CYB 572- Secure Cloud Computing Spring 2021

Instructor	Bhrigu Celly, Ph.D.	**E-Mail**	bcelly@csudh.edu
Classroom	2103	**Class Time**	Saturday 5:00-8:30
Office	TBD	**Office Hours**	TBD
Phone	(310) 243-3398	**URL**	*http://csc.csudh.edu*

COURSE DESCRIPTION:

Students will learn the four service models cloud service models: IaaS- Infrastructure as a Service, PaaS- Ptafform as a Service, SaaS- Software as a Service, and BpaaS- Business Process as a Service; This course will also cover topics related to big data, and challenges resulting from the implementation of high computing performances.

PRE-REQUISITE: Graduate Standing Consent of Instructor

TEXTBOOKS [N/A]:

There is no textbook for this course.

Registered students will access the course materials through Toro Blackboard. Supporting handout materials to be posted in the Toro Blackboard.

Reading:

CSA CCSK Guidebook
http://www.cloudsecurityalliance.org/guidance/csaguide.v2.1.pdf

Enisa cloud computing risk assessment

http://www.enisa.europa.eu/act/rm/files/deliverables/cloud-computing-risk-assessment

NIST Publishes Draft Cloud Computing Security Document

http://www.nist.gov/itl/csd/cloud-061113.cfm

NIST Cloud Computing Security Reference Architecture

http://bigdatawg.nist.gov/_uploadfiles/M0007_v1_3376532289.pdf

COURSE GOALS:

- Understand some of the major security challenges of cloud computing that act as hindrance to widespread adoption.
- Learn about some of the newer techniques that scientists are considering to protect cloud systems, their advantages and disadvantages.
- Learn how to critically evaluate security literature.
- Learn how to formulate and solve a research problem in secure cloud computing and be able to present it.
- To develop an understanding of what research in cloud computing security is about, how to identify a contribution, what the quality standards in scientific publications are, and to study selected technical sub-topics in depth.

COURSE OUTCOMES:

Upon completing this course students will be able to:

- Describe Cloud Computing Architectural Framework
- Identify Cloud Computing Security challenges
- Perscribe Cloud Computing Security controls recommendation
- Perform an investigation of various aspects of security in Cloud Computing.

STUDENT ACADEMIC APPEALS PROCESS

Authority and responsibility for assigning grades to students rests with the faculty. However, in those instances where students believe that miscommunication, error, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the Undergraduate Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.

AMERICANS WITH DISABILITIES ACT

CSUDH adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with temporary and permanent disabilities. If you have a disability that may adversely affect your work in this class, I encourage you to register with Disabled Student Services (DSS) and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: no accommodation can be made until you register with the DSS. For information call (310) 243-3660 or to use the Telecommunications Device for the Deaf, call (310) 243-2028, or go to: http://www4.csudh.edu/dss/

COMPUTER INFORMATION LITERACY EXPECTATIONS

It is expected that students will:

1. *Use Microsoft Word for word processing unless otherwise approved by the instructor,*
2. *Be familiar with using email as a communication tool and check your official campus email account at least every other day;*
3. *Be able to access websites and online course materials which may require Flash and other plug-ins;*

4. *Use the library databases to find articles, journals, books, databases and other materials;*
5. *Be able to create an effective PowerPoint presentation;*
6. *Be able to record audio (ideally video) to share with the instructor via the web; and*
7. *Have regular access to a computer and internet access for the term of this course.*

ACADEMIC INTEGRITY

Academic integrity is of central importance in this and every other course at CSUDH. You are obliged to consult the appropriate sections of the University Catalog and obey all rules and regulations imposed by the University relevant to its lawful missions, processes, and functions. ***All work turned in by a student for a grade must be the students' own work.*** Plagiarism and cheating (e.g. stealing or copying the work of others and turning it in as your own) will not be tolerated, and will be dealt with according to University policy. The consequences for being caught plagiarizing or cheating range from a minimum of a zero grade for the work you plagiarized or cheated on, to being dropped from the course.

COURSE POLICIES:

- Deliverables (Class Assignments, Projects) submitted late are not accepted.
- Deliverables (Class Assignment, Projects) not submitted before the end of the final class will earn 0%.
- Any exceptional, non-academic circumstances need to be discussed with the instructor as soon as they arise, prior to the due date of the deliverable. At the time of the discussion, NO make-up work will be assigned.

The instructor reserves the right not to award credit for deliverables that are incomplete. Partial credit is awarded at the instructor's discretion, and only for work that merits such an award. Assignments that are incomplete or incongruous with the specifications may be returned to the student.

GRADES:

The following grading scale will be used:

Score	Grade	Score	Grade
94-100	A	91-93	A-
88-90	B+	84-87	B
81-83	B-	78-80	C+
74-77	C	71-73	C-
68-70	D+	64-67	D
0-63	F		

GRADING:

The weighting of the coursework is listed below:

Labs	**200**
Homework	**200**
Discussions	**200**
Final	**200**
Research Propose Plan/Project	**100**
Research Project Report /Project	**200**

Research Project Presentation **100**

Total: **800**

TOPIC OUTLINE (Will be conducted according the following. However, the schedule of the topics schedule or timetable may be varying slightly)

Tentative Course Schedule

WEEK #	DATE	TOPIC	*Reading Assignment/ Computer Lab Topic/In Class Assignments*
Week 1	TBD	**Cloud Computing Architectural Framework**-Cloud Benefits, Business scenarios, Cloud Computing Evolution, cloud vocabulary, Essential Characteristics of Cloud Computing, Cloud deployment models, Cloud Service Models, Multi-Tenancy, Approaches to create a barrier between the Tenants, cloud computing vendors, Cloud Computing threats, Cloud Reference Model, The Cloud Cube Model, Security for Cloud Computing, How Security Gets Integrated.	Hand-Out
Week 2	TBD	**Governance and Enterprise Risk Management**-Information security governance processes, Governance and enterprise risk management in Cloud Computing Governance Recommendations, Enterprise Risk Management recommendations, Information Risk Management Recommendations, Third Party Management Recommendations	Hand-Out
Week 3	TBD	**Legal and Electronic Discovery Risk Management**-Legal and Electronic Discovery Risk Management Security Recommendations	Hand-Out/Annotated Bibliography paper Due
Week 4	TBD	**Compliance and Audit**-Cloud customer responsibilities, Compliance and Audit Security Recommendations	Hand-Out
Week 5	TBD	**Information Lifecycle Management**-Key challenges regarding data lifecycle security, Data Security Recommendations	Hand-Out
Week 6	TBD	**Portability and Interoperability**-Changing providers reasons, Changing providers expectations, Recommendations all cloud solutions, IaaS Cloud Solutions, PaaS Cloud Solutions, SaaS Cloud Solutions	Hand-Out/Paper I Due

Week 7	TBD	**Traditional Security, Business Continuity, and Disaster Recovery**-Risk of insider abuse, Security baseline, Customers actions, Contract, Documentation, Recovery Time Objectives (RTOs) ,Customers responsibility, Vendor Security Process (VSP)	Hand-Out
Week 8	TBD	**Incident Response, Notification, and Remediation**-How to identify incident, How to response to security incident, Security incident Containment, Security Incident Response Recommendations	Hand-Out
Week 9	TBD	**Application Security**-Web Application, Application Weaknesses, Attack Methods, What is Web Application Security, application security layer, vulnerability distribution, Why Web Application Risks Occur, Security solutions, Applications in cloud environments Security Recommendations	Hand-Out /Paper II Due
Week 10	TBD	**Encryption and Key Management**-Encryption for Confidentiality and Integrity, Encrypting data at rest, Key Management Lifecycle, Cloud Encryption Standards, Recommendations	Hand-Out
Week 11	TBD	**Identity and Access Management**-Identity and Access Management in the cloud, Identity and Access Management functions, Identity and Access Management (IAM) Model, Identity Federation, Identity Provisioning Recommendations, Authentication for SaaS and Paas customers, Authentication for IaaS customers, Introducing Identity Services, Enterprise Architecture with IDaaS ,IDaaS Security Recommendations	Hand-Out
Week 12	TBD	**Virtualization**-Hardware Virtualization ,Software Virtualization, Memory Virtualization, Storage Virtualization, Data Virtualization, Network Virtualization, Virtualization Security Recommendations	Hand-Out/Paper III
Week 13	TBD	**Enisa** -Cloud Computing Risk Assessment-Guidelines	Hand-Out
Week 14	TBD	NIST-_Publishes Draft Cloud Computing Security Document Guidlines	Hand-Out
Week 15	TBD	**Research Paper Presentation**	***Due for Project Report, Presentation***

GO TOROS!