Syllabus MET CS200 Fundamentals of Information Technology Spring 2016

Instructor

Tuesday 6-9 PM KCB 107

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Course Description

MET CS200 Fundamentals of Information Technology

This course introduces information technology concepts and terminology and foundational mathematics. It also develops analytic and logical thinking and prepares students to take graduate-level courses in information technology and computer information systems. The course starts with the fundamentals of computing systems, including hardware and software, and then addresses the processes for designing and building computing systems, including systems analysis and project management. Relational database technology is introduced including SQL and database design concepts. Computer networks, including their components, types, design and management are explained. And lastly, students are introduced to software development and receive a thorough introduction to the programming languages. The course reviews the mathematics upon which computing systems are founded including number systems, set theory, algebra, and functions.

Learning Objectives

The course is designed to prepare students without a technical background in information technology to succeed in graduate courses in the Master of Science in Computer Information Systems (MSCIS) and Master of Science in Telecommunications (MSTC) programs. Students often ask how completion of the course relates to acceptance into these graduate programs. The department policy is as follows:

‘‘In making the decision regarding matriculating a student, the Admissions Committee considers the student’s prior academic record and any relevant experience. The Admissions Committee may require some applicants to take CS 200 to better prepare for graduate study in information technology before making a final matriculation decision. For students who complete CS 200 the Committee also considers each student’s performance in each of the areas of CS 200, such as computer systems, systems analysis, mathematics, databases, computer networks, and programming. If a student has demonstrated that they are ready for graduate study in *each* of these areas, as demonstrated by a combination of prior coursework, professional experience, and their performance in CS 200, then the Admissions Committee will matriculate them into the MSCIS program. Simply passing CS 200 does not assure matriculation, though excellent performance in all areas of CS 200 will earn an applicant matriculation into the program.”

For students coming from other programs, this course is a technically-oriented introductory survey of Information Technology.

Course Objectives

This course will enable you to:

- Understand the major hardware components of a modern computing system and their functions and interactions Understand how programs are executed, including the instruction execution cycle and the role of interrupts
- Understand the role of systems and applications software Understand the systems analysis and design process Understand the basic concepts of databases and database management systems, including the relational model and the basics of SQL Understand network architecture, both hardware and software, and be familiar with the basics of network security and management Understand how algorithms are developed and implemented in higher level languages

- Be able to design, write, and debug programs that use sequence, selection and repetition statements, methods, primitive data types, arrays, and that do I/O Understand object oriented concepts including classes, objects and inheritance
- Be able to solve mathematical problems that involve factoring algebraic expressions, operations with algebraic fractions and radicals, operations on sets, linear and quadratic functions

Course Organization

This course has 14 weeks of content divided into 7 modules, each two weeks long. Each module includes one major information technology topic and two math topics. Each module consists of:

- reading online content
- review questions
- assignments
- quizzes.

The study guide, which precedes each module, lists specific due dates. Assignments and quizzes are due each Tuesday. Math assignment solutions are provided in videos labeled “echo 360” Solutions to information technology assignments and quizzes will be provided after they are graded.

Course Outline

Module 1 — Fundamentals of Computer Systems

- Computer Systems
- Hardware Systems
- Processing Unit Flow of Control Memory Input/Output Software Systems Operating Systems Systems Analysis and Design
- Math Properties of Numbers
- Operations on Numbers Algebraic Expressions

Module 2 — Databases

- Databases Databases
- Relational Database Management Systems Introduction to Structured Query Language (SQL) Programming for Databases The Database Life Cycle
- Jobs in the Database Field Math
- Even and Odd Numbers Factoring Algebraic Expressions

Module 3 — Data Communications and Networks

- Data Communications Components of a network
- Network standards Network layers Types of networks Network security and management
- Math Operations on Algebraic Fractions
- Inverses Roots Radicals

Module 4 — Basics of Software Development

- Basics of Software Development: Overview of Programming Language Systems, Integrated Development Environment, Creating, Executing, and Debugging Programs, Variables and Data Types
- Math Arithmetic Expressions Sets

Module 5 — Basics of Programming

- Promotions and Casting
- Input/output Conditional statement Repetition Structures
- Math Graphing a Function
- Deriving the Equation of a Line Intersection of Line with the Axis

Module 6 — Programming

- Methods
- Scope of Variables Recursion Arrays Strings
- Math Quadratic Equations
- Inequalities Methods

Module 7 — Introduction to Object Oriented Programming

- Classes versus Objects Building a Class Writing a “Driver” Program Constructors
- ‘‘Printing” an Object Class Inheritance

Module 8 — Project

Course Developer

Bruce P. Tis, PhD

Dr. Bruce Tis is an associate professor of computer science at Simmons College in Boston with an appointment in the computer science and informatics program in the School of Library and Information Science. He has been at Simmons for 16 years, 10 of which he chaired the computer science department. He received a BSEE and MSEE from Northeastern University and a PhD in computer engineering from Boston University, where he has been teaching part time for 30 years in the areas of information technology, computer networks, operating systems, security, and Java programming. He has done research in the area of distributed operating systems. Dr. Tis is also interested in computer science education and has published papers on curriculum design and pedagogy, and has conducted workshops on computer security.

Additional Course Developer

Anatoly Temkin, PhD

Dr. Anatoly Temkin has been a BU faculty member since 1989. He has taught numerous graduate and undergraduate courses from the math and computer science curricula. He is currently a professor and a graduate student advisor in the Boston University Metropolitan College.

Study Guide

Module 1 Study Guide and Deliverables

Readings Discussions Assignments Assessments:

Online - Fundamentals of Computer Systems Online - Math 1 & Math 2

Text - *Schaum's* Chapters 1 & 2

- Discussion 1 postings
- Assignment 1 due February 2
- Assignment 2 due February 9
- Math Quiz 1 February 2
- Math Quiz 2 February 9
- Module 1 Quiz February 9

Module 2 Study Guide and Deliverables

Readings Discussions Assignments Assessments:

NO CLASS Feb 16 (President's Day)

Online - Data and Databases Online - Math 3 & Math 4

Text - *Schaum's* Chapters 3 & 5

- Discussion 2 postings
- Assignment 3 due February 23
- Assignment 4 due February 23
- Math Quiz 3 February 23
- Math Quiz 4 February 23
- Module 2 Quiz February 23

Module 3 Study Guide and Deliverables

Readings Discussions Assignments Assessments:

NO CLASS Feb Mar 8 (Spring Break)

Online - Data Communications and Networks Online - Math 5 & Math 6

Text - *Schaum's* Chapters 6–8

- Discussion 3 postings
- Assignment 5 due March 1
- Assignment 6 due March 1
- Math Quiz 5 March 1
- Math Quiz 6 March 1
- Module 3 Quiz March 1

Module 4 Study Guide and Deliverables

Readings Discussions Assignments Assessments:

Online - Basics of Software Development using Java

Online - Math 7 & Math 8 *Schaum's* Chapters 12 & 13

Maslanka, J. (2010) *Introduction to Programming in Java* chapter 1

- Discussion 4 postings
- Assignment 7 due March 15 Assignment 8 due March 15
- Math Quiz 7 March 15 Math Quiz 8 March 15
- Module 4 Quiz March 15

Module 5 Study Guide and Deliverables

Readings Discussions Assignments Assessments:

Online - Basics of Java Online - Math 9 & Math 10

Text - Schaum's outline of college algebra chapter 14

Maslanka, J. (2010) *Introduction to Programming in Java* chapters 2–4, 6, 8, 9

- Discussion 5 postings
- Assignment 9 due March 29 Assignment 10 due April 5
- Math Quiz 9 due March 29 Math Quiz 10 April 5
- Module 5 Quiz due April 5

Module 6 Study Guide and Deliverables

Readings Discussions Assignments Assessments:

Online - Programming in Java Online - Math 11 & Math 12

Text - Schaum's outline of college algebra chapters 16 & 19

Maslanka, J. (2010) *Introduction to Programming in Java* chapters 10–13

- Discussion 6 postings
- Assignment 11 due April 19 Assignment 12 due April 19
- Math Quiz 11 April 19 Math Quiz 12 April 19
- Module 6 Quiz April 19

Module 7 Study Guide and Deliverables

Readings Discussions Assignments Assessments:

Online - Introduction to Object Oriented Programming

Maslanka, J. (2010) *Introduction to Programming in Java* chapters 5 and 14

- Assignment 13 due Apr 26 Assignment 14 due Apr 26
- Module 7 Quiz Apr 26

Project Details

- To be distributed separately
- Presentations Apr 26
- Due May 3

Resources

Books

Spiegel, M. R., & Moyer, R. E. (2014). *Schaum's outline of college algebra* (4th ed.). New York: McGraw-Hill Companies, Inc. ISBN 9780071821810.

A list of errata for this book can be downloaded here (../media/Errata.docx) . This textbook can be purchased from Barnes and Noble at Boston University.

(http://bu.bncollege.com/)

Maslanka, J. (2010). *Introduction to programming in Java.*

Download the text (../media/IntroJavaProgRev4.docx) and Appendix D (../media/IntroJavaProgRev4AppendixD.docx) (illustrations). (Only accessible via link when logged into Boston University Online Campus)

Required Software

You will be implementing a relational database using the MySQL relational database management system. You will use a distribution of MySQL called XAMPP which includes an apache web server, php, phpMyAdmin, and MySQL. The software runs on either a Mac or Windows machine and is freely available at www.apachefriends.org (https://www.apachefriends.org/) .

You will be writing *Java programs in this course and using the Oracle (Sun) Java Platform Standard Edition JDK (current or recent version). Instructions for downloading and installing this software can be found in module 4.

To facilitate the program development process, we will be using the *Eclipse integrated development environment (IDE). This is an industrial-strength IDE used to develop large systems based on Java. Eclipse is also used in MET CS520.

Both products have versions that run under Windows, OS X, and Linux.

General Software

All assignments are to be submitted online.

You might find a drawing program, such as Visio, useful in drawing diagrams required in some assignments but hand drawn diagrams are acceptable. Visio is available free to you from the MSDNAA program discussed in a later section of this syllabus.

Boston University Library Information

Boston University has created a set of videos to help orient you to the online resources at your disposal. An introduction to the series is below:

Download (http://www.bu.edu/av/disted/training/library/downloadable/met_ode_library_14_sp1_00_intro.mp4)

All of the videos in the series are available on the Online Library Resources (https://onlinecampus.bu.edu/bbcswebdav/courses/00cwr_odeelements/library/library_videos/ode_elements_library.html) page, which is also accessible from the Campus Bookmarks section of your Online Campus Dashboard. Please feel free to make use of them.

As Boston University students, you have full access to the BU Library. From any computer, you can gain access to anything at the library that is electronically formatted. To connect to the library, use the link http://www.bu.edu/library (http://www.bu.edu/library/) . You may use the library's content whether you

are connected through your online course or not, by confirming your status as a BU community member using your Kerberos password.

Once in the library system, you can use the links under “Resources” and “Collections” to find databases, eJournals, and eBooks, as well as search the library by subject. Some other useful links follow:

Go to http://www.bu.edu/library/research/collections (http://www.bu.edu/library/research/collections/) to access eBooks and eJournals directly.

If you have questions about library resources, go to http://www.bu.edu/library/help/ask-a-librarian (http://www.bu.edu/library/help/ask-a-librarian) to email the library or use the live-chat feature.

Course Grading Information

The course is organized into seven learning modules, each two weeks long. All seven modules consist of one or two major information technology related topics and the first six modules also contain a mathematics component.

Grading Percentages

Quizzes	**30%**	**Assignments**	**30%**
Project	**30%**	**Discussion**	**10%**

Letter grades will be assigned based on numeric average ranges according to the following:

A	**95–100**	**A-**	**91–94**		
B+	**87–90**	**B**	**83–86**	**B-**	**80–83**
C+	**76–79**	**C**	**72–75**	**C-**	**68–711.7**
D	**60–67**			**Fail**	**< 60**

Quizzes

Taken in class and/or online

Review Questions

The review questions are for practice. The review questions are similar to the ones which will appear in quizzes. Your results on the review questions will not affect your grade. Unlike the quizzes, you may try the review questions as often as you would like. You are not required to take the review questions, although we strongly encourage you to do so.

Technical Support

Assistance with course-related technical problems is provided by the IS&T Help Center. To ensure the fastest possible response, please fill out the online form using the link below.

IT Help Center Support

Email

ithelp@bu.edu (mailto:ithelp@bu.edu) Please use “BB Learn Question” in the subject line

Web

http://www.bu.edu/tech/web/course-sites/blackboard-learn/

Phone

(888) 243-4596

(subject to change)