2ed, 3ed and 4th weeks	3 h. lect. 2h. lab	Knowledge and understanding of lectures	Second exam. Organisms biodiversity	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests
1st week, 2ed, 3ed and 4th weeks	3 h. lect. 2h. lab	Knowledge and understanding of lectures	Organisms biodiversity (Continuation of the lecture) Skin structure and the modifications in variable organisms Digestive system in(fish, birds, mammals, ruminant	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests

11. Infrastructure	
1- Textbooks required for the course	**1- A class- Book of Botany, 7th edition 2005, Oxford University Press, India. By: A.C. Dutta** **2- Biology , Teresa A., Gerald A. and Bruce E. 2008**
2 References	**1- A textbook of Botany- Angiosperm, reprint ,2009. S. Chand and Company, India. By B.P. Pandy** **2- The plant Stem A microscopic Aspect, 2018, Springer, Switzerland** **3- Junqueira's Basic Histology TEXT AND ATLAS Anthony L. Mescher, PhD, 2018** **4- Junqueira's Basic Histology: Text & Atlas,2016**
Recommended readings	1- Introduction to Botany, 2018. Alexey Shipunov

1- Electronic website	1- http://ashipunov.info/shipunov/school/biol_154/ 2- https://www.selfstudys.com/books/ncert-notes/english/class-11th/biology/chapter-4-animal-kingdom/41431

12. Course Development Plan
course development based on recent versions of books and references.

First Stage/ Fundamental Ecology/ E102

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

1- Educational Institution	College of Science/ University of Basrah
2- Department	Ecology
3- Course name/Code	Fundamental Ecology/ E102
4- Degree program	BSc.
5- Attendance Form Available	Weekly
6- Semester/ Year	First Semester/ 2020-2021
7- Total of study hours	30 hours
8- The course description was prepared in	01/09/2020
9- Course Aims	
This course works on fundamental ecology and focuses on the interaction between organisms and the environment. Students investigate the relationship between abiotic and biotic components of an ecosystem. Students examine the interplay between these components at the organismal, population, community, and ecosystem levels.	
10- Course outcomes and methods of teaching, learning, and assessment	

A. Cognitive goals

A1- Get to know the ecosystem. A2- Learn about environmental terms. A3- Identify the components of the ecosystem. A4- Learn about the interactions that occur in the environment A5- To identify the environmental relationships between living and non-living components
B. Skills objectives of the course. B1- Acquire basic knowledge of the ecosystem and the terms used. B2 - Qualifying the student to learn about environmental sciences in the coming semesters. B3- Developing English language learning skills
Learning Methods
1- Theoretical and practical lectures. 2- Use of educational aids (presentations and scientific films). 3- Practical application.
Evaluation methods
Theoretical and practical semester exams, in addition to the final exam
C- Emotional and value goals 1 -The ability to monitor and collect environmental data - 2 To make the student look at the environment from a scientific point of view.
Teaching and learning methods
Explanation, direct speech, and presentation using illustrations
Evaluation methods
1- Daily quizzes and reports. 2- Monthly exams. 3- Final exams.
D- General qualification skills transferred (other skills related to employability and personality development) 1- Developing the skills. 2-Dealing with field and laboratory environmental measuring devices. 3-Developing the mental abilities of the student.
This course description summarizes the essential characteristics of the course and the learning outcomes expected of the student to achieve, demonstrating whether he has

made the most of the available learning opportunities. It must be linked to the description of the program.

Sequencing of course content

Week	Hours	Course Outcomes	Unit name	Learning method	Evaluation method
1st week, 2ed, 3ed and 4th weeks	3 h. lect. 2h. lab.	Knowledge and understanding of lectures	What is ecology? Divisions of ecology Ecosystem Ecosystem components Abiotic Components Biotic Components Producers Consumers	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests
1st week, 2ed, 3ed and 4th weeks	3 h. lect. 2h. lab	Knowledge and understanding of lectures	First exam.	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests
1st week, 2ed, 3ed and 4th weeks	3 h. lect. 2h. lab	Knowledge and understanding of lectures	Herbivores, Carnivores Omnivores, Decomposers Incomplete ecosystem Levels of studying ecology Population Community Biome Environment (biophysical)	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests
1st week, 2ed, 3ed and 4th weeks	3 h. lect. 2h. lab	Knowledge and understanding of lectures	Food chain trophic level Types of Food Chains found in Ecosystems Grazing food chain Detritus food chain Significance of food chain	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests
1st week, 2ed, 3ed and 4th weeks	3 h. lect. 2h. lab.	Knowledge and understanding of lectures	Food web feeding relations Energy flow in the food chain	Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory	Daily and monthly tests
1st week, 2ed, 3ed	3 h. lect. 2h. lab	Knowledge and understanding of lectures	Second exam.	Understand the evolving state of knowledge	Daily and monthly tests

and 4th weeks				**learn to carry out practical work, in the field and in the laboratory**	
1st week, 2ed, 3ed and 4th weeks	**3 h. lect. 2h. lab**	**Knowledge and understanding of lectures**	**Ecological Pyramids Pyramid of Number Pyramid of Biomass Pyramid of Energy Symbiosis Neutralism Mutualism Commensalism Competition Amensalism Predation Parasitism Parasitoidism**	**Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory**	**Daily and monthly tests**
1st week, 2ed, 3ed and 4th weeks	**3 h. lect. 2h. lab**	**Knowledge and understanding of lectures**	**Major elements cycles in nature carbon cycle Nitrogen cycle Phosphorus cycle Water cycle**	**Understand the evolving state of knowledge learn to carry out practical work, in the field and in the laboratory**	**Daily and monthly tests**

13. Infrastructure	
1- Textbooks required for the course	1- Odum, E. P. 1971. Fundamentals of Ecology. Philadelphia, PA: W.B. Saunders
2- References	McIntosh, R. P. 1985. The Background of Ecology: Concept and Theory. Cambridge, UK: Cambridge University Press.
3-Recommended readings	McIntosh, R. P. 1985. The Background of Ecology: Concept and Theory. Cambridge, UK: Cambridge University Press.
4- Electronic website	http://www.ecology.com/

14. Course Development Plan
course development based on recent versions of books and references.

The first stage / photography and nature J111

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Photography and nature (J 111)	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
First Semester 2020-2021	6- Semester / Year
15 credit hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description

9- Course Objectives
The student's ability to identify the basics of photography, types of digital cameras and their parts, how to adjust them, how they work, and how to capture, process and store digital images with appropriate extensions

10.Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1- Know the difference between photography with photographic cameras (with film) and digital cameras A2- The reason for resorting to the use of digital cameras A3- Parts of digital cameras and the most important terms related to digital photography A4- How to adjust the camera and its mechanism of work. A5- Different automatic, semi-automatic and manual shooting modes. A6- Know the advantages and disadvantages of types of digital cameras and the types of lenses suitable for photography A7- Know how to adjust the settings in different weather conditions and how to adjust the camera to photograph wildlife A8- Know the most important image extensions and how the image is processed and stored
B - Skills objectives of the course. B1- How to hold the camera and learn to adjust the settings. B2- Take good pictures.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
Semester and final theoretical and practical exams
C. Emotional and value goals - Ability to photograph.
Teaching and learning methods

1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1- Developing the student's mental abilities 2- Developing skill capabilities 3- Dealing with the digital camera.

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

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	**General introduction** **The difference between a photographic and digital camera and the reason for resorting to digital cameras** **Continuation of the topic of the second week** **Explain the basic parts of the camera, the most important digital photography terms, and the appropriate settings to get a perfect and good image**	Student understanding of the lesson	2 N 2N	**The first** **The second** **And the third and fourth**

Daily and monthly tests	Theoretical and practical	**First theoretical exam Fundamentals of Digital Photography**	Student understanding of the lesson	1 n 1 n	**V and the sixth**
Daily and monthly tests	Theoretical and practical	**Continuation of the topic of the sixth week How the camera works**	Student understanding of the lesson	2 N	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	**Completion of the topic of the eighth week Types of digital cameras**	Student understanding of the lesson	2 N	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	**Completion of the topic of the tenth week Second theoretical exam Completing the basics of photography**	Student understanding of the lesson	2 N	**Eleventh and twelfth**
Daily and monthly tests	Theoretical and practical	**Types of lenses**	Student understanding of the lesson	1 n	**Thirteenth**
Daily and monthly tests	Theoretical and practical	**How to adjust camera settings and disk shooting modes and how to capture, process and store images with the appropriate extension**	Student understanding of the lesson	2 N	**Fourteenth and fifteenth and the sixteenth**

11.Infrastructure	
	1 Required textbooks
1) Better photo Basic. Jim Miotke 2) Secret of photography. Scott Kelby , 2012	2 Main references (sources)
Secrets of digital photography. Abdulaziz Abdulhameed National geographic abo Dubai	Recommended books and references (scientific journals, reports,....)
Coursera | Online Courses & Credentials From Top Educators. Join for Free	B Electronic references, websites ...

12.Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

First Stage / Computer Fundamentals C127

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
C127 Computer Fundamentals	3- Course Name/Code
Weekly in person and electronically	4- Available Attendance Forms
2019-2020	5- Semester / Year
30 credit hours + 60 hours of practical	6- Number of Credit Hours (Total)
6/9/2020	7- The history of preparation of this description
8- Course Objectives	
The student's ability to know the origin of the computer and understand its components.	
Use Office Office programs	
Use of Google applications	

9- Course Outcomes and Methods of Teaching, Learning and Assessment
A - cognitive objectives. A1- Identify the components of an electronic computer A2- Identify the origin and development of the computer A3- Learn about the use of office programs
B - Skills objectives of the program: B1- Acquire the skills of using the calculator. B2- Acquire the skills of using computer applications.
Teaching and learning methods
1- Theoretical lectures. 2- Use of teaching aids (presentations and software applications) 3- Using online explanations through Google applications
Evaluation methods
- Semester and final theoretical exams - Daily Tests
C- Emotional and value goals: C1- Ability to use computer software. C2- Understand the components of the computer.
Teaching and learning methods
1- Explanation and delivery through Google applications. 2- Screen and the use of computer devices for software applications 3. Use of Social Media
Evaluation methods
1-Daily Test 2. Monthly Tests 3- Final exams

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

D1- Learn Office Office Office programs

D2-Learn Google Applications

D3- Understanding and learning computer parts

10- Course Structure

The week	Hours	Required Learning Outcomes	Unit / Subject Name	Method of education	Evaluation method
The first The second And the third and fourth	2 N	Student understanding of the lesson	**- Introductory introduction to the material and curriculum vocabulary -The emergence of the computer and the generations of the computer -Computer types - Computer physical parts (input units)**	electronic - theoretical	Daily and monthly tests
V and the sixth	2 N	Student understanding of the lesson	**--Computer Physical Parts (Output Units) -Memory and its types**	electronic - theoretical	Daily and monthly tests
Seventh and eighth	2 N	Student understanding of the lesson	**-Operating systems and processors -Protection of computers and its information**	electronic - theoretical	Daily and monthly tests
Ninth and tenth	2 N	Student understanding of the lesson	**- Types of computer hazards -Computer and the Internet and its dangers**	electronic - theoretical	Daily and monthly tests

11- Infrastructure

1- Required textbooks	1- Computer Basics and Office Applications Book
2- Main references (sources)	Office programs

	A) Recommended books and references (scientific journals, reports)
Google Software Applications	B) Electronic references, websites, ...
12- Course Development Plan	
Communicate in the development of the curriculum based on recent versions of books and references.	

Second Stage / Plant Classification J202

Course Description

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

University of Basrah – College of Science	13- Educational institution
ecology	14- Scientific Department / Center
Plant classification (J202)	15- Course Name/Code

Bachelor	16- Programs in which he enters
weekly	17- Available Attendance Forms
First Semester 2020-2021	18- Semester / Year
30 hours theoretical + 60 hours practical	19- Number of Credit Hours (Total)
1/9/2020	20- The history of preparation of this description
21- Course Objectives	
The student's ability to identify plant groups and how to diagnose them and identify their different parts, types, genera and families.	

13.Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1 - Knowledge of the descriptive terms of the phenotypic parts of the plant A2- Know other taxonomic evidence A3- Knowledge of pollination methods, breeding systems and classification A4- Knowing the name A5- Know the description of the families and the most important genera and species
B - Skills objectives of the course. B1- Identify the main sections of plant groups with examples of some families, genera and species. B2- Identify a practical picture of the role of plants in the environment.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports and collect plant samples. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods

Semester and final theoretical and practical exams
C. Emotional and value goals - The ability to communicate information after monitoring and collecting data. - Linking information to environmental reality and influencing other neighborhoods.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1- Developing the mental abilities of the student 2- Developing skill capabilities 3- Dealing with field and laboratory environmental measuring devices.
This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities . It must be linked to the program description.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	General introduction to taxonomy, plant classification, historical development, its relationship with other sciences and its importance to humans	Student understanding of the lesson	2 N 3p	**The first The second And the third and fourth**

Daily and monthly tests	Theoretical and practical	General terms and terms of leaf - stem and flower and their variations	Student understanding of the lesson	2 N 3p	**V and the sixth**
Daily and monthly tests	Theoretical and practical	Types of fruits, inflorescences and seeds and their taxonomic importance	Student understanding of the lesson	2 N 3p	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	Advanced taxonomic evidence	Student understanding of the lesson	2 N 3p	**Ninth**
Daily and monthly tests	Theoretical and practical	First Semester Exam	Student understanding of the lesson	2 N 3p	**X**
Daily and monthly tests	Theoretical and practical	Pollination, its types, methods and adaptations of flowers and pollen, its taxonomic characteristics and importance	Student understanding of the lesson	2 N 3p	**Eleventh**
Daily and monthly tests	Theoretical and practical	Field trip	Student understanding of the lesson	2 N 3p	**Twelfth**
Daily and monthly tests	Theoretical and practical	Reproduction systems and origin of flowering plants Classification systems, naming methods and diagnosis	Student understanding of the lesson	2 N 3p	**Thirteenth**
Daily and monthly tests	Theoretical and practical	Description of selected families of dicotyledons	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth**
Daily and monthly tests	Theoretical and	Complement the description of selected	Student understan	2 N 3p	**Sixteenth**

	practica l	families of dicotyledons and monocotyledons	ding of the lesson		

14.Infrastructure	
	1 Required textbooks
1- Flora of Iraq vol. 1-9 2- Ecology and Plant of basrah (2016). 3- Plant taxonomy	2 Main references (sources)
1- Flora of turkey 2- Flora of Iranica.	Recommended books and references (scientific journals, reports,....)
https://www.kew.org	B Electronic references, websites ...

15.Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Second Stage / Classification of Animal J204

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Animal classification J204	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
2020-2021	6- Semester / Year
30 Theoretical Credit Hours + 60 Practical Hours	7- Number of Credit Hours (Total)

1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify the principles of taxonomy, diagnose and name objects and place them in their appropriate taxonomic ranks.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment

A- Cognitive objectives

1- Identify the principles of taxonomy.

2- The importance of taxonomy in the diagnosis and naming of animal organisms.

3- Knowing the rules of writing the scientific name.

4- Arranging living organisms within taxonomic ranks, which facilitates dealing with them.

5- Identify the characteristics of living organisms and their taxonomic groups.

B - Skills objectives of the course.

- The ability to diagnose and classify living organisms.

2- Provides various types of taxonomic knowledge to scholars and practitioners in this field.

Teaching and learning methods

- Theoretical and practical lectures.

2- Use of teaching aids (presentations and scientific films)

- 3- Practicality

Evaluation methods

Semester and final theoretical and practical exams

C. Emotional and value goals

C1- The ability to communicate information after investigation and data collection.

C2- Linking information about the existence of animal organisms and their relationship with humans and other living organisms.

Teaching and learning methods

1- Explanation and direct delivery.
2- Using field skills and supplies in developing the student's ability to deal with living organisms in their environments.
3- Powerpoint presentation. and screen.

Evaluation methods

1. Daily testing and reports
2. Monthly Tests
3- Final Exams

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

1 - Development of the mental abilities of the student
2- Skill Development
3- Dealing with field and laboratory environmental measurement and diagnostic devices.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	Animal Kingdom taxonomy The importance of invertebrates Primary Division	Student understanding of the lesson	2 N 3p	**The first The second And the third and fourth**

Daily and monthly tests	Theoretical and practical	Division of pores or sponges Intestinal division of the cavity or stingers	Student understanding of the lesson	2 N 3p	**V and the sixth**
Daily and monthly tests	Theoretical and practical	Flatworms Division	Student understanding of the lesson	2 N 3p	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	Arthropods and ringworms division	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	Chordates Division (spear - circular mouth - fish)	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
Daily and monthly tests	Theoretical and practical	Amphibians and reptiles	Student understanding of the lesson	2 N 3p	**Thirteenth**
Daily and monthly tests	Theoretical and practical	Birds and mammasts	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth and the sixteenth**

11- Infrastructure	
1- Zoology.Author, Stephen A. Miller & John P. Harley, Vol. 5, 2001 2- Invertebrates, written by Zuhair Mohammed Abdullah Al-Sharouk, University of Mosul, 1989 3- The life of invertebrates. Translated by Salman Dawood Salman, Yahya Touma Dawood and Balsam Anis Hanna - University of Basra 2016	1 Required textbooks
1- Fundamentals of Comparative Anatomy of Chordates, authored by Shukri Habib Khalil and Abdel Zahra Kazem Muhammad - Salahaddin University 1985 3- General zoology. Fourteenth 2-adition,2005.Author,Charles F.Lytle&John R.Meyer. 4- Biology of the invertebrates. Author, Cleveland P. Hickman.1973	2 Main references (sources)
1- Principles of Animal Taxonomy. Author,Ashok Verma . 2015 The living marine resources of Kuwait, eastern-2 Saudi Arabia, Bahrain, Qater, and united arab Emarates.Author,Kent E.capenter.1997	Recommended books and references (scientific journals, reports,....)
www.epa.gov	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Phase II / Animal Environment J205

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Plant ecology (J203)	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
First Semester 2020-2021	6- Semester / Year
30 credit hours + 60 hours of practical	7- Number of Credit Hours (Total)

1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify the different environments of the plant, the influence of factors on its growth, development and distribution, and how to measure its quantitative and descriptive qualities.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1- Knowledge of vegetation cover, types, development and distribution in the world and in Iraq A2- Knowing the impact of environmental and climatic factors on it, A3- Knowledge of ecosystems and their types and their relationship to water and soil A4- Knowledge of plants and their natural communities and their distribution in Iraq A5- Know the role of plants in sustainable development
B - Skills objectives of the course. B1- Provide students with theoretical, applied and field information to help them develop their understanding, skills and scientific abilities in plant ecology and its applications B2- And know the relationship of plants with the different components of the environment
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports and collect plant samples and save them. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
Semester and final theoretical and practical exams
C. Emotional and value goals - The ability to communicate information after monitoring and collecting data. - Linking information to environmental reality and influencing other organisms.
Teaching and learning methods

1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1- Developing the mental abilities of the student 2- Developing skill capabilities 3- Dealing with field and laboratory environmental measuring devices.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	General introduction to plant ecology, evolutionary history and importance to society	Student understanding of the lesson	2 N 3p	**The first The second And the third and fourth**
Daily and monthly tests	Theoretical and practical	Vegetation cover, origin, development and succession in land and water	Student understanding of the lesson	2 N 3p	**V and the sixth**
Daily and monthly tests	Theoretical and practical	Plant formations, plant migration and geographical distribution in the world	Student understanding of the lesson	2 N 3p	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	Methods of measuring vegetation cover and biodiversity and how to protect them	Student understanding of the lesson	2 N 3p	**Ninth**
Daily and monthly tests	Theoretical and	Natural Plant Distribution Areas in Iraq and Communities	Student understanding of	2 N 3p	**X**

	practical		the lesson		
Daily and monthly tests	Theoretical and practical	Field trip	Student understanding of the lesson	2 N 3p	**Eleventh**
Daily and monthly tests	Theoretical and practical	First Exam	Student understanding of the lesson	2 N 3p	**Twelfth**
Daily and monthly tests	Theoretical and practical	Desert plants, intermediate plants and aquatic plants	Student understanding of the lesson	2 N 3p	**Thirteenth**
Daily and monthly tests	Theoretical and practical	Environmental environment and non-living factors and their effects on plants	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth**
Daily and monthly tests	Theoretical and practical	Deserts and desertification and how to resist them	Student understanding of the lesson	2 N 3p	**Sixteenth**

11- Infrastructure	
	1 Required textbooks
1- Flora of Iraq vol. 1-9 2- Ecology and Plant of basrah (2016). 3- Plant Geographic	2 Main references (sources)
1- Kuwait Environment & Flora 2- Basra Marshes Magazine	Recommended books and references (scientific journals, reports,....)
https://www.kew.org	B Electronic references, websites.

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Second Stage / Plankton and productivity J207

Course Description

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

University of Basrah – College of Science	1. Educational institution
ecology	2. Scientific Department / Center
Plankton and primary productivity / J207	3. Course Name/Code
Bachelor	4. Programs in which he enters
weekly	5. Available Attendance Forms
2020-2019	6. Semester / Year
30 Theoretical credit hours + 60 practical hours	7. Number of Credit Hours (Total)

1-10-2020	8. The history of preparation of this description

9. Course Objectives

The student's ability to identify plant and animal plankton, their types, classification, environmental and economic importance, as well as their distribution in the environment. As well as methods of measuring primary productivity in the environment and the factors affecting it.

10- Course Outcomes and Methods of Teaching, Learning and Assessment

A- Cognitive objectives

A1-A1- Identification of groups and types of major phytoplankton.
A2- Identify the groups and types of the main zooplankton.
A3- Identify the environmental and economic importance of plankton
A4- Knowing the environmental conditions affecting their growth and prosperity and their relationship with each other
A5- Measurement of primary productivity of phytoplankton in the environment
A6- Knowing the environmental circumstance affecting primary productivity

B - Skills objectives of the course.

B1 - B1 – Acquire the skill of diagnosing and classifying phytoplankton and animals present in the environment.
B2 – Acquire the skill of measuring primary productivity and analyzing its results
B3 - Inferring the quality of ecosystem health through knowledge of the diversity of plankton present in it

Teaching and learning methods

- Theoretical and practical lectures.
- 2- Use of teaching aids (presentations and scientific films)
3- Practical application, which includes the examination of chips and ready-made models installed and live plankton and the conduct of primary productivity measurement laboratory and field.

Evaluation methods

1. Daily tests and laboratory reports
2. Monthly Tests
3- Final exams

C. Emotional and value goals

C1- The ability to recognize the health of the ecosystem through the biodiversity of plankton.

C2 - Linking the environmental imbalance with the number and types of plankton present

C3- Assess the state of the ecosystem and its impact on the rest of the elements of the system and the environment.

Teaching and learning methods

1- Explanation and direct delivery of lectures.

2- Using light and anatomical microscopy and live and fixed models of plankton and conducting a productivity measurement experiment

3- **Powerpoint** presentation and screen.

Evaluation methods

1- Follow-up laboratory reports and drawings for models and slides
2-Final Exams

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

-D1- Developing the mental abilities of the student
D2- Skill capacity development
D3- Dealing with ordinary and anatomical light microscopes.
D4- Monitoring and evaluating the environment.

11- Course Structure

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	Theoretical: Introduction to the definition of plankton, their environmental divisions, benefits and harms. Practical: Introduction Definition of plankton Methods of collection and preservation Methods of preparing samples and slices for diatomaceous and non-diatomaceous algae	Student understanding of the lesson	2 N 3p	**The first The second and the third**

Daily and monthly tests	Theoretical and practical	Phytoplankton blue-green, greens and euglinis Proat, zero, gold, and diatomy	Student understanding of the lesson	2 N 3p	**Fourth Fifth and the sixth**
Daily and monthly tests	Theoretical and practical	Zooplankton and methods of collection, preservation, counting and diagnosis	Student understanding of the lesson	2 N 3p	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	Ciliates, flagella, intestinal subterranean arthropods and wheels	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	Plankton environment: impact of environmental factors on plankton	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
Daily and monthly tests	Theoretical and practical	The relationship of phytoplankton with animal	Student understanding of the lesson	2 N 3p	**Thirteenth**
Daily and monthly tests	Theoretical and practical	Measurement of primary and secondary productivity	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth**

12- Infrastructure	
	1 Required textbooks

*Marine planktology. Zheng Zhong et al, 1989 *Phycology, Lee, (2008). *Ecology of Phytoplankton. C. S. Reynolds, (2006). *Plankton, A guide to their ecology and monitoring for water quality, Iain M. Suthers and David Rissik, (2009).	2 Main references (sources)
*Freshwater algae of North America, ecology and classification. Wehr and Sheath, (2003). *Freshwater algae, identification and use as bioindicators,. Bellinger and Sigee, (2010). *Identification Handbook of Freshwater Zooplankton of the Mekong River and its Tributaries, (2015).	Recommended books and references (scientific journals, reports,....)
www.plankton.net www.epa.gov	B Electronic references, websites ....

13- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references. And the adoption of modern interactive teaching methods. And activating the adaptation programs with international universities to see modern curricula and teaching methods and exchange experiences

Phase II / Biodiversity and Sustainable Development J208

Course Description

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

University of Basrah – College of Science	1- Educational institution

ecology	2- Scientific Department / Center
Biodiversity and sustainable development E208	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
2020-2021	6- Semester / Year
30 Theoretical Credit Hours + 60 Practical Hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to understand biodiversity, its divisions, the factors affecting it, and the evidence used in measuring it	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives 1- Identify the components of the ecosystem and the importance of biodiversity and its sections. 2- The importance of biodiversity for the stability of ecosystems. 3- Identify the factors affecting biodiversity and species extinction. 4- Identify the most common indicators in calculating biodiversity. 5- Identify the primary and secondary succession and its types.
B - Skills objectives of the course. 1- Use common biodiversity guides. 2- Studying the biodiversity of different types of living organisms (plants and animals).
Teaching and learning methods
1- Theoretical and practical lectures. 2- Use of teaching aids (presentations and scientific films) 3- Practicality

Evaluation methods
Semester and final theoretical and practical exams
C. Emotional and value goals - The ability to communicate information after collecting and analyzing data. - Link information to the reality of the ecosystem.
Teaching and learning methods
- Direct explanation and delivery. - The use of scientific films. - Powerpoint presentation. and screen.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). -Developing the mental abilities of the student -Skill capacity development - Dealing with field and laboratory environmental measuring devices.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week

Daily and monthly tests	Theoretical and practical	- **Introduction to the environment and biodiversity** - **Food chains and nets (water and terrestrial)**	Student understanding of the lesson	2 N 3p	**The first The second And the third and fourth**
Daily and monthly tests	Theoretical and practical	**Diversity of habitats, aquatic environments, land environments**	Student understanding of the lesson	2 N 3p	**V and the sixth**
Daily and monthly tests	Theoretical and practical	**First Exam**	Student understanding of the lesson	2 N 3p	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	**Different uses of biodiversity guides, sovereignty**	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	**Plant diversity, water layers (trees, shrubs and grasses), qualitative composition of plant communities, transition zones, ecological succession**	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
Daily and monthly tests	Theoretical and practical	**Loss of biodiversity, factors affecting**	Student understanding of the lesson	2 N 3p	**Thirteenth**

		biodiversity (living and living)			
Daily and monthly tests	Theoretical and practical	**Sustainable Development: The Concept of Sustainability Scientific foundations of sustainability Solutions**	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth and the sixteenth**

11- Infrastructure	
	1 Required textbooks
1- Krebs, C. J.C.2013. The Experimental Analysis of Distribution and Abundance. 6th edition. Parson Eduction,Limited.] 2-Krebs, C. J.C.2009. The Experimental Analysis of Distribution and Abundance. 6th edition. Parson Eduction,Limited.	2 Main references (sources)
Miller, G. T.2002. Living in the Environment.12th Edition. Thomson Learing 2002	Recommended books and references (scientific journals, reports,....)
www.epa.gov	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Second Stage / Microbiology Environment J209

Course Description

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

University of Basrah – College of Science	1- Educational institution

ecology	2- Scientific Department / Center
Microbiology (J 209)	3- Course Name/Code
Bachelor, Master, PhD	4- Programs in which he enters
weekly	5- Available Attendance Forms
First Semester 2020-2021	6- Semester / Year
30 Theoretical Credit Hours + 60 Practical Hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify microbiology groups in the environment and their environmental role and how to benefit from them in our daily lives.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1- Knowledge of the basic groups of microorganisms in the environment A2- Identify how microorganisms affect different parts of the environment and how they are affected by them. A3- Identify the role of the microorganism in different environments. A4- Knowing the impact of various environmental factors on the presence of microorganisms in the environment. A5- Know the environmental role played by microorganisms in different environments. A6- Knowing the harms and benefit of the presence of the organism in different environments and how to harness them for the benefit of humans.
B - Skills objectives of the course. B1- Practical identification of the main groups of microorganisms. B2- Identifying in a practical way the role of the microorganism in the environment.

Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
Semester and final theoretical and practical exams
C. Emotional and value goals - The ability to communicate information after monitoring and collecting data. - Linking information to environmental reality and influencing other neighborhoods.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1- Developing the student's mental abilities 2- Developing skill capabilities 3- Dealing with field and laboratory environmental measuring devices.
This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities . It must be linked to the program description.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week

Daily and monthly tests	Theoretical and practical	**General introduction** **The main types of microorganisms in the environment** **Continuation of the topic of the second week** **Soil microbiology** **Continuation of the topic of the third week**	Student understanding of the lesson	2 N 3p	**The first** **The second** **And the third and fourth**
Daily and monthly tests	Theoretical and practical	**First theoretical exam** **Microbiology in water**	Student understanding of the lesson	2 N 3p	**V** **and the sixth**
Daily and monthly tests	Theoretical and practical	**Continuation of the topic of the sixth week** **Microbiology in the air environment**	Student understanding of the lesson	2 N 3p	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	**Completion of the topic of the eighth week** **Microbiology in extreme environments**	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	**Completion of the topic of the tenth week** **Second theoretical exam carbon cycle**	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
Daily and monthly tests	Theoretical and practical	**Nitrogen cycle**	Student understanding of the lesson	2 N 3p	**Thirteenth**
Daily and monthly tests	Theoretical and practical	**Sulfur and iron cycle** **Harms and benefits resulting from the role of microorganisms in the cycles of elements**	Student understanding of the lesson	2 N 3p	**Fourteenth** **and fifteenth**

		Bioremediation using microbiology			**and the sixteenth**

11- Infrastructure	
	1 Required textbooks
1- Environmental microbiology , Second ed., Maier et al.(2009). 2- Topics in ecological and Environmental microbiology, Schmidt & Schaechter (2009). 3- Environmental microbiology, Spencer et al.(2004).	2 Main references (sources)
1- Applied and Environmental microbiology 2- Environmental microbiology journal	Recommended books and references (scientific journals, reports,....)
www.epa.gov	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Second Stage / Environmental Chemistry J210

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Environmental Chemistry Y210	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms

2020-2021	6- Semester / Year
30 credit hours + 60 hours of practical	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify the most important sources of chemicals, their interactions, transformations and effects on the environment, humans and other organisms.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives 1- Identify the components of the atmosphere, water and land. 2- Chemical reactions that occur in the atmosphere of different substances and their environmental and health effects. 3- Chemical reactions and transformations that occur in the aquatic environment of different materials and the role of aquatic organisms and environmental conditions in those transformations. 4- Chemical reactions and transformations that occur in the land environment of different materials and their different effects on terrestrial organisms. 5- Biogeochemical cycles of carbon, nitrogen, phosphorus, sulfur elements. - Identify the components of the atmosphere
B - Skills objectives of the course. 1- Acquire the skills of examination and measurement of chemicals in air, water and soil. 2- Identify the most important transformations that occur in various chemicals.
Teaching and learning methods
1- Theoretical and practical lectures. 2- Use of teaching aids (presentations and scientific films). 3- Practicality
Evaluation methods
Semester and final theoretical and practical exams

C. Emotional and value goals - The ability to communicate information after monitoring and collecting data. - Linking information to the health reality of humans and influencing other neighborhoods.
Teaching and learning methods
- Direct explanation and delivery. - The use of devices in measuring air pollutant concentrations. - Powerpoint presentation. and screen.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). - Developing the mental abilities of the student - Development of skill capabilities - Dealing with field and laboratory environmental measuring devices in a scientific and accurate manner.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	**General introduction Identify the layers of the atmosphere, their characteristics, the most important chemical components, their interactions and their**	Student understanding of	2 N 3p	**The first The second And the third and fourth**

		biological and environmental effects.	the lesson		
Daily and monthly tests	Theoretical and practical	**First theoretical exam Introduction to the water environment and the most important chemical components in it**	Student understanding of the lesson	2 N 3p	**V and the sixth**
Daily and monthly tests	Theoretical and practical	**Water-dissolved gases and their effects on biology and their interactions and transformations in the aquatic environment**	Student understanding of the lesson	2 N 3p	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	**Acidic and basic in the aquatic environment and its changes and effects on biology**	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	**Completion of the topic of the tenth week Second theoretical exam**	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
Daily and monthly tests	Theoretical and practical	**The terrestrial environment and the most important basic and non-essential elements and their effects on biology**	Student understanding of the lesson	2 N 3p	**Thirteenth**

Daily and monthly tests	Theoretical and practical	**Cycles of elements (carbon, nitrogen, phosphorus and sulfur) in the three environments.**	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth**

11- Infrastructure	
	1 Required textbooks
2- ENVIRONMENTAL Chemistry, Manahan, Stanley E (2001)	2 Main references (sources)
ENVIRONMENTAL CHEMISTRY - UNIT 14http://www.ncert.nic.in/ncerts/l/kech207.pdf https://www.google.iq/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=environmental+chemistry+pdf	Recommended books and references (scientific journals, reports,....)
https://en.wikipedia.org/w/index.php?title=Environmental_chemistry&action=edit https://www.chem.utoronto.ca/research/environmental.php	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Second Stage / Calculator Applications H260

Course Description

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

University of Basrah - College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Computer Applications C260	3- Course Name/Code
Weekly	4- Available Attendance Forms
2019-2020	5- Semester / Year
30 credit hours + 60 hours of practical	6- Number of Credit Hours (Total)

6/9/2020	7- The history of preparation of this description

8- Course Objectives
The student's ability to use equations for environmental sciences in electronic computer programs and draw them

9- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- Getting acquainted with the MATLAB computer program A2- Learn how to use the program to solve mathematical equations A3- Identify the use of the program by solving vectors and matrices A4- Identify the drawing of mathematical equations using the program
B - Course skills objectives B1 - Acquisition of mathematical analysis skills. B2- Acquire drawing skills for environmental factors.
Teaching and learning methods
1- Theoretical lectures. 2- Use of teaching aids (presentations and software applications)
Evaluation methods
- Semester and final theoretical exams - Daily Tests
C- Emotional and value goals: C1- The ability to use computer software to analyze environmental equations. C2- Identify and draw environmental factors and their effects on environmental samples.
Teaching and learning methods
1- Explanation and direct delivery. 2- Screen and the use of computer devices for software applications 3-Online Applications

Evaluation methods
1-Daily Test 2. Monthly Tests 3- Final exams
d. General and qualifying skills transferred (other skills related to employability and personal development). D1- Developing the mental abilities of the student D2- Skill capacity development

10- Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Daily and monthly tests	theoretical	-Introduction to MATLAB and program interfaces -Variables and constants in MATLAB and arithmetic sentences -Vectors (Part I) - Vectors (Part II)	Student understanding of the lesson	2 N	**The first The second And the third and fourth**
Daily and monthly tests	theoretical	-Matrices and calculations on them -Types of matrices and matrix functions	Student understanding of the lesson	2 N	**V and the sixth**
Daily and monthly tests	theoretical	-Input sentences -Directing sentences	Student understanding of the lesson	2 N	**Seventh and eighth**
Daily and monthly tests	theoretical	-جمل التكرار (for) -جمل التكرار (while)	Student understanding of the lesson	2 N	**Ninth and tenth**
Daily and monthly tests	theoretical	-Charts (Part I) -Graphs (Part II)	Student understanding of the lesson	2 N	**Eleventh and twelfth**
Daily and monthly tests	theoretical	-Conditional sentences	Student understanding of the lesson	2 N	**Thirteenth**

11- Infrastructure	
	1- Required textbooks

4- Matlab 6.5 Reference and Educational Guide, Eng. Abdul Karim Al-Beko, Shuaa Publishing House	2 Main references (sources)
MATLAB Help Version 6.5	Recommended books and references (scientific journals, reports,....)
www.Mathworks.com octaveonline.com	B Electronic references, websites ...
12- Course Development Plan	
Communicate in the development of the curriculum based on recent versions of books and references.	

Third Stage / Marine Environment J302

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Marine Environment 302	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
2020-2021	6- Semester / Year

30 Theoretical Credit Hours + 60 Practical Hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify the marine environment and global phenomena.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives 1- Identify the formation of seas and oceans 2- Access to the topography of the seas 3- Identify the sections of marine environments 4- Identify the most important sea currents 5- Identify the characteristics of marine waters 6- Marine phenomena
B - Skills objectives of the course. 1- Acquire the skills of examination and measurement used in the seas. 2- Expanding marine culture and how to protect the marine environment
Teaching and learning methods
1- Theoretical and practical lectures. 2- Use of teaching aids (presentations and scientific films) 3- Practicality
Evaluation methods
Discussion during the lecture and theoretical and practical tests in the semester and final
C. Emotional and value goals - The ability to explain natural phenomena. - Basic knowledge of the marine environment
Teaching and learning methods

- Explanation and direct delivery. - The use of devices in measuring marine environmental factors. - Access to ships and navigation - Powerpoint presentation. and screen.
Evaluation methods
- Daily test and discussion during the lecture - Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). - Developing the mental abilities of the student - Development of skill capabilities - Dealing with field and laboratory environmental measuring devices.
This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities . It must be linked to the program description.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	**Introduction The theory of the origin of the universe and oceanic basins Stretches and depths of the oceans Continental Shelf Marine Ponds**	Student understanding of the lesson	2 N 3p	**The first The second And the third and fourth**

		Bridges or sea chains **Marine trenches** **Division of oceans** **Water Area** **Benthic region** **Sea currents** **Creoles effect** **Surface currents**			
Daily and monthly tests	Theoretical and practical	**Marine Whirlpools** **El Nino phenomenon** **Subsurface water movement** **Life characteristics of the marine environment** **Marine plankton** **Marine phytoplankton** **Productivity in the seas**	Student understanding of the lesson	2 N 3p	**V and the sixth**
Daily and monthly tests	Theoretical and practical	**Determinants of primary productivity** **Distribution of primary productivity in the world's seas**	Student understanding of the lesson	2 N 3p	**Seventh and eight**

		Secondary productivity Upper displacement or emanation Red Tide Physical properties of water Hydrogen bonding of water			
Daily and monthly tests	Theoretical and practical	**Freezing Surface tension Viscosity Heat Capacity Thermal slope Salinity distribution in seas and oceans Mediterranean Sea**	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	**Red Sea Persian Gulf Vertical distribution of salinity of sea and ocean water, with depth Dissolved gases in seawater**	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**

		Water Specific Density and Pressure Hydro pressure and diving Some weather diseases			
Daily and monthly tests	Theoretical and practical	**Sunlight and sea water color pH Tides Sea Waves**	Student understanding of the lesson	2 N 3p	**Thirteen**
Daily and monthly tests	Theoretical and practical	**Marine environments Sandy beaches environment Rocky coastal environment: Estuarine environment Salt marsh ecology Clay Earth Environment Mangrove Environment Coral reef ecology**	Student understanding of the lesson	2 N 3p	**Fourteen and fifteenth and the sixteenth**

11- Infrastructure	
Tait, R.V. and F. A. Dipper (1998). Elements of Marine Ecology Fourth Edition. British Library	1 Required textbooks

Tait, R.V. and F. A. Dipper (1998). Elements of Marine Ecology Fourth Edition. British Library	2 Main references (sources)
Barnes, R. S. K and R. N. Hughes (2009) An Introduction to Marine Ecology, Third Edition. Blackwell Science Ltd	Recommended books and references (scientific journals, reports,....)
http://faculty.virginia.edu/pace/documents/Publications/Marino%20et%20al.%20MEPS%202006.pdf	B Electronic references, websites ...

12- Course Development
Communicate in the development of the curriculum based on recent versions of books and references.

Third Stage / Methods of separation and automatic analysis
J303

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Analysis and methods of separation J303	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
First Semester 2020-2021	6- Semester / Year
30 credit hours + 60 hours of practical	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify the principles of instrumental analysis and various measurement methods .	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1- Identify the types of chemical analysis A2- The importance of different methods of diagnosing vehicles. A3- Identify the principles of the work of the devices used to diagnose chemical compounds. A4- Identify the ability of each device in diagnosing a specific group of different chemical compounds. A5- Knowing the most important modern devices used in the diagnosis of compounds, elements and environmental toxins.
B - Skills objectives of the course. 1- Acquire the skills of examination, measurement and diagnosis of various materials and compounds in the environment. 2- Acquire the skills of using modern diagnostic devices.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Theoretical and practical lectures. 4- Use of teaching aids (presentations and scientific films) 5- Practicality
Evaluation methods
Semester and final theoretical and practical exams
C. Emotional and value goals - The ability to communicate information after monitoring and collecting data. - Linking information to environmental reality and influencing other neighborhoods.
Teaching and learning methods
1- Explanation and direct delivery. 2- The use of devices in measuring the concentrations of compounds and various elements. 3- العرض التقديمي Power point. والشاشة.
Evaluation methods
1. Daily testing and reports

2. Monthly Tests
3- Final Exams

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

1- Developing the student's mental abilities
2- Developing skill capabilities
3- Dealing with field and laboratory environmental measuring devices.

Course Structure

Evaluation method	**Learning method**	**Unit Name**	**Learning Outcomes**	**Hours**	**The week**
Daily and monthly tests	Theoretical and practical	Introduction to Analytical Chemistry, Types of Analytical Chemistry, Separation Methods, Types of Separation	Student understanding of the lesson	2 N 3p	The first The second And the third and fourth
Daily and monthly tests	Theoretical and practical	- Spectroscopic methods by analysis -Emission and absorption devices	Student understanding of the lesson	2 N 3p	V and the sixth
Daily and monthly tests	Theoretical and practical	-Fluorescence device -Spectro Photometer	Student understanding of the lesson	2 N 3p	Seventh and eighth
Daily and monthly tests	Theoretical and practical	First Monthly Exam - Spectral Absorption	Student understanding of the lesson	2 N 3p	Ninth and tenth

Daily and monthly tests	Theoretical and practical	- Atomic absorption spectrometry - Chromatographic separation	Student understanding of the lesson	2 N 3p	Eleventh and twelfth
Daily and monthly tests	Theoretical and practical	Gas chromatography	Student understanding of the lesson	2 N 3p	Thirteenth
Daily and monthly tests	Theoretical and practical	High Performance Liquid Chromatography Chromatography of the mass spectrum of the second exam	Student understanding of the lesson	2 N 3p	Fourteenth and fifteenth and the sixteenth

11- Infrastructure	
	1 Required textbooks
1- Instrumental Analysis in Analytical Chemistry - authored by Muayad Qasim Al-Abaji and Muhammad Saleh Abdul Qadir Al-Hafez - 2002 **2- Analytical Chemistry: Basic Concepts in Traditional and Automated Analysis, 2012 Dr. Abdullah Mahmoud Abu Al-Kabash**	**2 Main references (sources)**
1- Basic Concepts Of Analytical chemistry Author M Khopkar,2nd Edition 2004 **2- Fundamentals of Analytical Chemistry** **Douglas A. Skoog, Donald M. West, F. James Holler - 1996 y**	**Recommended books and references (scientific journals, reports ,....)**
- **www.epa.gov** **https://books.google**	**B Electronic references, websites ...**

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Third Stage / Wetland Environment J304

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Wetland environment (J 304)	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
First Semester 2020-2021	6- Semester / Year
30 credit hours + 60 hours of practical	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
Introducing the student to the different wetland environments, studying their physical and chemical properties, identifying various biological groups, and showing the role of wetlands in nutrient recycling.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1- Knowledge of the different scientific and administrative definitions of wetlands

A2- Knowing the general characteristics of wetlands and their distinctive features.

A3- Knowledge of the science of wetlands water, its sources and its importance for wetlands.

A4- Knowledge of wetland soil, its types and distinctive characteristics

A5- Study of biochemical recycling of the most important nutrients in wetlands

A6- Identify the different biological groups in the wet ground.

B - Skills objectives of the course.

B1- Identify the importance of wet ground in the surrounding environment in an accurate scientific manner.

B2- Identify the different biological groups and the role of each group in the food pyramid.

Teaching and learning methods

1- How to explain the lecture and interactive discussion
2- Urging the student to conduct research and reports.
3- Encourage the student to conduct PowerPoint presentations.

Evaluation methods

Semester and final theoretical and practical exams

C. Emotional and value goals

1- The ability to communicate information in an easy and understandable way.

2- Linking information to environmental reality to show the importance of wetlands.

Teaching and learning methods

1- The method of explaining the lecture and discussion.
2- Urging the student to conduct research and reports.
3- Encourage the student to conduct PowerPoint presentations.

Evaluation methods

-Daily testing and reports
-Monthly tests
- Final exams

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

1- Developing the mental abilities of the student
2- Developing skill capabilities
3- Dealing with field and laboratory environmental measuring devices.

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

Course Structure

Evaluation method	**Learning method**	**Unit Name**	**Learning Outcomes**	**Hours**	**The week**
Daily and monthly tests	Theoretical and practical	Introduction to Wetlands Wetland definitions Characteristics and features of wetlands Definitions of administrative and scientific wetlands**.**	Student understanding of the lesson	2 N 3p	**The first The second and the third**
Daily and monthly tests	Theoretical and practical	Wetland Wetland soil science	Student understanding	2 N 3p	**Fourth V**
		First theoretical exam			**Sixth**
Daily and monthly tests	Theoretical and practical	Wetland biota Microbiology (bacteria, algae fungi)	Student understanding of the lesson	2 N 3p	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	Wetland plants Wetland invertebrates	Student understanding of the lesson	2 N 3p	**Ninth and the tenth**

Daily and monthly tests	Theoretical and practical	Wetland fish Wetland birds	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
		Second theoretical exam			**Thirteenth**
Daily and monthly tests	Theoretical and practical	Wetland blocks Established wetlands (industrial) and their role in treating polluted water and recycling it to the environment	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth and the sixteenth**

11- Infrastructure	
	1 Required textbooks
1- Wetland Ecology , Principles and Conservation. SECOND EDITION. PAUL A. KEDDY. (2010). 2- Wetlands . Fifth Edition. William J. Mitsch, James G. Gosselink. (2015) 3- Wetland Indicators, A Guide to Wetland Formation, Identification, Delineation, Classification, and Mapping. Second Edition.Ralph W. Tiner. (2017) 4- WETLAND IDENTIFICATION AND DELINEATION. SECOND EDITION . JOHN GRIMSON LYON , LYNN KRISE LYON. (2011).	2 Main references (sources)
1- Wetlands: Functioning,Biodiversity Conservation, and Restoration. R. Bobbink, B. Beltman , . T.A.Verhoeven, D.F.Whigham. (2006). 2- Multifunctional Wetlands, Pollution Abatement and Other Ecological Services from Natural and Constructed Wetlands. Nidhi Nagabhatla, Christopher D. Metcalfe. (2018)	Recommended books and references (scientific journals, reports,....)
https://www.wetlands.org	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Stage III / Air Pollution J305

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he

or she has made the most of the available learning opportunities . It must be linked to the program description.

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Air pollution E305	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
2020-2021	6- Semester / Year
30 credit hours + 60 hours of practical	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify the nature of air pollution, its sources, effects and methods of control.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives 1. Identify the components of the atmosphere 2- The importance of the atmosphere for different organisms. 3- Identify the health effects of external and indoor air pollutants. 4- Identify fixed and mobile sources of air pollutants 5- Identify methods of treating and controlling air pollutants.

B - Skills objectives of the course.

1- Acquire the skills of examination and measurement of air pollutants.

2- Reduce air pollution.

Teaching and learning methods

1- Theoretical and practical lectures.

2 - Use of teaching aids (presentations and scientific films)

3- Practicality

Evaluation methods

Semester and final theoretical and practical exams

C. Emotional and value goals

- The ability to communicate information after monitoring and collecting data.
- Linking information to the health reality of humans and influencing other neighborhoods.

Teaching and learning methods

- Direct explanation and delivery.
- The use of devices in measuring air pollutant concentrations.
- Powerpoint presentation. and screen.

Evaluation methods

-Daily testing and reports

-Monthly tests

- Final exams

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

-Developing the mental abilities of the student

-Skill capacity development

- Dealing with field and laboratory environmental measuring devices.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	-Overview and introduction to exposure assessment	Student understanding of the lesson	2 N 3p	**The first The second And the third and fourth**
Daily and monthly tests	Theoretical and practical	-Gaseous pollutants	Student understanding of the lesson	2 N 3p	**V and the sixth**
Daily and monthly tests	Theoretical and practical	-Particulate pollutants	Student understanding of the lesson	2 N 3p	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	-Indoor air pollution	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	-Respiratory deposition of environmental contaminants	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
Daily and monthly tests	Theoretical and practical	-The measurement and monitoring of air pollution -AQI	Student understanding of the lesson	2 N 3p	**Thirteenth**
Daily and monthly tests	Theoretical and practical	-The regulatory control of air pollution -Preventing and controlling air pollution	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth and the sixteenth**

11- Infrastructure	
Air pollution by Hamed Taleb Al-Saad and Nader Abdulsalman / Al-Surra University	1 Required textbooks
4- Fundamental of Air pollution 4th Edition Author Daniel Vallero	2 Main references (sources)
1- Indoor Environmental Quality 2001 Author Thad Godish 2- Air pollution authored by Dr. Ali Hassan Moussa - second edition - 1996 Environmental Pollution Written by Abdulhadi Yahya Al-Sayegh and Arwa Shazl Taqa 2002	Recommended books and references (scientific journals, reports,....)
www.epa.gov	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Stage III / Water and soil pollution J306

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Water and soil pollution Y306	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
First Semester 2020-2021	6- Semester / Year
30 credit hours + 60 hours of practical	7- Number of Credit Hours (Total)

1/9/2020	8- The history of preparation of this description

9- Course Objectives

The student's ability to identify the different types ofwater and soil pollutants and ways to control and reduce them.

10- Course Outcomes and Methods of Teaching, Learning and Assessment

A- Cognitive objectives

A1- Identify the components of the water environment and soil.
A2- The importance of the aquatic environment for life on Earth.
A3- Identify the most important forms of environmental pollution.
A4- Identify the sources of pollutants in the environment.
A5- Identify the effects of various environmental pollutants on different forms of life and the imbalance they cause to the ecosystem and its balance.
6- Knowing ways to reduce pollution and its treatments..

B - Skills objectives of the course.

1- Learn methods of diagnosis and estimation of pollutants in the environment.
2- Reducing environmental pollution.

Teaching and learning methods

1- The method of explaining the lecture and discussion.
2- Urging the student to conduct research and reports.
3- Encourage the student to conduct PowerPoint presentations.
4- Practicality

Evaluation methods

Semester and final daily theoretical and practical tests

C. Emotional and value goals

C1- The ability to communicate information after monitoring and collecting data.
C2- Linking information to the environmental and health reality of humans and other organisms.

Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Daily testing and reports -Monthly tests - Final Exams- Direct explanation and delivery.
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1- Developing the student's mental abilities 2- Developing skill capabilities 3- Dealing with field and laboratory environmental measuring devices.
This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities . It must be linked to the program description.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	- Introduction to the aquatic environment and its importance for life, environmental balance and land environment.	Student understanding of the lesson	2 N 3p	The first The second And the third and fourth

		-Types of environmental pollution .			
Daily and monthly tests	Theoretical and practical	- Pollution by petroleum hydrocarbons. - Methods of treatment and reduction of oil pollutants.	Student understanding of the lesson	2 N 3p	V and the sixth
Daily and monthly tests	Theoretical and practical	Contamination with trace elements and heavy metals. Pesticide contamination	Student understanding of the lesson	2 N 3p	Seventh and eighth
Daily and monthly tests	Theoretical and practical	. First exam Organic pollution	Student understanding of the lesson	2 N 3p	Ninth and tenth
Daily and monthly tests	Theoretical and practical	. Wastewater pollution Acid precipitation	Student understanding of the lesson	2 N 3p	Eleventh and twelfth
Daily and monthly tests	Theoretical and practical	Thermal pollution	Student understanding of the lesson	2 N 3p	Thirteenth

Daily and monthly tests	Theoretical and practical	Radioactive contamination. Modern forms of pollution The second exam	Student understanding of the lesson	2 N 3p	Fourteenth and fifteenth and the sixteenth

11- Infrastructure	
	1 Required textbooks
Environmental Pollution by Abdulhadi Yahya Al-Sayegh and Arwa Shazl Energy 2002 Environmental Pollution, Dr. Ayed Radi Khanfar, first edition. 2010	2 Main references (sources)
3- Petroleum pollution, d. Ahmed Al-Sorouri, first edition. 2011 4- Indoor Environmental Quality 2001 Author Thad Godish 5- The environments of the Iraqi marshes - d. Najah Abboud Hussein - first edition - 2014 6- The Science of Environmental Pollution, Second Edition,2009. Author Frank R. Spellman	Recommended books and references (scientific journals, reports,....)
www.epa.gov http://www.unep.org/arabic http://www.fao.org/home/en	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Third Stage / Nature Reserves J310

Course Description

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

University of Basrah – College of Science	1- Educational institution

ecology	2- Scientific Department / Center
Nature Reserves (J 310)	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
First Semester 2020-2021	6- Semester / Year
30 credit hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
Developing the student's abilities to plan for the establishment, management and development of nature reserves.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive goals A1- Know the basic conditions of the Nature Conservancy Organization (IUCN) about nature reserves. A2- Basic divisions and classifications of nature reserves and their definitions. A3- Knowing the basic conditions and rules for building the nature reserve and giving it its own category. A4- Field procedures for evaluating areas to turn them into nature reserves. A5- Knowing the mechanism of implementing a nature reserve project (logistical, administrative, scientific). A6- Knowing how to manage, sustain and develop a nature reserve. A7- Knowing how to transform the marshes of southern Iraq into nature reserves and divide them into different areas.
B- Program Skills Objectives B1- Acquire the necessary skill in how to diagnose areas eligible for the establishment of nature reserves. 2- Acquire the necessary skill in how to properly manage reserves successfully.
Teaching and learning methods

1- The method of explaining the lecture and discussion. 2- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
Semester and final theoretical exams
C- Emotional and evaluation goals. C1- Linking the importance of environmental disciplines and their eligibility in the establishment and management of natural reserves. C2- Spreading the culture of nature reserves and studying them academically through which cadres working in them can be qualified.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Monthly tests - Final exams
d. General and qualifying skills transferred (other skills related to employability and personal development). D1- Developing the mental abilities of the student D2- Developing the student's skills on how to establish and manage natural reserves. D3- Establishing competencies through which to lead and manage projects for natural reserves.

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

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and watching progressive shows	IUCN Terms and Regulations International Union for Conservation of the Environment ,Classification of organisms according to IUCN Types of reserves,sanotuary,national parks National parks,wildlife rufge life shelters,wildlife shelter Life protection Zoo and botanical garden,wildlife reserve, study of the establishment of a reserve in Iraq (Central Marshes Reserve)	Student understanding of the lesson	2 Theoretical	**The first The second And the third and fourth**
Daily and monthly tests	Theoretical and watching progressive shows	Administrative planning conditions, benefits obtained from reserves First Semester Exam	Student understanding of the lesson	2 Theoretical	**V and the sixth**
Daily and monthly tests	Theoretical and watching progressive shows	Axes of biological - economic - social diversity How to conduct an interdisciplinary survey of reserves	Student understanding of the lesson	2 Theoretical	**Seventh and eighth**
Daily and monthly tests	Theoretical and watching progressive shows	Study of the establishment of a reserve in Iraq (Central Marshes Reserve) التقيم البيئي HHA	Student understanding of the lesson	2 Theoretical	**Ninth and tenth**
Daily and monthly tests	Theoretical and watching progressive shows	Iraqi Environment Classification System	Student understanding of the lesson	2 Theoretical	**Eleventh and twelfth**

Daily and monthly tests	Theoretical and watching progressive shows	Important Ecoregions (KBA)	Student understanding of the lesson	2 Theoretical	**Thirteenth**
Daily and monthly tests	-	Second Semester Exam	Student understanding of the lesson	2 Theoretical	**Fourteenth and fifteenth and the sixteenth**

11- Infrastructure	
	1 Required textbooks
IUCN Defining Protected Areas An international conference in Almeria, Spain, May 2007 Edited by Nigel Dudley and Sue Stolton IUCN Protected Area Governance and anagement by: •Graeme L. Worboys , Michael Lockwood, Ashish Kothari , Sue Feary , Ian Pulsford . 2015.	2 Main references (sources)
The Ramsar Convention on Wetlands and CBD's PoW on Protected Areas, Lew Young	Recommended books and references (scientific journals, reports,....)
Web sites about protected area	B Electronic references, websites ...

12- Course Development Plan
Urging the student to design theoretical projects on how to establish proposed reserves in southern Iraq.

Third Stage / Freshwater Environment and Estuaries J311

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Freshwater and estuaries environment J311	3- Course Name/Code
Bachelor	4- Programs in which he enters

weekly	5- Available Attendance Forms
2020-2021	6- Semester / Year
30 credit hours + 60 hours of practical	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to absorb the freshwater environment and estuaries and study the factors affecting it	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives 1- Identify the components of the ecosystem and the importance of biodiversity and its sections. 2- The importance of biodiversity for the stability of ecosystems. 3- Identify the factors affecting biodiversity and species extinction. 4- Identify the most common indicators in calculating biodiversity. 5- Identify the primary and secondary succession and its types.
B - Skills objectives of the course. 1- Identify fresh static and mobile environments as well as the estuary environment. 2- Studying the biodiversity of various types of living organisms (plants and animals) in static and mobile environments.
Teaching and learning methods
1- Theoretical and practical lectures. 2- Use of teaching aids (presentations and scientific films) 3- Practicality 4- Field trips
Evaluation methods

Semester and final theoretical and practical exams
C. Emotional and value goals - The ability to communicate information after collecting and analyzing data. - Link information to the reality of the ecosystem.
Teaching and learning methods
- Direct explanation and delivery. - The use of devices in measuring nutrient concentrations, dissolved oxygen and salts. - Powerpoint presentation. and screen.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). -Developing the mental abilities of the student -Skill capacity development - Dealing with field and laboratory environmental measuring devices.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	**Introduction, General divisions of freshwater environment, running water**	Student understanding of the lesson	2 N 3p	**The first The second And the third and fourth**

Daily and monthly tests	Theoretical and practical	**Rivers, River Water Source, Permanent Rivers, Temporary Rivers, Intermittent Rivers**	Student understanding of the lesson	2 N 3p	**V and the sixth**
Daily and monthly tests	Theoretical and practical	**Physical factors in river water, color and turbidity, temperature, water currents**	Student understanding of the lesson	2 N 3p	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	**Chemical agents in river water, dissolved gases, oxygen, temperature, carbon dioxide, dissolved solids**	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	**Life groups in rivers, erosion in rivers, mechanical erosion, chemical erosion, standing water, lakes, heat typesetting, classification of lakes according to food enrichment Comparison of lakes and ponds**	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
Daily and monthly tests	Theoretical and practical	**Volcanic basins, landslide basins, glacial lakes, lake basins formed by collapse, basins formed by sea currents, lake basins formed by rain, lakes**	Student understanding of the lesson	2 N 3p	**Thirteenth**

		of organic origin, basins formed by meteorites, lakes basins of unknown origin			
Daily and monthly tests	Theoretical and practical	**Estuarine environment, types Physical and chemical properties of estuaries, life groups in estuaries, estuarine classification**	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth and the sixteenth**

11- Infrastructure	
Freshwater Science and Estuaries by Hamid Talib Al-Saad / University of Surra	1 Required textbooks
5- Aquatic Environment Written by Prof. Hussein Al-Saadi 2006	2 Main references (sources)
6- Freshwater Science by Feryal Intimate	Recommended books and references (scientific journals, reports,....)
www.epa.gov	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Third Stage / Natural Resources and Energy Sources J314

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Natural resources and energy sources (F314)	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
First Semester 2021-2022	6- Semester / Year
30 credit hours	7- Number of Credit Hours (Total)
27/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify the importance of natural resources and ways to sustain them, as well as to identify the types of renewable and non-renewable energy sources and how to obtain new sources of energy.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment

A- Cognitive objectives

A1- Knowing the most important sources of natural resources.

A2- Identify the types of renewable and non-renewable energy sources.

A3- Identify the types of alternative energy sources for fossil fuels.

A4- Knowing ways to sustain natural resources.

A5- Knowing the role played by the seas and oceans in providing humanity with its food and energy.

A6- Knowing the importance of alternative sources of energy such as solar energy, wind energy, tides, waves, geothermal heat, waste incineration and other energy alternatives.

B - Skills objectives of the course. B1- Identifying practically the main groups of energy alternatives. B2- Practical identification of how to sustain natural resources.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
Semester and final theoretical and practical exams
C. Emotional and value goals - The ability to communicate information after monitoring and collecting data. - Linking information to environmental reality and influencing other neighborhoods.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1- Developing the student's mental abilities 2- Developing skill capabilities 3- Dealing with field and laboratory environmental measuring devices.
This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities . It must be linked to the program description.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	theoretical	General introduction The main types of natural resources in the environment Continuation of the topic of the second week The importance of seas and oceans in food and energy production Completing the topic of the third week The most important renewable and non-renewable energy sources	Student understanding of the lesson	2 N	**The first The second And the third and fourth**
Daily and monthly tests	theoretical	First theoretical exam The importance of solar energy in obtaining energy	Student understanding of the lesson	2 N	**V and the sixth**
Daily and monthly tests	theoretical	Continuation of the topic of the sixth week Wind energy, tides and waves - Differences in the temperature of the water body	Student understanding of the lesson	2 N	**Seventh and eighth**
Daily and monthly tests	theoretical	Completion of the topic of the eighth week Use waste incineration for energy.	Student understanding of the lesson	2 N	**Ninth and tenth**
Daily and monthly tests	theoretical	Supplement the theme of the tenth weekThermal energy hollow ground for energy. Second theoretical exam	Student understanding of the lesson	2 N	**Eleventh and twelfth**
Daily and monthly tests	theoretical	Biofuels	Student understanding of	2 N	**Thirteenth**

			the lesson		
Daily and monthly tests	theor etical	Production of hydrogen gas and its use as a new source of energy production. Reuse of plastic as a source of hydrocarbon fuel	Student understa nding of the lesson	2 N	**Fourteen th and fifteenth** **and the sixteenth**

11- Infrastructure	
	1 Required textbooks
1- Book of Principles of Renewable Energies, Dr. Omar Al-Jubouri, Ministry of Higher Education 2010 2- Lectures on Renewable Energy, Dr. Raed Al-Fahdawi 2016Ministry of Higher Education	2 Main references (sources)
-Renwal energy	Recommended books and references (scientific journals, reports,....)
www.epa.gov www.pdf drive.com	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Stage III / Environmental Modeling J317

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Environmental modeling (J 317)	3- Course Name/Code
Bachelor, MSc	4- Programs in which he enters

weekly	5- Available Attendance Forms
First Semester 2020-2021	6- Semester / Year
30 credit hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify how to design models that simulate environmental systems and the most important steps in preparing the model and the basic components of the environmental model and the use of Excel in the application of environmental models and obtain results to solve most environmental problems.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1- Identify the classifications of environmental models. A2- Identify the steps of the environmental model. A3- Identify the basic components required for the work of the environmental model. A4- Applying environmental models using the Excel program. A5- Know the role that these models play in solving environmental problems. A6- Know the benefits and determinants of environmental models
B - Skills objectives of the course. B1- Practical identification of how environmental models work. . B2- Applying environmental models in a practical manner and addressing some environmental problems.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods

Semester and final theoretical and practical exams
C. Emotional and value goals - The ability to communicate information after monitoring and collecting data. - Linking information to environmental reality and solving environmental problems.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1- Developing the student's mental abilities 2- Developing skill capabilities
This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities . It must be linked to the program description.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	theoretical	Introduction to ecosystems and how to manage them, changing ecosystems, models as powerful planning and management tools, classification of environmental models	Student understanding of the lesson	2 N	**The first** **The second**

Daily and monthly tests	theoretical	Environmental design issues and the role of designers, purpose of environmental modeling, uses of environmental modeling, areas of application of environmental modeling	Student understanding of the lesson	2 N	**Third and fourth**
Daily and monthly tests	theoretical	First theoretical exam Modeling concepts (external factors, state variables, mathematical equations, standards, general constants), widespread use of models in environmental management	Student understanding of the lesson	2 N	**V and the sixth**
Daily and monthly tests	theoretical	Choosing the composition of the environmental model and its complexity, how to make an environmental model.	Student understanding of the lesson	2 N	**Seventh and eighth**
Daily and monthly tests	theoretical	Steps to make an environmental model (defining the problem, formulating operations in the form of mathematical equations, sensitivity analysis), estimating and calibrating variables	Student understanding of the lesson	2 N	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	Second theoretical exam Some mathematical functions used in environmental modeling by applying Excel	Student understanding of the lesson	2 N	**Eleventh and twelfth**

Daily and monthly tests	Theoretical and practical	Uses of environmental models in environmental management, organic pollution model (OPI).	Student understanding of the lesson	2 N	**Thirteenth**
Daily and monthly tests	Theoretical and practical	دليل الاثراء الغذائي Trophic State Index (TSI) TRIX Food Enrichment Guide	Student understanding of the lesson	2 N	**Fourteenth and fifteenth**

11- Infrastructure	
Introduction to Environmental Modeling William G. Gray, *University of North Carolina, Chapel Hill*, Genetha A. Gray, *Intel Corporation*	1 Required textbooks
1- https://mpimet.mpg.de/en/science/independent-research-groups/environmental-modeling 2- https://www.journals.elsevier.com/environmental-modelling-and-software	Recommended books and references (scientific journals, reports,....)

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Third Stage / Meteorology J333

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

University of Basrah – College of Science	1. Educational institution
Ecology	2. Scientific Department / Center
Meteorological J (333)	3. Course Name / Code

Bachelor	4. Programs in which he enters
weekly	5. Available Attendance Forms
First Semester 2020-2021	6. Semester / Year
30 credit hours	7. Number of Credit Hours (Total)
2020/9/1	8. The history of preparation of this description

9. Course Objectives

Give the student general knowledge of the components and characteristics of the atmosphere surrounding the globe and know how weather phenomena arise in the atmosphere and what are the causes of climate changes and various weather phenomena.

10.Course Outcomes and Methods of Teaching, Learning and Assessment

A- Cognitive objectives

1. Identify the components of the atmosphere and their properties.
2. Identify the changes of weather and climate elements as a function of time and place.
3. Identify the ways in which weather and climate phenomena occur
4. Identify the characteristics of important and most frequent weather phenomena.

B - Skills objectives of the course.

Writing reports and scientific research for a specific topic on an atmospheric phenomenon.

Teaching and learning methods

The method of explaining the lecture and discussion.
Urging the student to conduct research and reports.

Evaluation methods

Semester and final theoretical exams

	C. Emotional and value goals - The ability to communicate scientific information clearly and easily . - Linking scientific information and concepts with reality and real phenomena.
	Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.	
	Evaluation methods
	-Daily testing and reports -Monthly tests - Final exams
d . General and rehabilitative skills transferred (other skills related to employability and personal development).	1- Developing the student's mental abilities to understand the occurrence of natural phenomena 2- Developing skill capabilities 3- Dealing with measuring devices if available.

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	theoretical	**General introduction.**	Student understanding	2 N	**The first The second**

		Components and properties of the atmosphere. **Floor heating.** **Air temperature.**	of the lesson		**And the third and fourth**
Daily and monthly tests	theor etical	**Moisture, condensation and clouds.** **Atmospheric pressure and wind.**	Student understanding of the lesson	2 N	**V and the sixth**
Daily and monthly tests	theor etical	**The first theoretical exam.** **Air masses and fronts.**	Student understanding of the lesson	2 N	**Seventh and eighth**
Daily and monthly tests	theor etical	**Thunderstorms and hurricanes.** **Weather forecasting.**	Student understanding of the lesson	2 N	**Ninth and tenth**
Daily and monthly tests	theor etical	**air pollution**	Student understanding of the lesson	2 N	**Eleventh and twelfth**
Daily and monthly tests	theor etical	**Climate change**	Student understanding of the lesson	2 N	**Thirteenth**
Daily and monthly tests	theor etical	**The second theoretical exam.** **Review and discuss.**	Student understanding of the lesson	2 N	**Fourteenth and fifteenth and the sixteenth**

11.Infrastructure	
	1 Required textbooks
Essential of Meteorology, Editor: Donland Ahrens.	2 Main references (sources)
Meteorology: An Educator's Resource. Dr. Joseph D. Exline	Recommended books and references (scientific journals , reports ,....)
www.nasa.gov	B Electronic references, websites ...

12.Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Water Treatment technology E351 **Third Stage/**

Course Description

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

University of Basrah/ Collage of Science	1- Educational institution
Ecology	2- Scientific Department / Center
Water Treatment technology (E351)	3- Course Name/Code
Bachelor's	4- Programs in which he enters
weekly	5- Available Attendance Forms
2020- 2021	6- Semester / Year

30 credit hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify the methods of treatment in the environment of water and how to benefit from it in our daily life	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives 1- Know the basic methods of treating water in the environment 2- Learn how to obtain clean water in a clean environment. 3- Identify the devices used in purification in different environments. 4- Knowing the effect of various environmental factors on purification methods. 5- Knowing the environmental role that microorganisms play in different environments in the treatment methods. 6 - Knowing the harms and benefits of the organism's presence in different environments and how to harness it for the benefit of man.
B - Skills objectives of the course. 1- Practical identification of the main methods of treatment and the extent of their application on the ground. 2 - To identify in a practical way how to implement and the extent of its success.
Teaching and learning methods
1- How to explain the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Urging the student to make PowerPoint presentations.
Evaluation methods
Theoretical, semester and final exams
C. Emotional and value goals 1- The ability to communicate information after monitoring and collecting data. 2- Linking information to environmental reality and affecting other neighborhoods.

Teaching and learning methods
1- How to explain the lecture and discussion 2- Urging the student to conduct research and reports. 3- Urging the student to make PowerPoint presentations.
Evaluation methods
- Daily test and reports Monthly exams - final exams
- Transferred general and qualification skills (other skills related to employability and personal development). 1- Developing the mental abilities of the student 2- skill development 3- Dealing with field and laboratory environmental measuring devices.
This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, demonstrating whether he has made maximum use of the available learning opportunities. It must be linked to the description of the program.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	General introduction Identify environmental factors, including physical and chemical Continuation of the topic of the second week Microorganisms, biology and algae in the environment Continuation of the topic of the third week	Student understanding of the lesson	2 T 3P	first second Third and fourth
Daily and monthly tests	Theoretical and practical	The first theoretical exam Physical methods of processing	Student understanding of	2 T 3P	Fifth And the sixth

			the lesson		
Daily and monthly tests	Theoretical and practical	Supplement to the topic of the sixth week Chemical methods of processing	Student understanding of the lesson	2 T 3P	Seven and eight
Daily and monthly tests	Theoretical and practical	Supplement to the topic of the eighth week	Student understanding of the lesson	2 T 3P	ninth and tenth
Daily and monthly tests	Theoretical and practical	Biological methods in water treatment continuation of lectures	Student understanding of the lesson	2 T 3P	eleventh and twelfth
Daily and monthly tests	Theoretical and practical	The equipment used in the treatment	Student understanding of the lesson	2 T 3P	Thirteenth
Daily and monthly tests	Theoretical and practical	continuation of lectures Biological treatment using microorganisms	Student understanding of the lesson	2 T 3P	fourteenth and the fifteenth and sixteen

11- Infrastructure	
1- Environmental engineering,sixth edition edited by nelson l. nemerow, franklin j. agardy, patrick sullivan, and joseph a. salvato	1- Required course books
2- Environmental microbiology journal	Recommended books and references (scientific journals, reports),....)
. http://tarek.kakhia.org	ب- Electronic references, websites...

12. Course Development Plan
Communicate in curriculum development based on recent versions of books and references.

Phase III / Environmental disasters J340

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Environmental disasters (J 340)	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
2020- 2021	6- Semester / Year
30 credit hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
Develop the student's ability to identify the most important disasters in the environment and how to deal with them and reduce their damage.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1- Knowing the types of environmental disasters A2- Identify how these disasters affect the ecosystem. A3- Identify the role of government agencies and individuals to reduce the risks resulting from environmental disasters. A4- Knowing the impact of various environmental factors on the occurrence of disasters. A5- Knowing the impact of human activity on the types of disasters and the frequency of their occurrence.

B - Skills objectives of the course. B1- Identify the most prominent risks facing the environment B2- Identify the most prominent local environmental disasters
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
Semester and final theoretical exams
C. Emotional and value goals - The ability to communicate information after monitoring and collecting data. - Linking information to environmental reality and influencing other neighborhoods.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1- Developing the student's mental abilities 2- Developing skill capabilities

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

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	theoretical	General introduction Types of disasters Classification of environmental hazards and disasters	Student understanding of the lesson	2 N	**The first The second And the third and fourth**
Daily and monthly tests	theoretical	Types of natural disasters Earthquakes volcanoes	Student understanding of the lesson	2 N	**V and the sixth**
Daily and monthly tests	theoretical	Tsunamis Torrents	Student understanding of the lesson	2 N	**Seventh and eighth**
Daily and monthly tests	theoretical	First theoretical exam	Student understanding of the lesson	2 N	**Ninth and tenth**
Daily and monthly tests	theoretical	Floods Desertification Drought Sandstorms	Student understanding of the lesson	2 N	**Eleventh and twelfth**
Daily and monthly tests	theoretical	Hurricanes Geomorphological disasters	Student understanding of the lesson	2 N	**Thirteenth**
Daily and monthly tests	theoretical	Second theoretical exam	Student understan	2 N	**Fourteenth and fifteenth**

		Chemical and radiological accidents	ding of the lesson		**and the sixteenth**

11- Infrastructure	
	1 Required textbooks
1- Environment and Disaster Risk. Emerging Perspectives. UNEP (2008) 2- Environmental disasters in social context: toward a preventive and precautionary approachKenneth Hewitt (2012) 3- Drought and drought tolerance. J. B. Passioura (1996) 4- Earthquake Location,Direct, Global-Search Methods. Lomax et al https://www.geos.ed.ac.uk/~acurtis/assets/Lomax_etal_2009.pdf	2 Main references (sources)
1- Assessment of drought vulnerability based on the soil moisture. Yoo et al (2006)	Recommended books and references (scientific journals, reports,....)
www.epa.gov https://www.geos.ed.ac.uk/~acurtis/assets/Lomax_etal_2009.pdf	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Stage III / Organic pollution J343

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Organic pollution E343	3- Course Name/Code

Bachelor, Master, PhD	4- Programs in which he enters
weekly	5- Available Attendance Forms
2020-2021	6- Semester / Year
30 credit hours + 60 hours of practical	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to know the types of organic pollutants and detect their sources in the environment, their transformations, health and environmental effects, and methods of disposing of them safely and soundly.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
B- Cognitive Objectives 1- Identifying the chemical composition of organic materials in the environment and methods of detection. 2- Identify the most important non-natural sources of organic matter in the air, water and soil and their transformations. 3- Identify the most important health problems resulting from organic pollutants. 4- Identify the methods used in the safe and proper disposal of organic materials.
B – Skills objectives of the program. 1- Acquire the skills of examining organic pollutants and measuring their quantities in the air, water and soil. 2- Reducing the levels of organic pollution in the environment.
Teaching and learning methods
1- Theoretical and practical lectures. 2- Use of teaching aids (presentations and scientific films) 3- Practicality
Evaluation methods

Semester and final theoretical and practical exams
C. Emotional and value goals 1- The ability to communicate information after monitoring and collecting data. 2- Linking information to the environmental reality of the region.
Teaching and learning methods
- Direct explanation and delivery. - Use of field and laboratory equipment and equipment. - Powerpoint presentation. and screen.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). -Developing the mental abilities of the student -Skill capacity development - Dealing with measuring devices in an accurate scientific manner.
This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities . It must be linked to the program description.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	theoretical practical		Student understanding of the lesson	2 N 3 Practical	**The first The second And the third and fourth**

Daily and monthly tests	theoretical practical	3-	Student understanding of the lesson	2 N 3 Practical	**V and the sixth**
Daily and monthly tests	theoretical practical	4-	Student understanding of the lesson	2 N 3 Practical	**Seventh and eighth**
Daily and monthly tests	Theoretical Practical	5-	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical Practical	6-	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
Daily and monthly tests	Theoretical Practical		Student understanding of the lesson	2N 3p	**Thirteenth**
Daily and monthly tests	Theoretical Practical		Student understanding of the lesson	2N 3p	**Fourteenth and fifteenth and the sixteenth**

3 Infrastructure	
	1 Required textbooks
1- Organic Pollutants - Monitoring, Risk and Treatment … Edited by M. Nageeb Rashed, ISBN 978-953-51-0948-8, 238 pages	2 Main references (sources)
1- **Persistent Organic Pollutants……**Editor(s): Stuart HarradPublished Online: 29 DEC 2009.	Recommended books and references (scientific journals, reports,....)
1- Pollution with fertilizers and agricultural fertilizers as one of the forms of chemical pollution of the aquatic	B Electronic references, websites ...

environment.....http://www.arsco.org/detailed/7ea77df6-87bc-461d-a656-94aae2f68231 2- http://www.vercon.sci.eg/indexUI/uploaded/waterpolution3/waterpolution.htm 3- https://arabic.rt.com/news/788760-%D9%85%D8%B3%D8%A8%D8%A8%D8%A7%D8%AA-%D8%AA%D9%84%D9%88%D8%AB- 4- %D8%A7%D9%84%D9%87%D9%88%D8%A7%D8%A1-%D8%B9%D8%A7%D9%84%D9%85-%D8%A7%D9%84%D9%8A%D9%88%D9%85/	

4 Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Stage III / Microbial Contamination Y347

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Microbial contamination (J 347)	3- Course Name/Code
Bachelor, Master, PhD	4- Programs in which he enters
weekly	5- Available Attendance Forms
2020-2021	6- Semester / Year
30 credit hours + 60 hours of practical	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description

9- Course Objectives
The student's ability to identify polluted microorganisms groups in the environment and their environmental role and how to deal with them in our daily lives.

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1- Knowledge of the basic groups of microorganisms polluting the environment A2- Identify how microorganisms affect different parts of the environment. A3- Identify the role of the microorganism that pollutes different environments. A4- Knowing the impact of various factors on microbial pollution in the environment. A5- Knowing the pollution produced by microorganisms in different environments. A6- Know the damages resulting from microbial contamination and how to prevent it.
B - Skills objectives of the course. B1- Identifying in a practical way the main groups of microorganisms polluting the environment. B2- Identify in a practical way the role of the microscopic organism polluting different environments.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
Semester and final theoretical and practical exams
C. Emotional and value goals - The ability to communicate information after monitoring and collecting data. - Linking information to environmental reality and influencing other neighborhoods.
Teaching and learning methods

1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1- Developing the student's mental abilities 2- Developing skill capabilities 3- Dealing with field and laboratory environmental measuring devices.

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

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	General introduction The main types of microorganisms polluting the environment Continuation of the topic of the second week Soil contaminated microorganisms	Student understanding of the lesson	2 N 3p	**The first** **Second** **Third** **Fourth**

Daily and monthly tests	Theoretical and practical	Continuation of the topic of the third week The first theoretical exam	Student understanding of the lesson	2 N 3p	**V** **Sixth**
Daily and monthly tests	Theoretical and practical	Microorganisms polluted by water Continuation of the topic of the sixth week	Student understanding of the lesson	2 N 3p	**Seventh** **Eighth**
Daily and monthly tests	Theoretical and practical	Air polluting microorganisms Completion of the topic of the eighth week	Student understanding of the lesson	2 N 3p	**Ninth** **X**
Daily and monthly tests	Theoretical and practical	Contaminated microorganisms for food Second theoretical exam	Student understanding of the lesson	2 N 3p	**Eleventh** **and twelfth**
Daily and monthly tests	Theoretical and practical	Microbial contamination inside homes	Student understanding of the lesson	2 N 3p	**Thirteenth**
Daily and monthly tests	Theoretical and practical	Completion of the topic of the thirteenth week How to prevent microbial contamination in the environment	Student understanding of the lesson	2 N 3p	**Fourteenth** **and fifteenth and the sixteenth**

11- Infrastructure	
	1 Required textbooks
1- microbiology , Second ed., Maier et al.(2009). 2- Topics in ecological and Environmental microbiology, Schmidt & Schaechter (2009). 3- Food microbiology, Spencer et al.(2004).	2 Main references (sources)
1- Applied and Environmental microbiology 2- Environmental microbiology journal	Recommended books and references (scientific journals, reports,....)
www.epa.gov	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Stage IV / Environmental Awareness and 400

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Environmental awareness (400)	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
2020- 2021	6- Semester / Year
30 Credit Hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The course aims to introduce the student to the meaning and importance of environmental awareness, its objectives, how to spread it to preserve the environment and its components and avoid the risks that can occur by explaining	

the meaning of the environment and its components, knowing the types of pollution, its sources and effects, and how to reduce it. It also aims to mention the most important environmental problems and the phenomena of ecosystem imbalance and solutions to reduce them.

10- Course Outcomes and Methods of Teaching, Learning and Assessment

A- Cognitive objectives

A1- Knowing the meaning of environmental awareness, its objectives and tools.

A2- Knowing the appropriate methods to spread awareness among specialists and the general public.

A3- Knowing the most important means of spreading environmental awareness.

A4- Know the meaning of the environment, the components of the environment and the functions of the ecosystem.

A5- Knowledge of living standards in the ecosystem and the relationships between living organisms.

A6- Knowing the meaning of environmental pollution, its types and the most important phenomena that disturb the ecosystem.

A7- Knowing the impact of each pollution, whether water, air or soil, and what are the most important sources of each of them and its effects and how to reduce it

B - Skills objectives of the course.

B1- How to prepare a report on environmental awareness topics

B2- How to prepare awareness posters on topics related to the environment

Teaching and learning methods

1- The method of explaining the lecture and discussion.
2- Urging the student to conduct research and reports.
3- Encourage the student to conduct PowerPoint presentations.
4- Urging the student to make awareness posters and brochures

Evaluation methods

Semester and final theoretical and practical exams

C. Emotional and value goals

- Ability to understand the meaning of environmental awareness

Teaching and learning methods

1- The method of explaining the lecture and discussion.
2- Urging the student to conduct research and reports.
3- Encourage the student to conduct PowerPoint presentations.

Evaluation methods

-Daily testing and reports
-Monthly tests
- Final exams

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

1- Developing the student's mental abilities.
2- Developing skill capabilities.
3- Dealing with awareness reports and posters and how environmental awareness is spread.

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

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	theoretical	General introduction to the meaning of the environment, its components, living standards in the ecosystem, ecosystem functions, and relationships between organisms Definition, types and sources of pollution Know the meaning of air pollution, its sources and impact, and how to reduce it	Student understanding of the lesson	4 N 4n	**The first The second** **And the third and fourth**
Daily and monthly tests	theoretical	The first theoretical exam	Student understanding of	2 N 2 N	**V and the sixth**

		Environment and its components Pollution and its types	the lesson		
Daily and monthly tests	theoretical	Water pollution, its types, sources, effects and how to reduce it Soil pollution, its sources and effects and how to reduce its effects	Student understanding of the lesson	4 N	Seventh and eighth
Daily and monthly tests	theoretical	Define the meaning of the equilibrium of the ecosystem and know the most important phenomena that cause disruption of this system Understand the meaning of acid rain, ozone hole, fog and climate change	Student understanding of the lesson	4 N	Ninth and tenth
Daily and monthly tests	theoretical	Completion of the topic of the tenth week Second theoretical exam Complement the types of pollution and phenomena of disruption of the ecosystem	Student understanding of the lesson	4 N	Eleventh and twelfth
Daily and monthly tests	theoretical	The meaning of environmental awareness, its objectives and means of dissemination	Student understanding of the lesson	2 N	Thirteenth
Daily and monthly tests	theoretical	Completing the lesson of environmental awareness and knowing the role of the specialist, citizen, state and clerics in spreading environmental awareness	Student understanding of the lesson	4 N	Fourteenth and fifteenth

11- Infrastructure	
	1 Required textbooks

1- Environmental Awareness and protection D. B. N. Murthy , 2004 2- Environmental Education and Environmental Awareness Dr. Asmaa Radi Khanfar and Dr. Ayed Radi Khanfar	2 Main references (sources)
1. Journal of Environment and Development	Recommended books and references (scientific journals, reports,....)
Coursera | Online Courses & Credentials From Top Educators. Join for Free	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Fourth Stage / Waste Treatment and Recycling J401

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Waste treatment and recycling (J 401)	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
First Semester 2020-2021	6- Semester / Year
30 Credit Hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to manage solid waste and how to reuse or recycle it by scientific methods in the environment and how to benefit from it in our daily lives.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment

A- Cognitive objectives

A1- The student's knowledge of the basic things of waste management in the environment

A2- Identify how waste affects the different environment and how it is affected by it.

A3- Identify the role of humans in waste management in different environments.

A4- Knowing the impact of various environmental factors on the presence of waste in the environment.

A5- Knowing the environmental role played by waste in different environments and its effects on humans and health.

A6- Knowing the pros and cons of the role of waste management in different environments and how to harness it for the benefit of humans.

B - Skills objectives of the course.

B1- Practical identification of management and reuse.

B2- Identifying in a practical way the role of humans in how to treat waste.

Teaching and learning methods

1- The method of explaining the lecture and discussion.

2- Urging the student to conduct research and reports.

3- Encourage the student to conduct PowerPoint presentations.

Evaluation methods

Theoretical and practical tests by holding semester exhibitions and final exams

C. Emotional and value goals

- The ability to communicate information after monitoring and collecting data.
- Linking information to environmental reality and influencing other neighborhoods.

Teaching and learning methods

1- The method of explaining the lecture and discussion.

2- Urging the student to conduct research and reports.

3- Encourage the student to conduct PowerPoint presentations.

Evaluation methods

-Daily testing and reports
-Monthly tests
- Final exams

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

1- Developing the student's mental abilities
2- Developing skill capabilities
3- Dealing with field and laboratory environmental measuring devices.

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

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	theoretical	General introduction The main types of solid waste in the environment Continuation of the topic of the second week Hazardous waste in the environment Learn about waste management	Student understanding of the lesson	2 N 2 N 2 N	**The first The second And the third and fourth**
Daily and monthly tests	theoretical	The first theoretical exam Supplement of treatment methods and recycling of pollutants	Student understanding of the lesson	2 N 2N	**V and the sixth**
Daily and monthly tests	theoretical	Cons and pros of processing methods	Student understanding of the lesson	2 N	**Seventh and eighth**

Daily and monthly tests	theoretical	Completion of the topic of the eighth week	Student understanding of the lesson	2 N	**Ninth and tenth**
Daily and monthly tests	theoretical	Paper and plastic management methods Second theoretical exam	Student understanding of the lesson	2 N	**Eleventh and twelfth**
Daily and monthly tests	theoretical	Metal Management	Student understanding of the lesson	2 N	**Thirteenth**
Daily and monthly tests	theoretical	Biogas production Compost production	Student understanding of the lesson	2 N	**Fourteenth and fifteenth and the sixteenth**

11- Infrastructure	
	1 Required textbooks
1- Solid waste management and recycling *Managing Editor:* Max Barlow, Concordia University, Montreal, Canada *Founding Series Editor:* Wolf Tietze, Helmstedt, Germany	2 Main references (sources)
	B Electronic references, websites
12- Course Development Plan	
Communicate in the development of the curriculum based on recent versions of books and references.	

Fourth Stage / Environmental Legislation and Laws J402

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning

outcomes that the student is expected to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Environmental Laws and Regulations (J402)	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
2020- 2021	6- Semester / Year
30 Credit Hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to learn about the set of international laws and conventions on environmental protection	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1- Knowledge of the basic groups of the concept of laws and legislations A2- Identify how human interaction with the environment affects A3- Identify the role of man in preserving and sustaining the environment A4- Knowing the impact of violations on environmental elements

A5- Knowledge of the role of the international community to preserve the environment
B - Skills objectives of the course. B1- Theoretical identification of the most important basic rules of laws and legislation B2- Theoretical identification of the most important international agreements on environmental protection
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
Semester and final theoretical exams
C. Emotional and value goals - The ability to communicate information after discussing the educational foundations - Linking the foundations to the reality of societies
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1- Developing the student's mental abilities 2- Developing skill capabilities
This course description provides a brief summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	theoretical	The concept of international environmental law, its historical roots Environment and international conventions The most important international agreements	Student understanding of the lesson	2 N	**The first The second And the third and fourth**
Daily and monthly tests	theoretical	The first theoretical exam	Student understanding of the lesson	2 N	**V and the sixth**
Daily and monthly tests	theoretical	Complement of international conventions	Student understanding of the lesson	2 N	**Seventh and eighth**
Daily and monthly tests	theoretical	Eighth week Environmental protection in Iraqi legislation:	Student understanding of the lesson	2 N	**Ninth and tenth**
Daily and monthly tests	theoretical	Objectives of the Iraqi Ministry of Environment Introducing the function of environmental observer in Iraqi law	Student understanding of the lesson	2 N	**Eleventh and twelfth**

Daily and monthly tests	theoretical	Tasks of the environmental observer	Student understanding of the lesson	2 N	**Thirteenth**
Daily and monthly tests	theoretical	Handling hazardous materials and waste in Iraqi law	Student understanding of the lesson	2 N	**Fourteenth and fifteenth**
Daily and monthly tests	theoretical	Protecting the environment from pollution resulting from the exploration and extraction of oil wealth and natural gas Punitive provisions in Iraqi law	Student understanding of the lesson	2N	**Sixteenth**

11- Infrastructure	
	1 Required textbooks
Hussein Taha Najm, Environment and Man (A Study in Human Ecology), Scientific Research House, Kuwait, 1977	2 Main references (sources)
Rashid Al-Hamad, Mohammed Saeed Sabbar, Environment and its Problems, Dar Al-Maarifa, 1990	Recommended books and references (scientific journals, reports,....)
	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Fourth stage / Environmental Physiology J410

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Environmental physiology JY 410	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
First Semester 2020-2021	6- Semester / Year
30 credit hours + 60 hours of practical	7- Number of Credit Hours (Total)
1/10/2021	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify various environmental factors and their impact on the performance of the functions of living organisms	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1- Knowledge of various environmental factors.

A2- Identify how these factors affect the performance and function of living organisms.
A3- Identify the ways in which adaptation is made to different environmental conditions.
A4- Knowing the impact of various environmental factors on the presence of living organisms.
A5- Knowing the damage and benefit of the presence of the organism in different environments and how to harness them for the benefit of humans.

B - Skills objectives of the course.
B1- Practical identification of environmental factors.
B2- Identifying in a practical way the impact of environmental factors on the functions of the organism.

Teaching and learning methods

1- The method of explaining the lecture and discussion.
2- Urging the student to conduct research and reports.
3- Encourage the student to conduct PowerPoint presentations.

Evaluation methods

Semester and final theoretical and practical exams

C. Emotional and value goals
- The ability to communicate information after monitoring and collecting data.
- Linking information to environmental reality and influencing other neighborhoods.

Teaching and learning methods

1- The method of explaining the lecture and discussion.
2- Urging the student to conduct research and reports.
3- Encourage the student to conduct PowerPoint presentations.

Evaluation methods

-Daily testing and reports
-Monthly tests
- Final exams

d. General and rehabilitative skills transferred (other skills related to employability and personal development).
1- Developing the student's mental abilities
2- Developing skill capabilities
3- Dealing with field and laboratory environmental measuring devices.

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

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	General introduction Definition of environmental physiology Thermal relations Second week Animals are hypothermic and variable in temperature Continuation of the topic of the third week Physiological and behavioral adaptations of organisms at different temperatures	Student understanding of the lesson	2 N 3p	**The first The second And the third and fourth**
Daily and monthly tests	Theoretical and practical	The first theoretical exam Ionic and Osmotic regulation	Student understanding of the lesson	2 N 3p	**V and the sixth**
Daily and monthly tests	Theoretical and	Continuation of the topic of the sixth week	Student understanding of	2 N 3p	**Seventh and eighth**

	practical	Osmotic regulation in fish and aquatic invertebrates	the lesson		
Daily and monthly tests	Theoretical and practical	Completion of the topic of the eighth week pH	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	Completion of the topic of the tenth week Second theoretical exam Oxygen and gas exchange in various living organisms	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
Daily and monthly tests	Theoretical and practical	The effect of light intensity on the physiology of living organisms	Student understanding of the lesson	2 N 3p	**Thirteenth**
Daily and monthly tests	Theoretical and practical	Completion of the topic of the thirteenth week The effect of moisture on the physiology of living organisms Wind and its effect on the physiology of living organisms	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth and the sixteenth**

11- Infrastructure	
	1 Required textbooks
1- EXT BOOK OF ANIMAL PHYSIOLOGY (For Indian Universities) 2 - general zoology 3- Fundamentals of animal physiology	2 Main references (sources)

Journal of Animal Physiology and Animal Nutrition	Recommended books and references (scientific journals, reports,....)
https://www.google.com/url?esrc=s&q=&rct=j&sa=U&url=https://esajournals.onlinelibrary.wiley.com/doi/pdf/	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

University of Basrah – College of Science	1. Educational institution
ecology	2. Scientific Department / Center
Environmental Toxins (J421)	3. Course Name/Code
Bachelor	4. Programs in which he enters
weekly	5. Available Attendance Forms
First Semester 2021-2022	6. Semester / Year
30 credit hours + 60 hours of practical	7. Number of Credit Hours (Total)
27/9/2021	8. The history of preparation of this description
9. Course Objectives	
The student's ability to identify the groups of toxic compounds in the environment and their environmental role and how they affect living organisms and humans and how to reduce their toxic effects and get rid of their toxicity.	

10.Course Outcomes and Methods of Teaching, Learning and Assessment

A- Cognitive objectives

A1- Knowledge of the basic groups of toxic compounds in the environment

A2- Identify how toxic compounds affect different parts of the environment and how they are affected by them.

A3- Identify the effect of toxic compounds in different environments.

A4- Knowing the effect of the interaction between different environmental factors on the toxicity of toxic compounds in the environment.

A5- Know the role that toxic compounds play in influencing living organisms

A6- Knowing the damage of toxic compounds to humans and their various body systems.

B - Skills objectives of the course.

B1- Practical identification of the main groups of toxic compounds.

B2- Identify in a practical way the role of toxic compounds in affecting the organism.

Teaching and learning methods

1- The method of explaining the lecture and discussion.
2- Urging the student to conduct research and reports.
3- Encourage the student to conduct PowerPoint presentations.

Evaluation methods

Semester and final theoretical and practical exams

C. Emotional and value goals

- The ability to communicate information after monitoring and collecting data.
- Linking information to environmental reality and influencing other neighborhoods.

Teaching and learning methods

1- The method of explaining the lecture and discussion.
2- Urging the student to conduct research and reports.
3- Encourage the student to conduct PowerPoint presentations.

Evaluation methods

-Daily testing and reports
-Monthly tests
- Final exams

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

1- Developing the student's mental abilities

2- Developing skill capabilities

3- Dealing with field and laboratory environmental measuring devices.
This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	General introduction The main types of toxic compounds in the environment Continuation of the topic of the second week Hydrocarbons - methods for measuring the amount of toxic compounds Completion of the topic of the third week heavy metals - pesticides and alcohols	Student understanding of the lesson	2 N 3p	**The first The second And the third and fourth**
Daily and monthly tests	Theoretical and practical	First theoretical exam The effect of toxic compounds on the skin system and the gastrointestinal tract	Student understanding of the lesson	2 N 3p	**V and the sixth**
Daily and monthly tests	Theoretical and practical	Continuation of the topic of the sixth week The effect of toxic compounds on the liver and renal extraction	Student understanding of the lesson	2 N 3p	**Seventh and eighth**

Daily and monthly tests	Theoretical and practical	Completion of the topic of the eighth week The effect of toxic compounds on the nervous system	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	Completion of the topic of the tenth week Second theoretical exam Effect of toxic compounds on DNA and mutation events	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
Daily and monthly tests	Theoretical and practical	Stages of cancer	Student understanding of the lesson	2 N 3p	**Thirteenth**
Daily and monthly tests	Theoretical and practical	Laboratory and industrial prevention methods to avoid the toxic effects of compounds on humans and the environment.	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth and the sixteenth**

11.Infrastructure	
	1 Required textbooks
1- Hand book of Ecotoxicology.2nd ed. David.j.Hovman.Lewis publisher 2002. 2- Principles of Ecotoxicology 2nd ed. C.h.Walker.Tylor 2008. 3- Ecotoxicology.Begum.Jeza.2012.	2 Main references (sources)
- Applied and Environmental Ecotoxicology	Recommended books and references (scientific journals, reports ,....)
www.epa.gov PDFDrive.com	B Electronic references, websites ...

12.Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Fourth Stage / Hydrology J436

Course Description

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

University of Basrah – College of Science	1- Educational institution

ecology	2- Scientific Department / Center
Hydrological J436	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
2020-2021	6- Semester / Year
30 credit hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify the general principles of hydrology by describing the state of formation, distribution and transport of water in its three forms (liquid, solid and gaseous) in all parts of the biosphere within the hydrological cycle The curriculum also included modern methods in clarifying and describing each element of the hydrological cycle and making the necessary calculations in estimating it and indicating the environmental factors affecting each element of this cycle. The curriculum also included a full explanation of the most important practical methods in measuring the hydrological properties of surface water with an indication of the special calculation methods in estimating them.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1- Identify the foundations of hydrology. A2- Identify the formation, distribution and transport of water in all environments within the hydrological cycle. A3- Identify the theoretical and practical foundations of hydrological measurements for each element of the hydrological cycle. A4- Knowing the environmental conditions affecting the elements of the hydrological cycle. A6- Identify the water balance of surface and groundwater.

B - Skills objectives of the course.

B1 – Acquire the skill of conducting mathematical calculations to estimate the hydrological conditions for each element of the hydrological cycle.

B2 – Acquire the skill of planning and designing the locations of measuring stations for hydrological elements, such as the possibility of knowing the optimal number of stations measuring the amount of rain in a given area and distributing them in an accurate scientific manner within the required area.

11- Course Structure

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
1- Theoretical and practical lectures.					
Daily and monthly tests productivity measure	theoretical ical applicatio odels installe	Introduction to hydrology and its applications and explanation of the hydrological cycle	Student understandin g of the lesson	2 N f primary	**The first**
Daily and monthly tests 2. Monthly Tests 3- Final exams	theoretical tests and labo	Introduction to precipitation, forms of precipitation, rain intensity and how to calculate it	Student understandin g of the lesson	2 N	**Second**
C- Emotional and val affecting them. C3- Water Budget S	theoretical e ability to ide king the elem	types Of Rain, Rainfall Data Displays,	Student understandin g of the lesson	2 N	**Third and fourth**
Daily and monthly tests Teaching and learn - Explanation and dire 2- **PowerPoint** preser Evaluation method: 1 Daily, monthly and	theoretical	Methods of estimating mean rainfall, arithmetic mean method, Thiessen method, isotope lines method, estimation of missing rain information (arithmetic mean method, normal ratio method).	Student understandin g of the lesson	2 N	**Fifth and sixth**
d. General and rehabilit employability and pers			d (other skills related to		
Daily and monthly tests	theoretical kill capacity d	Losses from precipitation, evaporation, factors affecting	Student understandin g of the lesson	2 N	**Seventh and eighth**

		evaporation, evaporation measurement methods			
Daily and monthly tests	theoretical	Filtration, Factors affecting filtration, Filtration measurement methods	Student understanding of the lesson	2 N	**Ninth and tenth**
Daily and monthly tests	theoretical	Runoff, Factors affecting runoff, Methods of measuring runoff, Hydrology of river systems, River classification, Measurement of water discharges, Measurement of water levels, Pathometric measurements, Water balance	Student understanding of the lesson	2 N	**Eleventh, twelfth, thirteenth and fourteenth**

12- Infrastructure	
	1 Required textbooks
1-Environmental hydrology, second edition, Andy D. Ward Stanley W. Trimble. Taylor & Francis Group, LLC, 2003. 2- Advanced Hydrology by V.T. Chow. 3- Geography of Water Resources, Hassan Abu Sammour and Khaled Al-Khatib, Dar Al-Safa for Publishing and Distribution, 1999. 4- Hydrology, Essam Mohammed Abdul Majid Ahmed and Abbas Abdullah Ibrahim, Sudan	2 Main references (sources)

University House for Publishing, Printing and Distribution, 2002. 5- Use of the World Wide Web.	
	Recommended books and references (scientific journals, reports,....)
	B Electronic references, websites ....

13- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references. And the adoption of modern interactive teaching methods. And activating the adaptation programs with international universities to see modern curricula and teaching methods and exchange experiences

Fourth Stage / Environmental Impact Assessment J444

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

University of Basrah – College of Science	1- Educational institution
Ecology	2- Scientific Department / Center
Environmental Impact Assessment J444	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
2020- 2021	6- Semester / Year
30 credit hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
Identify the meaning of environmental impact, assess the environmental impact and prepare environmental impact reports.	

10- Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives 1- Identify the meaning of environmental impact. 2- The importance of environmental impact. 3- Identify environmental impact assessment. 4- How to prepare environmental impact reports. 5- Terms of reference for the preparation of environmental impact.
B - Skills objectives of the course. 1- Acquire environmental impact assessment skills. 2- Contribute to the preparation of environmental impact reports
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.

Evaluation methods
Semester and final theoretical and practical exams
C. Emotional and value goals 1- The ability to document information after monitoring and collecting environmental data. 2- Linking, organizing and preparing information in assessing its environmental impacts.
Teaching and learning methods
1- Explanation and direct delivery. 2- Practical practices of environmental impact report forms. 3- العرض التقديمي Power point. والشاشة.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1D1 - Development of the mental abilities of the student D2- Skill capacity development D3- Dealing with environmental information and methods of collecting, organizing, tabulating and discussing it.
This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

Course Structure

Evaluation method	Learning	Unit Name	Learning	Hours	The week

	method		**Outcomes**		
Daily and monthly tests	theoretical	Meaning of environmental impact Environmental Impact Statement Environmental Impact Assessment Environmental Impact Assessment Procedures	Student understanding of the lesson	2 N	The first The second And the third and fourth
Daily and monthly tests	theoretical	Environmental Impact Assessment Process Requirements Environmental impact assessment of urban development projects	Student understanding of the lesson	2 N	V and the sixth
Daily and monthly tests	theoretical	First exam Environmental impact checklist for urban development. Impact prediction and mitigation actions	Student understanding of the lesson	2 N	Seventh and eighth
Daily and monthly tests	theoretical	Terms of Reference Required TOR in Environmental Impact Assessment Basic Lines for Organizing a TOR Report	Student understanding of the lesson	2 N	Ninth and tenth
Daily and monthly tests	theoretical	Projects requiring EIA reports Requirements for Environmental Impact Assessment Experts	Student understanding of the lesson	2 N	Eleventh and twelfth
Daily and monthly tests	theoretical	Procedures for granting and withdrawing a license	Student understanding of the lesson	2 N	Thirteenth

Daily and monthly tests	theoretical	Public Participation Mechanism Public Participation Procedures Environmental impact assessment models for urban, industrial and agricultural projects ..... etc Second exam	Student understanding of the lesson	2 N	Fourteenth and fifteenth and the sixteenth

11- Infrastructure	
	1 Required textbooks
1- Environmental Impact Reports and Licenses / Iraqi Ministry of Environment 2- Environmental Laws and Legislations / Iraqi Ministry of Environment 3- Iraqi Environment Laws / Iraqi Gazette	2 Main references (sources)
7- Ministry of Climate Change and Environment – UAE / Environmental Impact Licenses 8- Arab Republic of Egypt - Ministry of State for Environmental Affairs / Environmental Impact Assessment	Recommended books and references (scientific journals, reports ,....)
Canadian Environmental Assessment Agency - Canada.ca environmental impact assessment usa.gov.epa www.epa.gov http://www.moccae.gov.ae/ar/knowledge- and-statistics/epc.aspx	B Electronic references, websites ...

12- Course Development Plan

Continue to develop the curriculum based on recent versions of environmental impact assessment laws and reports

Fourth Stage / Botanical Techniques BIO456

Course Description

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

University of Basrah – College of Science	1- Educational institution

ecology	2- Scientific Department / Center
Plant Technology(J456)	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
First Semester 2020-2021	6- Semester / Year
30 credit hours	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	
The student's ability to identify the methods or techniques used in the environment for biological treatment and how to benefit from them in our daily lives.	

13- Course Outcomes and Methods of Teaching, Learning and Assessment

A- Cognitive objectives

A1- Knowledge of plant methods and mechanics used in treatment in the environment

A2- Identify how plants and microorganisms affect different parts of the environment and how they are affected by them.

A3- Identify the reasons for the spread of biological methods in treatment.

A4- Knowing the impact of various environmental factors on the presence of microorganisms in the environment and their participation with plants for treatment

A5- Knowing the environmental role played by plants in different environments and reducing pollution.

A6- Knowing the harms and benefits of the presence of plants in different environments and how to harness them for the benefit of humans.

B - Skills objectives of the course.

B1- Practical identification of the main groups of plants.

B2- Identify a practical picture of the role of plants in the biological treatment of pollutants in the environment.

Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
Semester and final theoretical and practical exams
C. Emotional and value goals - The ability to communicate information after monitoring and collecting data. - Linking information to environmental reality and influencing other neighborhoods.
Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1- Developing the student's mental abilities 2- Developing skill capabilities 3- Dealing with field and laboratory environmental measuring devices.

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

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	Theoretical and practical	General introduction Methods of removing contaminants in the soil Continuation of the topic of the second week Soil microbiology Continuation of the topic of the third week	Student understanding of the lesson	2 N 3p	**The first The second And the third and fourth**
Daily and monthly tests	Theoretical and practical	First theoretical exam Mechanics used by the plant for processing	Student understanding of the lesson	2 N 3p	**V and the sixth**
Daily and monthly tests	Theoretical and practical	Continuation of the topic of the sixth week	Student understanding of the lesson	2 N 3p	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	Benefits of Plant Technologies And how to help between the elderly and plants	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	Completion of the topic of the tenth week Second theoretical exam	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
Daily and monthly tests	Theoretical and practical	Environmental factors affecting phytotherapy	Student understanding of the lesson	2 N 3p	**Thirteenth**
Daily and monthly tests	Theoretical and practical	Completion of lectures Harms and benefits resulting from the role of microorganisms in plant	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth and the sixteenth**

		treatment, completion of lectures			

14- Infrastructure	
Phytoremediation	1 Required textbooks
1- Applied and Environmental microbiology 2- Environmental microbiology journal	Recommended books and references (scientific journals, reports,....)
15- Course Development Plan	
Communicate in the development of the curriculum based on recent versions of books and references.	

Fourth Stage / Remote Sensing and GIS J465

Course Description

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

University of Basrah – College of Science	1. Educational institution
Ecology	2. Scientific Department / Center
Remote Sense and GIS (465)	3. Course Name / Code
Bachelor	4. Programs in which he enters
weekly	5. Available Attendance Forms

First Semester 2020-2021	6. Semester / Year
30 credit hours	7. Number of Credit Hours (Total)
2020/9/1	8. The history of preparation of this description

9. Course Objectives

Give the student general knowledge of the characteristics and features of remote sensing science and what are the benefits and scientific applications of this applied science. As well as identifying the types of these systems, the electromagnetic spectra used in these systems, air windows, types of targets and methods of data analysis.

10.Course Outcomes and Methods of Teaching, Learning and Assessment

A- Cognitive objectives

1. Identify the characteristics and features of remote sensitics.
2. Identify the elements of remote sensing systems.
3. Identify the types of systems and their methods of operation.
4. Identify the properties and features of electromagnetic radiation.
5. Identify the types of electromagnetic spectrum that can be used in these systems.
6. Recognize aerial windows.
7. Identify the characteristics and types of targets on the surface of the earth.
8. Learn about data analysis methods for these systems.
9. Identify the characteristics and features of geographic information systems.
10. Study some applications.

B - Skills objectives of the course.

Writing scientific reports and research for a specific application of remote sensing systems.

Teaching and learning methods

1- The method of explaining the lecture and discussion.
2- Urging the student to conduct research and reports.

Evaluation methods

Semester and final theoretical exams

C. Emotional and value goals

- The ability to communicate information clearly and easily .
- Linking scientific information and concepts with reality and natural phenomena.

Teaching and learning methods

1- The method of explaining the lecture and discussion.
2- Urging the student to conduct research and reports.
3- Encourage the student to conduct PowerPoint presentations.

Evaluation methods

-Daily testing and reports
-Monthly tests
- Final exams

d . General and rehabilitative skills transferred (other skills related to employability and personal development).

1- Developing the student's mental abilities
2- Developing skill capabilities
3- Dealing with measuring devices if available.

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

Course Structure

Evaluation method	Learning method	Unit Name	Learning Outcomes	Hours	The week
Daily and monthly tests	theoretical	**General introduction Remote sensing features. Systems elements. Types of systems**	Student understanding of the lesson	2 N	**The first The second And the third and fourth**

Daily and monthly tests	theoretical	**Properties of the electromagnetic spectrum.** **Types of electromagnetic spectrum.**	Student understanding of the lesson	2 N	**V and the sixth**
Daily and monthly tests	theoretical	**Aerial windows.** **The first theoretical exam.**	Student understanding of the lesson	2 N	**Seventh and eighth**
Daily and monthly tests	theoretical	**Characteristics and types of goals.** **The interaction of electromagnetic radiation with targets.**	Student understanding of the lesson	2 N	**Ninth and tenth**
Daily and monthly tests	theoretical	**Types of remote sensing data.** **Data analysis methods.**	Student understanding of the lesson	2 N	**Eleventh and twelfth**
Daily and monthly tests	theoretical	**Study of some applications in remote sensitization.**	Student understanding of the lesson	2 N	**Thirteenth**
Daily and monthly tests	theoretical	**The second theoretical exam.** **Review and discuss.**	Student understanding of the lesson	2 N	**Fourteenth and fifteenth and the sixteenth**

11.Infrastructure	
	1 Required textbooks
Fundamentals of Remote Sensing, A Canada Centre for Remote Sensing Remote Sensing Tutorial.	2 Main references (sources)

1. Principle of remote sensing, Editors: Klaus Tempfli, Norman Kerle et al. 2.Introduction to remote sensing, Dr Robert Sanderson, New Mexico State University	Recommended books and references (scientific journals , reports ,....)
www.nasa.gov	B Electronic references, websites ...

12.Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.

Fourth stage / industrial pollutants J476

Course Description

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

University of Basrah – College of Science	1- Educational institution
ecology	2- Scientific Department / Center
Industrial pollutants (J 467)	3- Course Name/Code
Bachelor	4- Programs in which he enters
weekly	5- Available Attendance Forms
First Semester 2019-2020	6- Semester / Year
30 credit hours + 60 hours of practical	7- Number of Credit Hours (Total)
1/9/2020	8- The history of preparation of this description
9- Course Objectives	

Develop the student's ability to identify the types of industrial pollutants in the environment, their sources and how to treat them before and after they are released to the environment.

10- Course Outcomes and Methods of Teaching, Learning and Assessment

A- Cognitive objectives

A1- Knowledge of basic industries and what they put forward in the environment

A2- Identify how these pollutants affect the ecosystem.

A3- Identify the role of regulatory authorities and individuals to reduce pollution.

A4- Knowing the impact of various environmental factors on the concentration of these pollutants in the environment.

A5- Knowing the methods of establishing industrial facilities in a sound manner that is not harmful to the environment.

A6- Knowing the conditions that must be met in industrial environments.

A7- Knowing the most important methods of treating these pollutants

B - Skills objectives of the course.

B1- Identifying the most prominent local industrial establishments in the field.

B2- Practical identification of methods of measuring these pollutants in the environment.

Teaching and learning methods

1- The method of explaining the lecture and discussion.
2- Urging the student to conduct research and reports.
3- Encourage the student to conduct PowerPoint presentations.

Evaluation methods

Semester and final theoretical and practical exams

C. Emotional and value goals

- The ability to communicate information after monitoring and collecting data.
- Linking information to environmental reality and influencing other neighborhoods.

Teaching and learning methods
1- The method of explaining the lecture and discussion. 2- Urging the student to conduct research and reports. 3- Encourage the student to conduct PowerPoint presentations.
Evaluation methods
-Daily testing and reports -Monthly tests - Final exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). 1- Developing the student's mental abilities 2- Developing skill capabilities 3- Dealing with field and laboratory environmental measuring devices.
This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities . It must be linked to the program description.

Course Structure

Evaluation method	**Learning method**	**Unit Name**	**Learning Outcomes**	**Hours**	**The week**
Daily and monthly tests	Theoretical and practical	**General introduction** **Patterns of relationship between industrial zones and the city** **The topic of the second week** **Forms of industrial pollutants** **The topic of the third week** **Industrial wastewater pollution**	Student understanding of the lesson	2 N 3p	**The first The second And the third and fourth**

Daily and monthly tests	Theoretical and practical	**First theoretical exam The most prominent chemical industrial pollutants**	Student understanding of the lesson	2 N 3p	**V and the sixth**
Daily and monthly tests	Theoretical and practical	**Continuation of the topic of the sixth week Hazardous waste Featured Waste**	Student understanding of the lesson	2 N 3p	**Seventh and eighth**
Daily and monthly tests	Theoretical and practical	**Completion of the topic of the eighth week Classification of factories according to waste issued by them Physical industrial pollutants**	Student understanding of the lesson	2 N 3p	**Ninth and tenth**
Daily and monthly tests	Theoretical and practical	**Completion of the topic of the tenth week Industrial risk divisions Second theoretical exam**	Student understanding of the lesson	2 N 3p	**Eleventh and twelfth**
Daily and monthly tests	Theoretical and practical	**Infrastructure for the approach to dealing with industrial pollution**	Student understanding of the lesson	2 N 3p	**Thirteenth**

Daily and monthly tests	Theoretical and practical	**Application of international standards on industrial waste management**	Student understanding of the lesson	2 N 3p	**Fourteenth and fifteenth and the sixteenth**

11- Infrastructure	
	1 Required textbooks
1- Advanced Air and Noise Pollution Control. Lawrence K. Wang et al. 2005 2- Treatment and disposal of hazardous waste. Mohamed Ahmed Elsayed 2011 3 - Environmental and Sanitary Engineering Mohammed Ahmed Khalil 2010	2 Main references (sources)
Environmental toxicity and biological reactions of chemicals and pesticides. Zidan Hindi Abdel Hamid 2000	Recommended books and references (scientific journals, reports,....)
www.epa.gov	B Electronic references, websites ...

12- Course Development Plan
Communicate in the development of the curriculum based on recent versions of books and references.