1	**Course title**	Geographic Information Systems
2	**Course number**	5502360
3	**Credit hours (theory, practical)**	3
	Contact hours (theory, practical)	3
4	**Prerequisites/corequisites**	None
5	**Program title**	B.Sc. in Biological Science
6	**Program code**	-
7	**Awarding institution**	University of Jordan / Aqaba Branch
8	**School**	Faculty of Marine Sciences
9	**Department**	Coastal Environment
10	**Level of course**	Second, third and fourth year
11	**Year of study and semester (s)**	2019/2020 – Spring Term
12	**Final Qualification**	B.Sc. in Biological Science
13	**Other department (s) involved in teaching the course**	NA
14	**Language of Instruction**	English
15	**Teaching methodology**	☐Blended ☒Online
16	**Electronic platform(s)**	☐Moodle ☐Microsoft Teams ☐Skype ☒Zoom ☐Others…………
17	**Date of production/revision**	2020

18. Course Coordinator:

Office numbers, office hours, phone numbers, and email addresses should be listed.

Office Number: N/A
Office Hours:
Phone Number: NA
Email Address: w.hayek@ju.edu.jo

19. Other instructors:

Office numbers, office hours, phone numbers, and email addresses should be listed.

None

20. Course Description:

As stated in the approved study plan.
Study the basic principles of geographic information systems in terms of the definition of geographic information systems and the development of concepts and components or theories or methods of expression through the same programs. It also deals with the basic principles and methods of managing the databases in terms of producing maps with their various symbols, tables, graphs, and texts, as well as techniques of cutting and pasting, delimitation and merging,

21. Course aims and outcomes:

A- Aims:
1. Introducing the students to the GIS software and its various components.
2. Understanding the basic concepts and functions and how to apply it with real case studies.
3. Being able to prepare basic GIS maps using the various arc tools available within the softeware.
4. Apply a preliminary spatial analysis on a real spatial data sets.

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to

1) Describing the basics of GIS, GIS components
2) Comparing the various functions of GIS
3) Being able to surf through the program.
4) Comparing vector and raster layers
5) Comparing the differences between the basic tool bars in GIS
6) Demonstrating what is vector and raster data and other basic functions in GIS
7) Describing how to open vector and raster data
8) Comparing the different types of vector data: point; line; polygon.
9) Comparing raster surfaces and raster data showing categorical data
10) Describing how to add attribute data to a vector spatial layer by using a relational join
11) Saving vector data that you were added.
12) Setting up and access a file geodatabase
13) Investigating the symbology and display properties that can be used to change the appearance of vector and raster data.
14) Investigating the layout view for producing maps in ArcMap
15) Exporting a layout map to a graphics file which can be used in Word
16) Describing the toolboxes in ArcGIS
17) Being able to look at a layers attribute table and how to do field calculations in the table
18) Practicing spatial query using the select tool for vector data
19) Practicing spatial query using the Raster Calculator tool for raster data
20) Performing a common form of proximity analysis – buffer zone calculation, using both vector and raster data.
21) Performing a common form of proximity analysis with raster data using Euclidean distance.
22) Performing a common form of proximity analysis with vector data using the overlaying.
23) Performing two types of spatial overlay using vector data: clip a cookie-cutter operation and union
24) Performing an overlay using information from two raster layers, using the Raster Calculator.
25) Being introduced to the Environment settings of tools, particularly for handling raster calculations for the correct map extent and cell size.
26) Calculating basic terrain analysis indices such as gradient and aspect
27) Using a DEM for identifying flow directions, accumulations and river channel identification.
28) Using these to calculate a widely applied index for hydrological modelling which may indicate flood risk.
29) Using a DEM for identifying flow directions, accumulations and river channel identification.
30) Using these to calculate a widely applied index for hydrological modelling which may indicate flood risk.

22. Topic Outline and Schedule:

Week	Topic	Teaching Methods* Platform	Achieved ILOs	Evaluation Methods	Reference

Week One	Introduction to the Module	Zoom and Moodle	▪ Describing the basics of GIS, GIS components	Home works, quizzes, and practical sessions	ArcGIS Online Library
Week Two	Basic functions of GIS	Zoom and Moodle	▪ Comparing the various functions of GIS	Home works, quizzes, and practical sessions	ArcGIS Online Library
Week Three	GIS main tools and layers	Zoom and Moodle	▪ Being able to surf through the program. ▪ Comparing vector and raster layers ▪ Comparing the differences between the basic tool bars in GIS	Home works, quizzes, and practical sessions	ArcGIS Online Library
Week Four	Starting the ArcMap, starting the help system, opening some data in ArcMap (including connecting to folders)	Zoom and Moodle	▪ Demonstrating what is vector and raster data and other basic functions in GIS	Home works, quizzes, and practical sessions	ArcGIS Online Library
Week Five	Applying simple spatial query, Changing the map extent, Vector data – lines, Vector data – points	Zoom and Moodle	▪ Describing how to open vector and raster data ▪ Comparing the different types of vector data: point; line; polygon. ▪ Comparing raster surfaces and raster data showing categorical data	Home works, quizzes, and practical sessions	ArcGIS Online Library

QF-AQAC-03.02.1.2

	Vector data recap, Raster data – a continuous surface, Raster data – a categorized map, Raster Data Recap				

Week Six	Making maps using vector and raster layers Joining attribute tables to a vector map	Zoom and Moodle	▪ Describing how to add attribute data to a vector spatial layer by using a relational join ▪ Saving vector data that you were added. ▪ Setting up and access a file geodatabase	Home works, quizzes, and practical sessions	ArcGIS Online Library
Week Seven	Using other attributes of a vector map to change the display, changing the appearance of a raster map, making a map for printing or inclusion in another document, printing or copying into other documents,	Zoom and Moodle	▪ Investigating the symbology and display properties that can be used to change the appearance of vector and raster data. ▪ Investigating the layout view for producing maps in ArcMap ▪ Exporting a layout map to a graphics file which can be used in Word	Home works, quizzes, and practical sessions	ArcGIS Online Library

QF-AQAC-03.02.1.2

	adding a base map, Leaving ArcMap				

Week Eight	Opening the Toolbox, field calculations on attribute tables, adding a new area field, adding a new population density field, symbology revisited	Dr. Wissam Yahia Hayek	▪ Describing the toolboxes in ArcGIS ▪ Being able to look at a layers attribute table and how to do field calculations in the table	Home works, quizzes, and practical sessions	ArcGIS Online Library
Week Nine	Spatial query using vector data Spatial query using raster data Simple proximity analysis with vector data – buffer zones	Dr. Wissam Yahia Hayek	▪ Practicing spatial query using the select tool for vector data ▪ Practicing spatial query using the Raster Calculator tool for raster data ▪ Performing a common form of proximity analysis – buffer zone calculation, using both vector and raster data .	Home works, quizzes, and practical sessions	ArcGIS Online Library
Week Ten	Simple proximity analysis with raster data –	Dr. Wissam Yahia Hayek	▪ Performing a common form of proximity analysis with raster data using Euclidean distance. ▪ Performing a common form of	Home works, quizzes, and practical sessions	ArcGIS Online Library

QF-AQAC-03.02.1.2

	Euclidean distance tool, Overlaying two vector layers		proximity analysis with vector data using the overlaying.		

Week Eleven	Overlaying two raster layers, clipping to an area, Saving the map	Zoom and Moodle	▪ Performing two types of spatial overlay using vector data: clip a cookie-cutter operation and union ▪ Performing an overlay using information from two raster layers, using the Raster Calculator. ▪ Being introduced to the Environment settings of tools, particularly for handling raster calculations for the correct map extent and cell size.	Home works, quizzes, and practical sessions	ArcGIS Online Library
Week Twelve	Reading in the data, surface analysis functions, hydrological functions, calculating flow direction	Zoom and Moodle	▪ Calculating basic terrain analysis indices such as gradient and aspect	Home works, quizzes, and practical sessions	ArcGIS Online Library
Week Thirteen	Calculating Flow Accumulation, getting a river network from the flow accumulation surface	Zoom and Moodle	▪ Using a DEM for identifying flow directions, accumulations and river channel identification. ▪ Using these to calculate a widely applied index for hydrological modelling which may indicate flood risk.	Home works, quizzes, and practical sessions	ArcGIS Online Library

QF-AQAC-03.02.1.2

Week Fourteen	Reviewing the course material	Zoom and Moodle	• Explaining the basic functions in GIS • Comparing the different tool in GIS • Reviewing the concepts in GIS	Home works, quizzes, and practical sessions	ArcGIS Online Library

23 Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	Period (Week)	Platform
Homework 1	10	GIS material	Week 2	Zoom and Moodle
Homework 2	10	GIS material	Week 4	Zoom and Moodle
Quiz 1	10	GIS material	Week 6	Zoom and Moodle
Report1	10	GIS material	Week 8	Zoom and Moodle
Participation and Oral Exam	10	GIS material	Week 10	Zoom and Moodle
Final Exam	50	GIS material	End of term	Google forms and zoom

24. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

1- Power point presentations
2- Discussions and questions
3- Presenting real case studies

25. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

1- Home works
2- Quizzes
3- Report
4- Participation and oral exam
5- Final exam

26. Course Policies:

A- Attendance policies:
▪ Absence from lectures shall not exceed 15%.
▪ Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the college shall not be allowed to take the final examination and shall receive a mark of zero for the course.
▪ If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

B- Absences from exams and handing in assignments on time:
▪ Absences without a medical or emergency excuse acceptable to and approved by the Dean of the college shall receive a mark of zero.

C- Health and safety procedures:
NA

D- Honesty policy regarding cheating, plagiarism, misbehavior:
- Attempts to cheat during an exam or plagiarism for the written reports shall lead to a mark of zero in the exam or the home works and might lead to failure in the course with other consequences according to the regulations of the university.

E- Grading policy:

Semester Work	50%
Final Exam	40%
Total:	**100%**

94-100	4	**A**
87-93	3.75	**A-**
80-86	3.5	**B+**
75-79	3	**B**
70-74	2.75	**B-**
65-69	2.5	**C+**
60-64	2	**C**
55-59	1.75	**C-**
50-54	1.5	**D+**
45-49	1	**D**
40-44	0.75	**D-**
0-39	0	**F**

F- Available university services that support achievement in the course:
- Library sources and access to internet.

24. Required equipment: (Facilities, Tools, Labs, Training….)

1- Computer lab
2- ArcGIS software
3- Projector

25. References:

Required book (s), assigned reading and audio-visuals:
- Compiled material from the online library for ESRI

Recommended books, materials, and media:
- ArcGIS online library

26. Additional information:

NA

Name of Course Coordinator: Dr. Wissam Yahia Hayek Signature: Wissam Hayek Date: 14 June, 2020

Head of curriculum committee/Department: ---------------------------- Signature: --------------------------

Head of Department: -- Signature: ---------------------

Head of curriculum committee/Faculty: -- Signature: ------------------

Dean: -- -Signature: --