



جامعة القاهرة



كلية التخطيط الإقليمي والعمراني



الدبلوم المهني

تطبيقات تكنولوجيا المعلومات الجيومكانية

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الساعات
المعتمدة

٢٤ ساعة معتمدة
(٣ ساعة معتمدة لكل مادة)

القسم العلمي المسئول
عن تدريس الدبلومة

قسم التخطيط البيئي
والبنية الأساسية

الجهات المستهدفة

ريجي الجامعات
العاملين والمهتمين
بالبيانات المكانية

الأهداف العامة
للدبلومة

توفير المهارات التحليلية المكانية و التي تتجاوز ما توفره المناهج الدراسية التقليدية في البكالوريوس. وقد صمم منهج الدبلومة بعناية ليعكس المتطلبات الواقعية للأنظمة نظم المعلومات الجغرافية وتكنولوجيا المعلومات والاتصالات اللازمة للمهنة في العلوم الجغرافية المكانية

تهدف دبلومة تطبيقات تكنولوجيا المعلومات الجيومكانية اكتساب الطلاب والخريجين العلم والمهارة ليصبحوا محترفين ذوي مؤهلات علمية في مجال التطبيقات الجيومكانية ،بالإضافة إلى استخدام مهارات كامل تكنولوجيا الاتصالات والمعلومات وتطبيقات الويب الخاصة لمجالات نظم المعلومات الجغرافية في مجالاتهم الخاصة

المهارات المكتسبة

فهم و تطبيق علوم الكارتوجرافي و المساحية لانتاج الخرائط المكانية

فهم نظريات نظم المعلومات الجغرافية وتطبيقها العملي باستخدام احدث برامج نظم المعلومات الجغرافية ARCGIS PRO

التعامل مع تكنولوجيا المعلومات و الاتصالات و المصورات الفضائية

التعامل مع البيانات الضخمة Big Data وتصميم وإدارة قواعد البيانات المكانية

التدريب التطبيقي علي عمليات إحال البيانات المكانية ونظم المعلومات الجغرافية والتقنيات الحديثة بها

تطبيق تقنيات نظم المعلومات الجغرافية المتقدمة في المجالات المختلفة من مراجعة البيانات والعلاقات الهندسية و تطبيق قواعد التبولوجي البيانات المكانية وهندسة البناء نموذج للتحليل المكاني.

اكتساب المعرفة وأساسيات تقنيات نظم المعلومات الجغرافية التشاركية على شبكة الإنترنت و متعددة المستخدمين توزيع قواعد البيانات بالتطبيق علي احدث التطبيقات من ArcGIS Enterprise و ArcGIS Online وأدوات التحليل عبر الإنترنت في مجال التخطيط الاقليمي والعمراني و التصميم العمراني.

المقررات

تطبيقات نظم المعلومات الجغرافية في التخطيط الإقليمي

النظم المساحية الارضية المتطورة

مشروع تطبيقي في التخطيط البيئي وتخطيط البنية الأساسية

نظم المعلومات الجغرافية متقدم

موضوعات مختارة في التخطيط العمراني

الحاسب الالي في التخطيط الإقليمي والعمراني

موضوعات مختارة في تخطيط النقل والبنية الأساسية

مشروع تطبيقي

نظم المعلومات البيئية

تطبيقات الحاسب الالي

Geoinformatics Applications Diploma for Architects, Urban Planning and Spatial Sciences

The Target Authorities

Governmental Agents, Local Government Administrations, Private Interest Bodies

The Department Responsible for teaching the Diploma

Department of Environmental Planning and Infrastructure

Credit Hours

24Hours

Diploma Goals

- The diploma goals to train graduate students to become professionals with strong scientific and geospatial qualifications, as well as GIS web application skills in their special fields. These future leaders and skilled professionals require spatial analytical skills beyond what is offered by traditional curricula at the bachelors.
- The diploma curriculum has been carefully designed to reflect the real-world requirements of Geoinformatics and ICT needed for careers in the geospatial sciences to fulfill skills for the future nation vision of smartness, digital government and different development sectors.

Diploma Skills

- Understanding the GIS theories and practice of ArcGIS Pro.
- Illustrate GIS data entries processes and techniques.
- Practice Spatial Data Visualization and Analysis.
- Able to design, manage and understand data models of spatial databases and be familiar of Structured Query Language (SQL) and Python Programming for GIS.
- Conduct advance GIS technologies of Data Reviewer and Topologies for spatial data accuracy and model builder architecture for spatial analysis.
- Gain basics knowledge of Web GIS and multiusers distributed databases and practice ArcGIS Enterprise and ArcGIS Online analysis tools.
- Introduced to urban planning support systems of City Engine and Smart Urban GIS Use Cases .
- Practice Architects and Urban Planner special advance GIS tools for indoors analysis, site analysis, raster-based tools, image possessing.
- Gain basics special GIS analysis concepts and tools for infrastructure and transportation networks.

Diploma Courses Outlines

The Diploma Program is outlined to cover two types of Diploma:

- 1) Professional Diploma: For candidate held a Bachelor Degree from a university of institute and interested in Spatial Sciences
- 2) Academic Diploma: For candidate held Urban Planning, Architects and Civil Engineering Bachelor Degree

The Diploma Program courses is divided in two level:

Level (1) Courses: Geoinformatics basics courses and Web GIS applications

Level (2) Courses: Architects, Urban and Civil Engineering Geoinformatics Specific Courses and Applications

Diploma	Level1 CH	Level2 CH	Projects	Pre-Request
Professional Diploma (Min 24 Credit Hours) (Max 27 Credit Hours)	Min 12CH	Max 6CH	UP608 (3CH)& URP503 (6CH)	University/Institute Bachelor Degree
Academic Diploma (Min 24 Credit Hours) (Max 30 Credit Hours)	Max 12CH	Min 12CH	URP503 (6CH)	Engineering Bachelor Degree(Urban, Architects, Civil,...) Knowledge & Basics of GIS skills

For Professional Diploma

All **level (1) courses** are compulsory except student will select on second semester one course of RD505 and URP602 as elective course. While courses of the **level (2) Courses** will be elective courses for professional diploma students with maximum of only two courses optionally after termination of the 24 Credit Hours.

For Academic Diploma

For academic diploma students, all **level (1) courses** are elective with a maximum of 12 CH (maximum four courses only) while the final graduation project course URP503 is a compulsory course.

Level (2) courses are elective for Academic Diploma students with a minimum of 12 CH (at least four courses). Academic Diploma students might extend the diploma to 30 CH with addition of two courses optionally after termination of the 24 Credit Hours.



For Academic Diploma

Semester (1)	Goals	Subjects
<p>Advanced Surveying mapping systems (GIS Fundamentals & Introduction to ArcGIS Pro) EP506</p>	<ul style="list-style-type: none"> The course familiarizes students with ArcGIS Pro architecture software and acquire students with skills to use and perform common GIS workflows using ArcGIS Pro for applying cartography and produce of thematic maps in GIS environment. By the end of this course students will be able to master use of ArcGIS Pro for standard cartographic workflow to efficiently produce high-quality cartographic maps. 	<ul style="list-style-type: none"> The course introduces the fundamentals of surveying sciences and the basics of cartography mapping sciences. The course illustrates coordinate systems and the basics of GIS principles. During the course, students will practice to create spatial features and its attributes and importing from different data sources. Students will learn different methods and techniques to explore, manage and review geographic data and create thematic maps. The course covers creation and gathering spatial and attributes data from different sources to create accurate geographic data. Students will be introduced to the topology's principles and tools as well as data reviewer's extension of ArcGIS Pro as two main techniques for spatial data management and data quality accuracy control. Sufficient hands-on practice sessions with variety of ArcGIS Pro tools that streamline the editing process and decrease the potential for errors when updating your GIS database.
<p>Environmental Information Systems (Introduction to Databases principles & Spatial Analysis tools) EP505</p>	<ul style="list-style-type: none"> By the end of this course students will be able to handle and use of Geodatabases of ArcGIS Pro and applying spatial analysis tools and techniques to provide decision makers with required analysis outputs. 	<ul style="list-style-type: none"> This course introduces the system analysis field and database principles of Environmental Information Systems for design, create and manage DB and illustrate the structure difference for spatial databases concepts. Students will apply such principles and concepts of Databases within the ArcGIS Pro Geodatabases environment for creation and management of environmental information systems. The course introduces the essential concepts of Environmental spatial analysis and the standard spatial analysis workflow which you can apply to any spatial analysis project with a variety of tools and data, you will explore, analyze, and perform different types of analyses to efficiently create reliable results that support informed decision-making. Finally, the course will introduce the Model Builder tool of ArcGIS Pro to practice the automation of the spatial analysis tools.



Semester (1)	Goals	Subjects
Computer Applications (Introduction to Web GIS) URP505	<ul style="list-style-type: none"> The course aims to introduce the GIS Web paradigm and its applications architecture. By the end of the course, students will be familiarized with Web GIS concepts and can handle its components. 	<ul style="list-style-type: none"> This course begins with the definitions of Web terminologies and components and the principles of distributed and sharing web GIS applications and their benefits for Urban planning and Spatial sciences. Students will explore the services and portal components for any web GIS applications. The course explains the fundamentals of the GIS server. Students practice the web GIS services using ArcGIS Online and ArcGIS Enterprise by create and publish GIS services over the web by uploading spatial data, sharing maps, and applied GIS web analytical tools. Students will explore the management of GIS services access through variety of apps and devices for project GIS users' group from different locations. Thus, will be followed by an introduction for the portal website approach and its role in the Web GIS applications where you can organize your geospatial assets and share them with other people in the organization. The portal is designed to be a highly collaborative environment and the course let students to practice it to create maps, work with apps, and perform analytics over the web using ArcGIS online and ArcGIS Enterprise. The students will explore also the control access permissions rules for content and capabilities through unique identities for each user.
Quantitative and Qualitative Analysis Methodologies (Practical ArcGIS Pro Project application) UP608	<ul style="list-style-type: none"> The aim of the course is to provide students with the opportunity to apply and integrate their knowledge and skills gained from semester courses and to develop qualitative and quantitative analysis methodology strategies for their transition to professional GIS life. 	<ul style="list-style-type: none"> The course is designed to emphasize the GIS knowledge gained. Students are requested to apply a practical project for the basics GIS concepts, databases management and the spatial analysis tools. Students will take responsibility for the design, planning and organization of the various components required for successful completion of the project. Wherever possible, projects will be sourced from industry partners. Students are encouraged to work in small teams for the projects. Project proposals will be presented as both written report and maps as an oral presentation. Upon successful completion of this unit, students will continue with second semester courses where their project outcomes will be created, delivered and evaluated.



Semester (2)	Goals	Subjects
Geographic Information Systems for Regional Applications (Raster GIS principles in ArcGIS Pro) RD505	<ul style="list-style-type: none"> By the end of this course students will be able to create and apply raster-based GIS data structure and use of spatial raster analysis tools of ArcGIS Pro within the analysis of continuous spatial phenomena problems. 	<ul style="list-style-type: none"> The course explores the characteristics and advantages of raster-based GIS data structure for data collection and data analysis. by applying for. During the course, students will practice raster data structure, data creation and spatial analysis tools within national and regional planning practice project application. During the practice students will explore the various grid data sources, manage grid raster layers for creation and editing raster data. Students will also practice the application of logical, mathematical, functional tools for analysis and spatial modelling within ArcGIS Pro environment which will help making decisions for regional and national strategic planning processes and localizing appropriate activities.
Informal Housing (Web GIS ARCGISONLINE for Data Sharing applications) UP612	<ul style="list-style-type: none"> The course aims to introduce the Esri ArcGIS Online cloud web GIS application as a tool for informal housing management. By the end of this course students will be able to use ArcGIS Online for Web GIS applications for conduct field data collection and workforce management in the field as well as produce spatial interactive outputs of Dashboards and Map Stories for data sharing and analysis to support decision makers. 	<ul style="list-style-type: none"> During the course, students will practice the creation of informal areas web interactive maps and understand the advantages of such technique to follow the fast-urban characteristics change. Students will explore the advantages of data sharing, collaboration and monitoring of web GIS application during the community participation and decision-making processes for the informal housing areas. In the other hand, the course will introduce the integrated Esri mobile data collection applications with ArcGIS Online for field survey: Survey123 and data Collector. Students will practice use of such data collection mobile apps and explore the power to have shared on time field data for all decision makers and a comprehensive integration with the workforce extension to liberate the Geodatabase on the field and manage tasks and locations of surveyors on the field. Students will practice create, design Dashboards, Story Maps interactive analysis tools of ArcGIS Online.



Semester (2)	Goals	Subjects
Advanced Computer Applications (Fundamentals of Web GIS administration using ArcGIS Enterprise) URP602	<ul style="list-style-type: none"> By the end of the course, students will gain the basics knowledge to admin organization standard client/server Web GIS applications and concurrency management scalable spatial data and multiuser levels. 	<ul style="list-style-type: none"> The course introduces students to the basic knowledge for professional organization administrator of web GIS. Students will practice manage work groups between individuals of companies, allowing students to deal with management of centralized databases and other information resources in an organization of edit and store data simultaneously in ArcGIS Enterprise environment. Students will explore the industry-standard client / server and Internet architectures (e.g., Web services). They will practice the Concurrency management of GIS in a multiuser environment, the standard data management practices, such as backup, recovery, and replication, Performance for any number of users, the management and organization of data scalable data volumes. Students will apply the principles of centralized systemwide or companywide access to the data, data maintenance over long time periods, spanning personnel changes and hardware and software upgrades System failure and recovery mechanisms.
Practical Project (Diploma Final Graduation Project) URP503	<ul style="list-style-type: none"> Projects offer students the opportunity to apply and extend material learned throughout the diploma. Graduation Project represents the culmination of study towards the Geoinformatics Diploma degree. 	<ul style="list-style-type: none"> Students are required to prove their ability to apply gained information of GIS and Web GIS within a real problem issue. Assessment is by means of a seminar presentation, submission of maps, and public demonstration of work undertaken. In contrast to the majority of courses studied elsewhere in the diploma, projects are undertaken individually or in small groups. This necessarily required to start the selection of the project topic from the beginning of the second semester with periodic staff revisions and consultations to enable completion of a large, relatively unstructured "assignment" over the course of the semester.