Al al-Bayt University

Faculty of Earth and Environmental Sciences

Bachelor Degree Study Plan template

Of Geographical Information Systems and Remote Sensing

2017 - 2018

Guidance Plan for Undergraduate Students specializing in Geographical Information Systems and Remote Sensing

First Year							
First Semester				Second Semester			
Course No.	Course Title	Credits	Learning Type	Course No.	Course Title	Credits	Learning Type
-	Compulsory university requirement	3	Online	-	Compulsory university requirement	3	Online
0801106	General Geology (1)	3	Face to face	0802115	Geographical Database and Design	3	Face to face
0802110	Digital Cartography	3	Blended	0802116	Programming Principles for GIS(1)	3	Face to face
0802117	Basics of Geographical Information Systems	4	Face to face	0802118	Mapping and Geodetic Positioning	3	Blended
-	-	-	-	0802120	Basics of Remote Sensing	4	Face to face
Total		13		Total		16	

Second Year							
First Semester				Second Semester			
Course No.	Course Title	Credits	Learning Type	Course No.	Course Title	Credits	Learning Type
-	Compulsory university requirement	3	Online	-	Compulsory university requirement	3	Online
0401101	Calculus(1)	3	Blended	0402101	General Physics(1)	3	Blended
0802222	Digital Image Processing and Analysis	4	Face to face	0802213	GIS Data Analysis	4	Face to face
0802260	Fundamentals of Surveying	3	Face to face	0802221	Platforms, Sensors and Space Sciences	3	blended
0802214	Programming Principles for GIS(2)	3	Face to face	0802325	Satellite Systems for Global Navigation	4	Face to face
Total		16		Total			

Third Year							
First Semester				Second Semester			
Course No.	Course Title	Credits	Learning Type	Course No.	Course Title	Credits	Learning Type
-	Compulsory university requirement	3	Online	-	Compulsory university requirement	3	Online
-	Elective specialty requirement	3	Blended	-	Elective specialty requirement	3	Blended
0403101	General Chemistry(1)	3	Blended	0401102	Calculus(2)	3	Blended
0404101	General Biology(1)	3	Blended	0402102	General Physics(2)	3	Face to face
0802324	Programming Principles for Remote Sensing	3	Face to face	0802313	GIS Applications for Natural Disaster Management	3	Blended
0802314	GIS Applications for Natural Resources Management	3	Face to face	0802321	Microwave Remote Sensing	3	Face to face
Total		**18**		**Total**		**18**	

Summer semester			
Course No.	Course Title	Credits	Learning Type
0802481	Practical Training	3	Face to face

Fourth Year							
First Semester				Second Semester			
Course No.	Course Title	Credits	Learning Type	Course No.	Course Title	Credits	Learning Type
-	Elective university requirement	3	Blended	-	Elective university requirement	3	Blended
-	Elective university requirement	3	Blended	-	Elective specialty requirement	3	Blended
-	Elective specialty requirement	3	Blended	-	Elective specialty requirement	3	Online
0802451	Aerial Photos and Photogrammetry	4	Face to face	0802452	Aerial Photos Interpretation and Analysis	3	Face to face
0802453	Remote Sensing Applications for Natural Resources	3	Face to face	0802492	Graduation Project(2)	2	Face to face
0802491	Graduation Project(1)	1	Face to face				
Total		**17**		**Total**		**14**	

Description of Courses offered by the Department of Geographical Information Systems and Remote Sensing / Bachelor Degree in Geographical Information Systems and Remote Sensing

Course No.	الكارتوجرافيا الرقمية	(3) Credits	Learning Type
0802110	Digital Cartography	Pre-requisite: -	Blended
The concept of digital cartography and the meaning of a digital map, the differences between a traditional paper map and a map. Digital map data entry methods (manual numbering operations, scanning, automatic numbering, saving Digital map and display, control of scale and projection, use of computers in creating maps thematic and creating 3D charts, reading and interpreting thematic maps and charts)			

Course No.	قواعد البيانات الجغرافية وتصميمها	(3) Credits	Learning Type
0802115	Geographical Databases and Design	Pre-requisite: -	Face to face
Fundamentals and concepts, design and applications of database management systems, logical and physical models, calibration, languages Inquiry, Increasing Inquiry Effectiveness, Relational, Hierarchical, and Network Databases, Security and Integration, Databases Distributed, concurrent use control.			

Course No.	مبادئ البرمجة في نظم المعلومات الجغرافية (1)	(3) Credits	Learning Type
0802116	Programming Principles for GIS (1)	Pre-requisite: -	Face to face
Introduction to personal computers, computer history and applications, binary numbering system, computer data representation, Computer organization and its internal parts: central processing unit, memory, input and output units. Operating systems, application software: word processors, spreadsheets, and presentations. An introduction to the Internet and its uses, e-mail, an introduction to software systems related to modeling, analysis and mapping programs, and the basics of solving geographical problems using algorithms. You build and connect user interfaces (GUI) for various computer applications.			

Course No.	أساسيات نظم المعلومات الجغرافية	(4) Credits	Learning Type
0802117	Basics of Geographical Information Systems	Pre-requisite: -	Face to face
What is the science of geographic information systems, the nature and specificity of geographical data and information, ways to represent phenomena. Earth's surface and accurate representation, the concept of geographic information systems and their development, the relationship between geographic information systems. Automated (digital) cartography, GIS components, GIS software components. Methods of data representation in geographic information systems (vector, transcendental), the concept of geographical database. Its uses and data sources, geographical inquiry and analysis processes, examples of system uses and applications. Geographical information in the areas of land use, environment, resource management, and population studies.			

Course No.	علم الخرائط والإسقاطات الجغرافية	(3) Credits	Learning Type
0802118	Mapping and Geodetic Positioning	Pre-requisite: 0802117	Blended
Introduction, drawing scale, geographic position, coordinate systems, deformation due to conversion from spherical shape to. Plane shape, classification of projections and their characteristics, cylindrical projections, and cylindrical projections that. It is used in topographic maps, conic and azimuthal projections, and non-azimuthal projections.			

Course No.	أساسيات الاستشعار عن بعد	(4) Credits	Learning Type
0802120	Basics of Remote Sensing	Pre-requisite: -	Face to face
Fundamentals of remote sensing, electromagnetic energy, industrialization of satellites, properties of space visuals, Characteristics of remote sensing data, spatial and temporal resolution, and spectral relationship between remote sensing systems Geographic information. and types of image clarity. Factors affecting electromagnetic radiation and processes optimization. Learn about the most important characteristics of satellites, the basics of taking satellite images, and the most important correction operations radiometric			

Course No.	تحليل بيانات نظم المعلومات الجغرافية	(4) Credits	Learning Type
0802213	GIS Data Analysis	Pre-requisite: 0802117	Face to face
The concept of spatial analysis, geographical data and measurement, spatial statistics techniques, data analysis methods in systems Geographical information (campus, dissolution, merger, union, spatial relations and types of topological congruence, analysis Surfaces and regression models, exploratory analysis and deductive methods, spatial correlation, data accuracy check.			

Course No.	مبادئ البرمجة في نظم المعلومات الجغرافية (2)	(3) Credits	Learning Type
0802214	Programming Principles for GIS (2)	Pre-requisite: 0802116	Face to face
Basic concepts of Object-Oriented Programming, development of object-oriented programs Within the Microsoft environment and the .NET platform. Develop and create curve object programs using dot object libraries NET and Visual Studio .NET, developing and building geographic information systems tools within information systems software specialized geography.			

Course No.	المنصات والمجسات و علوم الفضاء	(3) Credits	Learning Type
0802221	Platforms, Sensors and Space Sciences	Pre-requisite:	Blended
The concept of space platforms and identifying the types of space platforms and sensors used, advantages and disadvantages in terms of Space group, cost, stability, frequency, and orbital scale, in addition to the characteristics of the images obtained from the satellite through space and air platforms. And some general characteristics of sensors and their relationship to space.			

Course No.	تحليل ومعالجة الصور الرقمية	(4) Credits	Learning Type
0802222	Digital Image Processing and Analysis	Pre-requisite: 0802120	Face to face
Digital processing and analysis techniques for remote sensing data, digital visualization processing (contrast processing, processing Multi-visualization, image enhancement, conversion, spectral fingerprint, visualization (analysis), output, aggregation.			

Course No.	مبادئ المساحة	(3) Credits	Learning Type
0802260	Fundamentals of Surveying	Pre-requisite:	Face to face
Basic surveying principles, measuring and correcting distances, reference surfaces, goniometers and theodolites, Vertical leveling and adjustment, directions, measuring and correcting angles, topographic surveying and contour lines, Methods and techniques of field elevation, measurement of areas and volumes in engineering projects.			

Course No.	تطبيقات نظم المعلومات الجغرافية في إدارة الكوارث الطبيعية	(3) Credits	Learning Type
0802313	Management GIS Applications for Natural Disaster	Pre-requisite: 0802117	Blended
The main concepts of GIS applications in the fields of geology and water. Introduction to defining compositions Geological, discerning temporal changes. Techniques used in the study of geological structures and the study of water Surface and underground within the GIS environment. Key concepts of GIS applications In the fields of (atmosphere, biosphere, hydrosphere, and geosphere). Information systems technologies Geographical measurements and environmental data by standards and field work on the application of principles in the collection of huh Data and their interpretation to solve various environmental issues.			

Course No.	تطبيقات نظم المعلومات الجغرافية في إدارة الموارد الطبيعية	(3) Credits	Learning Type
0802314	Management GIS applications for Natural Resources	Pre-requisite: 0802117	Face to face
The main concepts of GIS applications in the fields of geology and water. Introduction to identifying geological structures, distinguishing temporal changes. Techniques used in the study of geological structures, and the study of surface and groundwater within the geographic information systems environment. The main concepts in the applications of GIS in the fields of (atmosphere, biosphere, hydrosphere and land cover). GIS techniques in environmental measurements and data by means of standards and field work on the application of principles in collecting and interpreting these data to solve various environmental issues.			

Course No.	الاستشعار عن بعد بالموجات الدقيقة	(3) Credits	Learning Type
0802321	Microwave Remote Sensing	Pre-requisite: 0802222	Face to face
Various topics of microwave remote sensing with emphasis on remote sensing from space and from the Earth's atmosphere, land, and ocean, applications of microwave remote sensing through active techniques (radar) and issues related to the design of microwave sensors from space along with Radiative transfer theory.			

Course No.	مبادئ البرمجة في الاستشعار عن بعد	(3) Credits	Learning Type
0802324	Programming Principles for Remote Sensing	Pre-requisite: 0802222	Face to face
Introducing the concept of language programming and its relationship to remote sensing programs and how to use them as a data modeling tool Satellite remote sensing. and how to use them to represent and interpret satellite images.			

Course No.	أنظمة الأقمار الصناعية للملاحة العالمية	(4) Credits	Learning Type
0802325	Satellite Systems for Global Navigation	Pre-requisite:	Face to face
Earth's geodetic coordinate system, physical properties of geodetic measurements, spheroids and gravitational field, reference surfaces of vertical and horizontal coordinates, return of field observations of reference surfaces, conversion of geographic coordinates, determination of the plane and geodetic area field, geodetic networks, introduction to the global signature system (GPS), mathematical relations Basic determination of coordinates by means of (GPS), methods of determining location using (GPS), design and implementation of (GPS) networks.			

Course No.	التصوير الجوي والمساحة التصويرية	(4) Credits	Learning Type
0802451	Aerial photos and Photogrammetry	Pre-requisite: 00802222	Face to face
Introduction and definitions in aerial and ground photogrammetry, elements of photogrammetry optics, cameras Aerial photography, measurements and improvement of aerial photographs, vertical and lateral displacement aerial photographs, binocular vision Stereoscopy, binocular stereoscopy, drawing and creating maps using vertical and oblique aerial photographs.			

Course No.	تحليل وتفسير الصور الجوية	(3) Credits	Learning Type
0802452	Aerial photos Interpretation and Analysis	Pre-requisite: 0802222	Face to face
Measuring and correcting the coordinates of aerial photos, correcting distortions resulting from photographic film, and processing lens aberrations To calibrate the camera, methods of projecting aerial images, solve and find the absolute coefficients of aerial images and the relative between Two aerial photos, intersection and projection methods, and correction of aerial photos. Computer applications and processing training. A set of aerial photos using the triangulation method and control and correction points. Practical applications covered Topics covered in photogrammetry and aerial photography.			

Course No.	تطبيقات الاستشعار عن بعد في الموارد الطبيعية	(3) Credits	Learning Type
0802453	Remote Sensing Applications for Natural Resources	Pre-requisite: 0802222	Face to face
Practical applications of remote sensing using different areas of electromagnetic mud for water studies Surface and groundwater inference. Key concepts for remote sensing applications in the fields of geosciences (atmosphere, biosphere, hydrosphere, and geosphere), an introduction to identifying geological structures, distinguishing temporal and spatial changes in the hydrosphere, atmosphere, biosphere (vegetation), and the environmental field.			

Course No.	التدريب العملي	(3) Credits	Learning Type
0802481	Practical Training	Pre-requisite: Department approval	Face to face
Field training: The student does field training for a period of (8) weeks in an accredited institution/company after passing 90 (credit hours and approval from the department).			

Course No.	مشروع تخرج (1)	(1) Credits	Learning Type
0802491	Graduation Project (1)	Pre-requisite: Department approval	Face to face
A student or a group of students is testing a project related to a specialization in geographic information systems applications Remote sensing and in coordination with the department.			

Course No.	مشروع تخرج (2)	(2) Credits	Learning Type
0802492	Graduation Project (2)	Pre-requisite: 0802491	Face to face
Completion of work on the graduation project that was chosen in the graduation project (1)			

Course No.	البرمجة بلغة جافا	(3) Credits	Learning Type
0901211	Programming in Java	Pre-requisite: 0802116	Face to face
Recognizing object-oriented concepts in the Java language, such as classes, entities, messaging, and inheritance. Rectifiers java) interfaces, exceptions, packets, synchronization, and memory retrieval). Use the available package functions (lang, util, io, networking awt, swing). Server software (Applets), Threads, Files. GUI and Apps variety in the Java language.			

Course No.	التمثيل العددي للتضاريس	(3) Credits	Learning Type
0802250	Digital Elevation Models	Pre-requisite: 0802117	Face to face
Principles of numerical representation of terrain, calculating appropriate values for numerical representation of terrain, methods of storing representation values Numerical topography, how to display the numerical topography in a regular representation method in the form of matrices, road Non-uniform representation of distances, the concept of distribution of points suitable for calculating contour lines, terrain representation Using functions and using modern statistical methods such as the Craigung method and the arithmetic mean, perform exercises Practical covering the basic vocabulary of methods and principles of numerical representation of terrain and their applications to GIS			

Course No.	علوم الأرض وتكنولوجيا المعلومات	(3) Credits	Learning Type
0801261	Earth Sciences and Information Technology	Pre-requisite: 0801106	Blended
geomorphology and land structure: regional and local relations, moraine movement on slopes; landforms resulting from volcanic activity, geomorphological landforms associated with rock types, landforms associated with weathering, river erosion and associated landforms, glaciation; Coastal erosion and its land forms, man and his role in shaping the Earth's surface.			

Course No.	نظم الإدارة البيئية	(3) Credits	Learning Type
0802281	Principles of Environmental Management	Pre-requisite: 0801106	Blended
Basic concepts of environmental management, management of exploitation of natural resources and protection of the environment, monitoring and follow-up of environmental conditions (Methods, equipment and creation of environmental maps), ways and means of preserving and protecting the environment, environmental planning .egislations and laws that protect and preserve the environment, the environment and local and international policy.			

Course No.	الجيومورفولوجيا التطبيقية	(3) Credits	Learning Type
0802330	Applied Geomorphology	Pre-requisite: 0801106	Face to face
Classifications of minerals and rocks, study of structural engineering geology by different geological measurements For the rocky layers visible above the surface of the earth and the depth of the rocky layers below the surface of the earth, prepare sections Topographic geological maps, the study of physical and chemical weathering and the origin of Earth's surface forms and systems valleys. (Processes) rock gravity and morphometric of water basins. Study of the geological and engineering structure And represented by drawing and mathematical methods. Using the geological map and how to interpret it. Interpretation of aerial photographs Geological maps from aerial photographs.			

Course No.	تخطيط وإدارة استعمالات الأراضي	(3) Credits	Learning Type
0802381	Land Use Planning and Management	Pre-requisite:	Blended
General concepts of planning and land uses, the main principles in land use management, methods Characteristics and identification of land uses, the importance of land management and planning, comparison methods used land use operations			

Course No.	أساسيات التخطيط الإقليمي	(3) Credits	Learning Type
0802383	Principles of Regional Planning	Pre-requisite:	Online
The concept and types of planning, the problems of defining the planning unit (regions), the historical and contemporary framework for planning, Philosophy, foundations and theories of regional planning with emphasis on regional and urban planning processes and layout Resources, analysis of planning problems, issues and techniques in planning regions, identification of (political) objectives and constraints economic, social and environmental), general models of agricultural, industrial, urban and service planning Focusing on models and applications on Jordan.			

Course No.	إدارة مشاريع في نظم المعلومات الجغرافية	(3) Credits	Learning Type
0802414	Projects Management using GIS	Pre-requisite: 0802117	Face to face
The basic concepts of project management, the foundations of how to manage and organize projects, the methods used in project management Projects within a GIS environment.			

Course No.	إدارة الموارد المائية في المناطق الجافة	(3) Credits	Learning Type
0802484	Water Resources Management in Arid Regions	Pre-requisite: 801106	Online
Introduction, general concepts of arid and semi-arid regions, nature of drought, topography, water resources, strategy Use of water resources in arid and semi-arid regions, causes affecting arid regions, water limitations in dry areas.			

Course No.	تكنولوجيا الليزر في الاستشعار عن بعد	(3) Credits	Learning Type
0802424	Laser Scanning Technology in Remote Sensing	Pre-requisite: 802222	Face to face
Concepts, principles and applications of laser scanning in airborne, the nature of laser data and its usefulness And the general principles of it and the mechanism of displaying it in a three-dimensional way, the advantages and disadvantages of this technology, and the application of software systems in Solving specific problems with airborne laser scanning data and practical applications of laser technologies in the fields Archaeological surveys and landscape applications.			