CityUniversity of Seattle

Syllabus

SCHOOL OF TECHNOLOGY & COMPUTING (STC)

IS 306: Data Management Communications and Networking

5 Credits
Effective: Winter 2020

Access to the Internet is required.
All written assignments must be in Microsoft-Word-compatible formats.
See the library's APA Style Guide tutorial for a list of resources that can help you use APA style.

FACULTY

Faculty Name: Clark Jason Ngo

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Clark is currently a Graduate Teaching Assistant for Technology Institute and taking up Master of Science in Computer Science both in CityU. He came from a financial background both in educational experience and work experience. He earned his Bachelor of Science in Management of Financial Institutions with De La Salle University in the Philippines. He has worked for several companies such as Allied Bank, Thomson Reuters, S&P Capital IQ, and BPI/MS Insurance Corp. When he transitioned to technology, he found his passion for Software Development and Design and mentoring others to transition to this field as well. His experience now consists of full-stack development and cloud technologies.

COURSE DESCRIPTION

This course develops student understanding of a model of Information Systems composed of data acquisition, data transport, data manipulation, data storage and data display. The use of data to develop business intelligence and competitive advantage, and to support business operations through lean supply chains, delivery, and oversight has become an increasingly critical component in business success. Students will learn how modern computer systems work with data across multiple systems to deliver relevant, time-critical information to managers and workers. Students will gain an insight into networked communications in support of business operations. This course prepares the student for working with data in a modern, highly-connected organization anywhere in the world.

COURSE RESOURCES

Required and recommended resources to complete coursework and assignments are available from the Course Document Lookup.

CITYU LEARNING GOALS

This course supports the following City University learning goals:

COURSE OUTCOMES

In this course, learners:

- Identify and discuss how data is acquired and coded for use in information systems.
- Understand the importance of data management in organizations.
- Demonstrate how different data models and structures affect data manipulation and storage.
- Summarize key data communication protocols and their application.
- Produce appropriate database designs for simple data models.
- Illustrate how layers in a network model work together to provide effective data communications.

CORE CONCEPTS, KNOWLEDGE, AND SKILLS

- Be able to recognize, select and use different data structures.

- Be familiar with basic transport/session layer protocols, understanding the concept of ports and their use in networking.
- Be familiar with common measures of signals
- Be familiar with the data communication network model and introduce the main elements of a communication system
- Be familiar with different data communication network techniques and understand the concept of each technique.
- Be familiar with common network topologies and understand the issues with deploying these topologies.
- Be familiar with different flavors of local area networks, their characteristics, and when their use is appropriate.
- Be familiar with common physical media used in networking, their characteristics, and when their use is appropriate.
- Be familiar with different value representation techniques, their advantages and limitations.
- Be familiar with how access lists are used in network devices.
- Be familiar with techniques for quantizing data.
- Be familiar with the characteristics and use of common database tools.
- Become familiar with a variety of Data Acquisition Technologies and Sensors and the concepts they imploy.
- Become familiar with common application layer protocols and applications as a means of understanding how application layer protocols are used in networking.
- Compare and contrast lossless and lossy data compression techniques and recognize when their use is appropriate.
- Describe how and why Data Bases are used for the storage of data.
- Explain how routing is performed in Data Networks.
- Explain the basic techniques of Network Security.
- Explain the core concepts of Data Management including: Ownership, Integrity, Consistency, Location, Accessibility, Confidentiality and Non-repudiation.
- Give examples of common packet headers and describe their content.
- Know how attributes are used in databases.
- Know what entities are used to represent in databases.
- Summarize how Bridging and Switching are used in data networks.
- Understand how credentials and Authentication are used to control access to resources in a network.
- Understand how data is normalized in databases and be able to demonstrate the normalization of data.
- Understand how digital data is stored in Information Systems.
- Understand how firewalls function and are deployed to protect networks.
- Understand how IDS's are used in monitoring a network.
- Understand how real world data is modeled and structured in Information Systems.
- Understand the Data Flow Model of Information Systems.
- Understand the fundamentals of sampling analog data.
- Understand the importance of, and the means of controlling access to data a different levels in common databases.
- Understand the Data Link Control (DLC) protocol and how it ensures passing up the data to the next layer

- Understand the Internet Protocol (IP) model and where various network components fit in the model.
- Understand the OSI model and how its layers interact to enable data communications.
- Understand the role of Domain Name Services (DNS) in networking and how the protocols functions.
- Understand the use of relationships in databases.
- Understand when indexes and data de-normalization are effective in a database.
- Use SQL – Data Manipulation Language to insert, access, update and delete data in common databases.
- Use SQL-Data Structure Language to create and delete tables in common databases.

OVERVIEW OF COURSE GRADING

The grades earned for the course will be derived using City University of Seattle's decimal grading system, based on the following:

OVERVIEW OF REQUIRED ASSIGNMENTS	% OF FINAL GRADE	POINTS
Research Papers (RP) • #1: Data Acquisition and Coding • #2: Protocol Project	**20%** 10% 10%	200 = 100 points * 2 papers
Team Projects (TP) • #1: Data Modeling & Database • #2: Cloud Network Design Proposal	**30%** 15% 15%	300 = 150 points * 2 papers
Hands-On Practice (HOP)	**20%**	200 = 20 points * 10 weeks
Knowledge Checks (KC)	**10%**	100 = 10 points * 10 weeks
Instructor Assessments • The Muddiest Point (MP) • Discussion Board (DB)	**20%** 5% 15%	50 = 5 points * 10 weeks 150 = 15 points * 10 weeks
TOTAL	**100%**	**1000 points**

SPECIFICS OF COURSE ASSIGNMENTS

The instructor will provide grading rubrics that will provide more detail as to how this assignment will be graded.

Data Acquisition and Coding Project

Students investigate different sensors in use in the environment. They select at least 4 sensor systems and prepare a report providing information about each of them, including information about: the application of the sensor to a real world problem; the physical phenomena being sensed; the environment in which the sensor is used; capabilities and limitations of the sensor; a high level functional representation of how the sensor and sensor system functions; the data output of the sensor and how it is formatted. Typical sensors may include: traffic loop sensors – used to detect vehicles in intersections; bar code scanners – used to read bar codes on products; moisture sensors – used to turn on watering systems; EKG – detects

abnormalities in the heart; smoke detectors – sense smoke in the environment; radar sensors – detect car speed; radar detectors – detect radar signals being used to detect car speed.

Components	***% of Grade***
Writing Mechanics	15%
References	15%
Data Acquisition and Coding	55%
Requirements	15%
TOTAL	**100%**

Data Modeling & Database Project

Students develop an object-based data model for a given business situation. The model should include the objects, their attributes and their relationships. Each object and attribute should have a description, with the data format and parameters (limits, steps, etc) specified for the attributes. The model will include a written description of why the objects were selected. The data model will be implemented in a database in 3rd Normal form with sample data and a means of adding and accessing data.

Components	***% of Grade***
Requirements	20%
Database designs	60%
Data Models and Structures	20%
TOTAL	**100%**

Protocol Research Paper

Students Identify a protocol designed to address a specific data communication need. The students provide a summary of the need that is being addressed. They identify the documents that specify the protocol and the governing body or organization responsible for the development and maintenance of the protocol. The students summarize key and unique features of the protocol and give illustrations of how these allow the protocol to address the specific needs for which the protocol was devised. The students give examples demonstrating the use of the protocol in at least two organizations. The students discuss shortfalls, issues, and potential upgrades of the protocol.

Components	***% of Grade***
Writing Mechanics	15%
References	15%
Requirements	15%
Data Protocol	40%
Network Layers	15%
TOTAL	**100%**

Final Exam

The Final Exam covers material from throughout the course.

Components	*% of Grade*
Data Acquisition and Coding	20%
Data Management	20%
Data Models and Structures	20%
Data Protocol	10%
Network Layers	20%
Database designs	10%
TOTAL	**100%**

Instructor Assessments

The instructor will assess the students' performance in the course. This assessment will include participation in class, in discussion boards, and in instructor determined activities.

Components	*% of Grade*
TOTAL	**100%**

COURSE POLICIES

Late Assignments

LATE ASSIGNMENT

Participation

PARTICIPATION

Professional Writing

Assignments require error-free writing that uses standard English conventions and logical flow of organization to address topics clearly, completely, and concisely. CityU requires the use of APA style.

UNIVERSITY POLICIES

You are responsible for understanding and adhering to all of City University of Seattle's academic policies. The most current versions of these policies can be found in the University Catalog that is linked from the CityU Web site.

Scholastic Honesty

Scholastic honesty in students requires the pursuit of scholarly activity that is free from fraud, deception and unauthorized collaboration with other individuals. You are responsible for understanding CityU's policy on scholastic honesty and adhering to its standards in meeting all course requirements. A complete copy of this policy can be found in the University Catalog in the section titled *Scholastic Honesty* under *Student Rights & Responsibilities*.

Attendance

Students taking courses in any format at the University are expected to be diligent in their studies and to attend class regularly.

Regular class attendance is important in achieving learning outcomes in the course and may be a valid consideration in determining the final grade. For classes where a physical presence is required, a student has attended if s/he is present at any time during the class session. For online classes, a student has attended if s/he has posted or submitted an assignment. A complete copy of this policy can be found in the University Catalog in the section titled *Attendance Policy for Mixed Mode, Online and Correspondence Courses*.

SUPPORT SERVICES

Disability Resources

If you are a student with a disability and you require an accommodation, please contact the Disability Resource Office as soon as possible. For additional information, please see the section in the University Catalog titled *Students with Special Needs* under *Student Rights & Responsibilities*.

Library Services

CityU librarians are available to help you find the resources and information you need to succeed in this course. Contact a CityU librarian through the *Ask a Librarian* service, or access library resources and services online, 24 hours a day, seven days a week.

Smarthinking

As a CityU student, you have access to 10 free hours of online tutoring offered through Smarthinking, including writing support, from certified tutors 24 hours a day, seven days a week. Contact CityU's Student Support Center at help@cityu.edu to request your user name and password.