جامعة القاهرة

كلية التخطيط الإقليمي والعمراني

الدبلوم المهني

تطبيقات تكنولوجيا المعلومات المكانية في الهندسة المعمارية والتخطيط العمراني

العنوان: كلية التخطيط الإقليمي والعمراني، جامعة القاهرة,1 ش الجامعة -الجيزة – مصر

التليفون:35770/ 35812 /0235700830

الموقع الإلكتروني للكلية :

www.furp.cu.edu.eg- www.frup.cu.edu.eg

البريد الإلكتروني للكلية: furp@furp.cu.edu.eg

صفحة ادارة الدراسات العليا على فيسبوك

https://www.facebook.com/groups/456286008602852/?ref=share

الجهات المستهدفة	القسم العلمي المسئول عن تدريس الدبلومة	الساعات المعتمدة
خريجي كليات الهندسة المعمارية/التخطيط العمراني والمدنية	قسم التخطيط البيئي والبنية الاساسية	٢٤ ساعة معتمدة (٣ ساعة معتمدة لكل مادة)

الأهداف العامة للدبلومة

اكتساب مهارات جديدة في مجال نظم المعلومات الجغرافية بتطبيق نماذج التحليل المكاني باستخدام تطبيقات احدث نظم المعلومات الجغرافية وتكنولوجيا المعلومات والاتصالات و ذلك لتطوير أساليب اعداد، تحليل وتقييم الدراسات المعمارية والتخطيطية.

التعريف النظري للنماذج المكانية بالمجال وتطبيق التحليلات المكانية المتقدمة في مجال التخطيط العمراني و التصميم المعماري. بشكل يعكس المتطلبات الواقعية واحتياجات سوق العمل الرقمي في الجهات الحكومية و الخاصة لجيل جديد من المهندسين و المخططين ذو المهارات التي تتجاوز ما توفره المناهج الدراسية التقليدية في البكالوريوس لأنظمة نظم المعلومات الجغرافية وتكنولوجيا المعلومات والاتصالات اللازمة للمهن في العلوم الجغرافية المكانية لتحقيق اهداف ورؤي الدولة في التحول الي الدولة الرقمية و الذكاء الصناعي

المهارات المكتسبة

- فهم نظريات النماذج المكانية وتطبيقها العملي باستخدام احدث برامج نظم المعلومات الجغرافية ARCGIS PRO
- مهارات التعامل مع تكنولوجيا المعلومات والاتصالات و تطبيق علوم الاستشعار عن بعد في مجال التخطيط الإقليمي والعمراني والتصميم المعماري.
- التعامل مع تكنولوجيات البيانات الضخمة Big Data والحوسبة السحابية Computing Cloud في مجال التخطيط الإقليمي والعمراني و تصميم وإدارة قواعد البيانات المكانية التشاركية
- اكتساب المهارات في تطبيق نماذج إدال البيانات المكانية المتقدمة باستخدام تكنولوجيا المعلومات والاتصالات الحديثة بالمجال.
- تطبيق في مجال التخطيط الاقليمي والعمراني التقنيات الحديثة بنظم المعلومات الجغرافية المتقدمة في من أنظمة مراجعة البيانات و العلاقات الهندسية و تطبيق قواعد التبولوجي للبيانات المكانية العمرانية وهندسة البناء للنماذج المكانية.
- اكتساب مهارات التحليلات المكانية المتقدمة في مجال التخطيط و العمارة
- اكتساب المعرفة وأساسيات تقنيات نظم المعلومات الجغرافية التشاركية على شبكة الإنترنت و متعددة المستخدمين توزيع قواعد البيانات بالتطبيق علي احدث التطبيقات من ArcGIS Online و ArcGIS Enterprise وأدوات التحليل عبر الإنترنت في مجال التخطيط الاقليمي والعمراني و التصميم العمراني.

المقررات

مناهج التحليل الكمي والوصفي	تقييم وتقنيات استغلال الموارد الطبيعية
تطبيقات نظم المعلومات الجغرافية في التخطيط الإقليمي	تقييم وتقنيات استغلال الموارد الطبيعية
نظم المعلومات البيئية	مدالل نظم تخطيط البنية الأساسية
دراسة حرة في مجال تخطيط النقل والبنية الأساسية	دراسات حره في مجال التخطيط البيئي
أعمال الموقع العام	تطبيقات الحاسب الالي في التصميم العمراني
الاستدامة والمدن المستقبلية	دراسات حره في مجال التخطيط البيئي
التنمية المستدامة والتخطيط البيئي	تطبيقات متقدمة للحاسب الالي
	مشروع في التخطيط البيئي وتخطيط البنية الأساسية

For Professional Diploma

	Goals	Subjects
Computer in Urban and Regional Planning (Introduction to Python Programming in ArcGIS Pro) URP502	• The course aims to introduce GIS programming concepts for students. • By the end of the course students will have gained a fundamental understanding of Python programming language by creating a variety of scripts and applications within the ArcGIS Pro environments and GIS web systems.	• Python is an adaptable programming language, suitable for GIS scripting ranging from small scripts to large systems. • Students will explore best practices of python for GIS tasks within ArcGIS Pro environment and the large standard library of Python for GIS applications, which supports many common programming tasks.
Planning of urban transportation and traffic networks (Urban Network Analyst of ArcGIS Pro) EP502	• By the end of the course, students will be able to construct network dataset and apply the network analysis tools for network characteristics analysis and urban city accessibility analysis and scenarios.	• The course illustrates the basic concepts of urban transportation network analysis in GIS environment. • Students will be able to define the network dataset elements in ArcGIS Pro environment, they will practice creation of such a transportation network model within the network analyst use case. • Students will practice two network analysis types on the constructed network dataset, the application of the network analysis tools for solving complex routing problems such as plan routes for an entire fleet, origin destination optimum route, hierarchy of the road city network, drive times and traffic management. • Then it will be follows with the urban analysis tools for urban accessibility problems, urban accessibility scenarios, urban services areas analysis.

	Goals	Subjects
Site layout Works (Topography & Hydrology site Analysis using 3D Analyst of ArcGIS Pro) UD511	• The course goal is to introduce the spatial approach for architects and urban planner for topography and hydrology site analysis. • By the end of the course, students will have the skills to construct 3D surface model of the required site and apply spatial site analysis for topography and hydrology analysis in their GIS workflows using ArcGIS Pro.	• The course introduces the basic types of 3D data surface modelling types in GIS and the different data sources available. • • Students will practice the construction processes of terrain irregular network TIN and raster surface grid DEM and DTM analysis processing using 3D surface analysis tools of ArcGIS Pro. • • Students will apply a site analysis project to create, analysis and store the different 3D surface types and use such constructed surfaces to apply topography analysis and hydrology analysis for sites using the 3D Analyst extension of ArcGIS Pro.
Legislation and Urban Regulations (City Engine Decision Support Use Case for urban planning) UD610	• By the end of the course, students will have the skills to apply City Engine for housing detailed planning by create interactive 3D city visualization and use the Rule Based Modeling for generation of detailed plan city scenarios respecting legislation and laws requirements.	• The course introduces the City Engine Use Case, a spatial decision support system to generate smart urban detailed plans respecting regulations and urban legislations. • The course introduces the 3D interactive city visualization tools for land use, buildings and transportation networks using the Computer-Generated Architecture (CGA) modeling of City Engine Esri use Case. • The course also illustrates the spatial analysis tools and the Rule-based modeling (RBM) architecture concept of City Engine for generate smart detailed plans of parcels, buildings and transportation network following legislation and urban regulations. • Students will practice generating interactively detailed planning alternatives using the RBM Scripting for Architecture and Urban Planning Components respecting the legislation and laws requirements. • Students will also apply the Build Flexible Scenarios of city engine concept for the generation and assessment of different city planning scenarios and report the city indicators analysis and export the final city models.

	Goals	Subjects
Management of Urban Development (Smart Urban Planning of ArcGIS Pro for) UP606	• GIS Urban use case will allow planners to visualize the citywide detailed plan and the proposed projects in one place for collaboration among stakeholders and public participation. • By the end of the course students will have the skills to apply the GIS Urban use case for support urban planning processes, the creation and assessment of scenarios and alternatives and consider the feedback of public participation on scenarios and alternatives for the adjustment of the most appropriate scenario and alternative.	• The course explores the GIS use case to support urban planners and Architects on management of urban planning development processes. • The GIS Urban use case of ArcGIS Pro is a web-based solution that applies spatial modelling towards an interactive smart urban planning process. • Students will learn and practice the Urban GIS use case streamline for visualization of city plan and development, spatial analysis of the land use relationships and their impacts analysis for the management of urban development. • The GIS Urban use case will support planners and Architects in the creation and assessment of urban scenarios and alternatives. In addition, it will guide planners in the city management and prediction of the city urban development.
Sustainability, Design and Environment (GIS Indoor of ArcGIS Pro for Smart Architect Buildings) UD503	• At the end of the course, the student will be able to apply the different spatial analysis tools of GIS indoor use case within the building spaces and structure. The course will let you practice to relate building spaces and structure spatial analysis with building spatial database that facilitate the process of management and control.	• The course can be considered a recent part of smart urban management for buildings with an interactive, up to date indicators for a periodically monitoring analysis. • The course introduces architects and planners for the new paradigm of modern geographic information systems inside buildings of various kinds (residential - commercial - administrative – etc.). Students will learn the GIS Indoor use case process to create building geodatabase, to apply spatial analysis for spaces and structure buildings, to manage buildings in an intelligent manner and which leads to ease of analyzing, managing the site and dealing with it.

	Goals	Subjects
Natural Resources Exploration and Evaluation technologies (Image Processing techniques of Remote Sensing using ArcGIS Pro) EP 510	• The course aims to introduce basic knowledge of remote sensing science and image processing and mapping for geospatial applications within GIS environment. • Upon completion the course students will be able to develop analytical workflows to derive products from downloaded satellite imagery online and extract information from remotely sensed data for a broad range of applications. • Students will gain new skills to apply image analysis tools for image processing for a real-world situation of personal or professional interest.	• Students will develop a strong understanding of the image processing tools and techniques used to image display and process, analysis process the remotely sensed data within ArcGIS Pro environment. • The course will cover the use efficient solutions to process raster data and extract information products within ArcGIS Pro.
Infrastructure Systems Planning Approaches (ArcGIS Pro Utility Network for Analysis and Management of infrastructure systems). EP503	• Upon the end of the course, students will be able to model utilities network systems and apply spatial analysis tools to analyze, manage and assess the performance of the network and its components and deal with utility network crisis by scenarios creation.	• Utility network is the main component users work with when managing utilities network systems of electric, gas, water, wastewater and telecommunications. • The course provides for students the GIS comprehensive framework of modelling, managing, analyzing the performance and functionality of the utilities network systems. • The course is designed to practice to build a real-world GIS data model behavior of the utility systems within ArcGIS Pro environment. • Students will practice the creation of the network dataset in ArcGIS Pro for different utility network systems and its components such as wires, pipes, valves, zones, devices, and circuits. • During the course, students will practice the network dataset creation, components connectivity rules, network workflow tracing and operational view. • The course will follow by the introduction of the basic analysis tools for inspection, tracing, management and assessment of network and components performance, and apply the if-scenarios solutions for crisis management.

	Goals	Subjects
Principles design of Urban morphology and Urban Spaces (Space Syntax for Architects, Urban Design and Planning) UD607		• The course is concerning to introduce the spatial analysis modelling for architecture and urban designer by illustrate space syntax scientific paradigm for socio-economic and pedestrian behavior spatial analysis for the development and assessment of their design. • The course will cover the space syntax theories and techniques applications for spatial analysis and relationships within the architects and urban environments. • The course has been developed to practice the spatial analysis of the social and socio-economic effects and pedestrian human behavior patterns on the development and assessment of the proposed architects and urban design. • Space Syntax techniques will be applied and practiced by students using open source standalone GIS use case for the spatial analysis and assessment of architecture design and urban form.
Urban Upgrading and Reservation Methods (ArcGIS Pro façade Registration techniques using laser Scanner Point Clouds) UD620	• Students will be able to build a 3D model for the interactive 3D visualization for the whole area.	• The course introduces a smart GIS technique for the registration of heritage buildings for upgrading and reservations of historic areas. • The students will be able to deal with the point cloud data source of laser scanners within ArcGIS Pro. Students will extract facades, features and analyze point intensity statistically for object identification processes. • Students will practice the construction of the 3D model from different point clouds and apply registration processes with respect to the national coordinate systems for the whole areas. • By the end of the course, students will be able to handle 3D laser scanners files and can apply the registration and objects identification processes for the different building's façades.

Geoinformatics Applications Diploma for Architects, Urban Planning and Spatial Sciences

Preface

The world has taken rapid jumps towards digital transformation, adoption of Geoinformatics and Information and Communication Technology systems (ICT) and activation of their implications to reach an information society and a digital economy. In addition, ICT becomes one of the sustainable global aspects to achieve high levels of well-being for the citizen and resident and improves the society quality of life.
Geoinformatics and ICT holds particular promise on the national future vision of smartness and digital society. We believe that spatial and mapping issues in the digital age can use Geoinformatics and ICT to reduce corruption and increase government transparency, accountability, efficiency and citizen participation. There has been significant growth need for Geoinformatics and ICT skills and employment as a result for the digital society requirements and its spreading throughout the country.

There are many other benefits of Geoinformatics and ICT beyond geography and urban planning. There is compulsory need for Geoinformatics and ICT skills in the different employment job market of the society for all fields such as health, tourism, transportation and traffic, infrastructure, project management, business, insurance, commercial, telecommunications, security, marketing, etc. Geoinformatics and the use of spatial data becomes now part of our daily life and business. We believe that whole market industries will require and quest for future generation personal with Geoinformatics and ICT skills.

Cairo University as one of the Egyptian leader university has considered one of its social development goals to increase Geoinformatics and ICT technologies knowledge for their graduate students' skills to cope with the society need for such technology's skills for the future decade development.

In this context, Cairo University represented by Faculty of Urban and Regional Planning and Environmental Systems Research Institute Esri, the global market GIS leader, represented by Esri North Africa has developed an agreement for the development of the Geoinformatics and ICT skills for graduate students in the Egyptian society. The agreement has developed a professional and academic diploma using ESRI software to satisfy the Geoinformatics and ICT skills needed for the future.