PROFESSIONAL MASTER DEGREE IN CLOUD COMPUTER NETWORKS

Accredited from the Supreme Council of Universities

36 CREDIT HOURS PROFESSIONAL MASTERS DEGREE IN CLOUD COMPUTER NETWORKS.

Table of content

Faculty of Computer and Information – Cairo University in cooperation with EMC² started a new professional Master program specialized in Cloud Computer Networks.

Professional Master degree aims at qualifying IT professional in the field of cloud computing and cloud networks linking scientific backgrounds and modern techniques for the labor market.

Admission Requirements

- ✓ A bachelor degree in one of the disciplines of Computers and Information, or a bachelor degree from a recognized scientific institute accredited from the Supreme Council of Universities. Students may also be accepted from graduates of other colleges to hold them with supplementary materials specified by the management of the program.
- ✓ Language requirement condition is met.

- ✓ Obtaining the approval of the Program, and the College Board and the completion of the required documents from the post-graduate department.
- ✓ A qualification test may be conducted to test the knowledge of the applicant as well as to determine the number of students.
- ✓ Registration is open for the various courses at the beginning of each semester (in the period determined by the college council).

Registration Fees

700 LE per credit hour for Egyptians.

Program Regulations

- ✓ The Professional Master in Cloud Computer Networks is a two-year credit-based program (36 credit hours), the academic year is composed of two semesters (Fall and Spring), both of fifteen

weeks including exams, and an optional summer semester of 8-weeks.

- ✓ Minimum registration per semester is (9) credit hours and the maximum is (15) credit hours.
- ✓ The maximum duration for the professional master's degree is three years. The faculty council has the right to extend this duration for an additional year based on the excuse provided by the student and accepted by the Council.
- ✓ 30% of the educational material at most may be provided through E-learning.
- ✓ Study in the professional master is in English and can be offered in other foreign languages.
- ✓ The professional master program Council has the right to accept credit transfer of maximum 9 credit hour courses studied by students and succeeded provided that the students has studied these courses during the past three years at a recognized institution.

Assessment System

The basic unit in the credit hours' system is the course and not the year, and the assessment system is based on the assessment and recognition of each course, which is determined according to the following schedule: -

Percentage	Grade	GPA
95% or more	A+	4
90% and Less than %95	A	3,7
85% and Less than %90	B +	3,3
80% and Less than %85	B	3
75% and Less than %80	C +	2,7
70% and Less than %75	C	2,4
65% and Less than %70	D+	2,2
60% and Less than %65	D	2
Less than 60%	F	Zero

Program Structure

كود المقرر	أسم المقرر	عدد الساعات المعتمدة	متطلبات المقرر
CIS 601	Advanced Virtualized Networks	3	----------
CIS 602	Advanced Data centers Structure and Technologies	3	----------
CIS 603	Cloud Infrastructure and Services	3	----------
CIS 604	Advanced Cloud Security	3	----------
CIS 605	Cloud Lab	3	----------
CIS 606	Fundamentals of projects management	3	----------
CIS 607	Selected Topics I	3	----------
CIS 608	Selected Topics II	3	----------
CIS 609	Internship	6	----------
CIS 610	Project	6	----------

Courses Description

Course Name: Advanced Virtualized Networks

Course Code: CIS 601
Prerequisite: N/A
Three credit hours
Course Description: Virtual networking (VN) is an umbrella term encompassing several kinds of network technology aimed at making the network as agile and flexible as the virtualized server and storage infrastructure of the modern data center. The goal of VN is to allow network engineers and administrators to respond quickly to changing business requirements.

Course objectives: By the end of the course, students will be able to:

- Describe Software Defined Networking and Open Flow concepts, motivation, benefits and applications
- Describe concepts behind Network Functions Virtualization (NFV)
- Understand target environments for SDN/Open flow

- Describe VN and Open Flow building blocks, components, architectures and reference standards
- Describe Open Flow operation and Open Stack
- Discuss network functions virtualization

Course Contents:

- Software-defined networking (SDN)
- Controller supporting switching fabric
- Hardware and application-specific integrated circuits (ASIC)
- Network Functions Virtualization (NFV).
- Standard IT virtualization technology
- High performance switches and storage
- Networking technologies virtualization
- VN deployment models
- VN Device Implementations

References:

1. William Stallings, "Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud", 2015.
2. Patricia A. Morreale and James M. Anderson , "Software Defined Networking: Design and Deployment"– December 2014.

Course Name: Advanced Data centers Structure and Technologies

Course Code: CIS 602
Pre-requisite: N/A
Three credit hours
Course Description: This course presents advanced data center structures and technologies. The course introduces the architecture design of a data center, illustrating the main differences between an enterprise and a cloud data center, and introducing key technologies for modern data centers.

Course objectives: By the end of this course, students should be able to:

- Identify the basics of data center architecture.
- Describe the major differences between enterprise and cloud data center
- Identify the Key technologies and tools for modern data centers
- Describe data center switch architecture

Course Contents:

- Data centers and data center architecture design
- Cloud Data center
- Policy data center
- Key technologies and tools for modern data centers
- Data center switch architecture
- Data centers case studies: data centers in China, Cisco data centers
- Some typical models for data centers

References:

1. Gustavo Alessandro Andrade Santana , "Data center virtualization fundamentals", Cisco press, 2014.
2. Lucien Avramov, Maurizio Portolani, The Policy Driven Data Center with ACI: Architecture, Concepts, and Methodology (Networking Technology), Cisco Press, 2015
3. Hwaiyu Geng , Data center handbook, Wiley, 2015

Course Name: Cloud Infrastructure and Services

Course Code: CIS 603

Prerequisite: N/A

Three credit hours

Course Description: This course describes the cloud computing infrastructure and services. The course offers advanced cloud computing fundamentals, include concepts, models, technologies, mechanisms, and architecture. Based on those fundamentals, practical labs in the course employ the cloud fundamentals migrate to working with cloud computing.

Course Objectives: By the end of the course, students able to:

- Understand the cloud computing concepts, models, technologies, and fundamental security.
- Learn different cloud computing mechanisms, include infrastructural, specialized, and management mechanisms.

- Build different cloud architectures, such as simple, advanced, and specialized architectures.
- Measure the cloud delivery models' considerations, include metrics and pricing models

Course Contents:

- Cloud computing infrastructure
- Concepts, models, and technologies, of cloud
- Cloud mechanisms, and architecture.
- The 4D's **Migration** methodology
- Cloud monitoring and management
- Cloud migration techniques

References:

1. Thomas Erl and Ricardo Puttini, "Cloud Computing: Concepts, Technology & Architecture ", Wiley 2014
2. George Reese "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud (Theory in Practice (O'Reilly))", 2014

Course Name: Advanced Cloud Security
Course Code: CIS 604
Prerequisite: N/A
Three credit hours

Course Description: This course describes fundamentals and advanced security services and mechanisms applied for cloud computing aspects, include: Infrastructure, architecture, data, services, and strategies. In addition, different evaluation techniques for securing the cloud are presented.

Course Objectives: By the end of the course, students able to:

- Understand The fundamentals of cloud computing security concerns, include virtualization, provisioning, cloud storage, and assessing risk tolerance
- Learn the security requirements for cloud architecture and plan key strategies for cloud secure operations
- Review the current data encryption schemes and understand their relations with cloud data security.
- Understand user privacy, identification, and access control in clouds.

- Apply data security as a cloud service for cloud computing applications

Course Contents:

Fundamentals of cloud computing security

- Advanced data encryption schemes
- Virtualization, provisioning and cloud storage
- Assessing risk tolerance
- Security requirements for cloud architecture

References:

1. Vic (J.R.) Winkler , "Securing the Cloud: Cloud Computer Security Techniques and Tactics", 2014.
2. Raj Samani and Jim Reavis, "CSA Guide to cloud Computing: Implementing Cloud Privacy and Security" , 2014
3. Tim Mather and Subra Kumaraswamy " Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance (Theory in Practice)" , 2015

Course Name: Cloud Lab
Course Code: CIS 605
Prerequisite: N/A

Three credit hours

Course Description: This explores advanced installation, configuration and management of VMware enabling students to be familiar with virtual machines as well as virtual switches including designing a network configuration

Course objectives: By the end of the course, students able to:

- Install and configure virtual machines
- Using templates and clones
- Migrating and managing virtual machines
- Designing network configuration

Course Contents:

- Install and configure virtual machines
- Accessing ISCI and IP storage
- Modifying, migrating and managing virtual machines
- Monitoring virtual machine performance.

- Configuring virtual machines fault tolerance
- Managing virtual Apps

References:

1. Thomas Erl and Ricardo Puttini, "Cloud Computing: Concepts, Technology & Architecture ", Wiley 2014
2. George Reese "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud (Theory in Practice (O'Reilly))", 2014

Course Name: Fundamentals of projects management
Course Code: CIS 606
Three credit hours

Course Objectives: This course provide students with different tools and techniques for project management with case studies

Course Contents:

- Concepts of projects management
- Different techniques for projects management
- Automated tools for projects managements
- Case studies

References:

1. H.R. Kerzner, " project management: A System Approach to planning, scheduling and controlling " , 11th Edition , Wiley 2013

Course Name : Selected Topics I
Course Code : CIS 607
Three credit hours

Course Objectives: Provide the students with recent advances in cloud infrastructure and services

Course Name : Selected Topics II
Course Code : CIS 608
Three credit hours

Course Objectives: Provide the students with recent advances in cloud networks services and management

Course Name : Internship
Course Code : CIS 609
Six credit hours

Course Objectives: Provide the students with opportunity to practice the different concepts and techniques within big specialized companies.

Course Name : Project
Course Code : CIS 610
Six credit hours

Course Objectives: Enable students to complete a project independently , to set goals , develop action plans , implement it to measure the achievement of goals .

Course Contents: The project to be completed by students covers different knowledge gained by the students during the course of studies and implemented on real case in their scale.

For More Information:

Email: gamaldarwish8@gmail.com

http://www.fci.cu.edu.eg/