

IT 201 – Data Structures – Section 01

McPherson College - Mathematics Department

Fall 2015

INSTRUCTOR: Mark Hunter
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OFFICE HOURS: 11am-12pm Mon., Wed., Fri.; 2–4 pm Mon. or by appointment

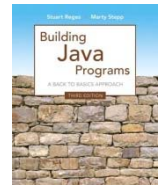
Feel free to contact me if you have questions about the material, course concerns, upcoming absences, or just to chat. I'm available in my office without appointment after each class. I will be on campus at various times throughout the week so you can schedule an appointment or just drop by. E-mail or text me anytime and try to call during reasonable hours. We can schedule additional office hours and appointment times as needed for your schedule.

COURSE MEETING TIME: MWF 1:00pm – 1:50pm
Lectures/Labs in Melhorn Hall, Room 123

UNITS/CREDIT HOURS: 3.0

PREREQUISITES: IT 200 or permission of the instructor.

REQUIREMENTS MET: This course is required of all mathematics majors and is a fascinating elective for students interested in using computers in the real world.



REQUIRED TEXT:

1. Building Java Programs: A Back to Basics Approach, Third Edition, © 2014, by Stuart Reges & Marty Stepp. ISBN-13: 978-0-13-336090-5, Publisher: Pearson.
2. Introduction to Programming Using Java, Sixth Edition Ver 6.0, © 1996-2011, by Eck.
Free online: <http://math.hws.edu/javanotes/index.html>

The lectures do not provide enough time to cover all material, so you are expected to read the textbooks to supplement lectures and clarify concepts.

COMPUTER SOFTWARE:

A resource fee of \$20 is being charged for this class to cover expenses of the USB flash drive, lab fees, and other materials used during the semester.

The recommended software is the Java Development Kit (JDK) version 6+ & Eclipse IDE. The Apache Tomcat Web Container for the JDK will also be used. Software will be provided and is free of charge. It will work with PC & MAC systems.

You must be able to access your student account on the McPherson Archway Portal (LMS) because additional class materials will be posted on-line. Other on-line references, practice tools, database servers and quizzes will also be provided on the web at www.webcoursework.com

You will be provided with a USB flash drive with any required software not installed in the campus labs. This drive must be turned in on assignment deadlines and at the end of term. You may keep the drive at the end of the semester.

COURSE DESCRIPTION/GOAL: This course will introduce students to basic and complex data structures, abstract data types, data typing, program flow, programming structures, classic algorithms, and database relationships. The improvement of data design skills, implementation, and programming style is emphasized through work with increasingly complex data structures and projects in a variety of program environments.

The content of this course will assist teacher education candidates in becoming service-oriented professionals who effectively blend the art and science of teaching. Candidates will become familiar with content knowledge and effective application of material through examples and projects. A variety of instructional methods applicable to the teaching profession will be modeled by the instructor and expected from candidates in presentations.

COURSE OBJECTIVES:

- Students will understand Software Engineering Principles
- Students will learn data structures and relationships
- Students will understand the concept of abstract data types
- Students will explore programming design methodologies
- Students will understand top-down design, validation, and the software life cycle
- Students will develop the use of data structures in education, business, and civil environments.

ATTENDANCE POLICY: Regular attendance is expected at all times. College courses require your participation and can become extremely difficult if class time is missed. However, because unexpected situations do arise, you will be allowed two session absences, which I will count as “freebies”. For students with more than two session absences, the policy is as follows:

- 3 absences: an “excessive absence” warning letter is sent
- 4 absences: final course grade decreased by one letter grade
- 5 absences: **automatic withdrawal** from the course may be requested

Being present for class is defined as being on time for class and remaining for the entire period. Students coming late to class will be marked as absent. Be warned.

Exceptions to the above policy may be made at the discretion of the instructor. This usually occurs only in the case of **documented** excused absences, such as medical emergencies (with a doctor’s note), or other major unforeseen occurrences. Normal sick days, vacations and conflicts between class and your work do not count as excused.

A course grade of F will be assigned to any student with 8 or more absences. This policy will be applied whether or not the absences are excused or unexcused.

CLASSROOM DECORUM: Students are expected to show respect for their fellow students, for the course, and for the College. Please arrive on time, do not leave early and do not talk in class except in the context of classroom discussion

ELECTRONICS POLICY: Do not use cell phones, radios, music players, etc. during class time. Laptops may only be used as part of the class. Cell phones must be placed in silent mode and texting is not permitted during class. If you use a cell phone, I will ask you to leave, and you will be marked as absent for that class period. If a cell phone is seen during a test or quiz day, you will be asked to leave and will receive **an automatic grade of zero** on that test or quiz. Talk to me before class if there is a reason you must be contacted.

ASSESSMENT: Course grades will be based on daily homework assignments, class participation, mini-projects with presentations, quizzes, and the final exam.

Unless explicitly stated in advance, quizzes and exams are closed-book and closed-notes. Only the specified programs may be used when a computer is required, otherwise no electronic devices may be used. Make-up assignments, quizzes, and exams will not be given except in case of a serious emergency. Evidence that you were physically unable to take an exam will be reviewed to determine if a make-up is warranted. If you will miss an assignment, quiz or exam due to an excused campus activity then you must complete the assessment in advance or it will not be accepted.

Homework –Homework will generally be assigned with about one week to complete. There is often overlap in due dates in order to allow questions about an assignment to be addressed during a class period before it is due. Programs will be graded on "external correctness" (behavior) and "internal correctness" (style and design). Late homework will be accepted up to one week late with a penalty of 10% every 24 hours. Each student may submit (2) late homework assignments without penalty if the homework is submitted before the next class period. Late homework questions will not be accepted after they are reviewed in class. Disputes about homework grading must be made within 2 weeks of receiving the grade. Homework will be in paper and electronic format.

* Your homework average will account for 50% of your final grade.

Each homework assignment will be graded:

50% Correct Operation (it works)

25% Structure and Design

20% Documentation

05% Style



Class Preparation and Participation – You will be asked to investigate some topics between classes and provide an informal presentation occasionally. A discussion on these topics and general classroom discussions should involve all students - you are part of everyone's learning experience. There will also be in-class worksheets.

* Your preparation and participation grade will account for 10% of your final grade.

Mini-Projects and Presentations – Several projects will be assigned during the semester. These projects include a short presentation to the class.

* Your project average will account for 15% of your final grade.

Quizzes – There will be three quizzes over the course of the semester. Quiz dates will be announced in advance.

* Your quiz average will account for 15% of your final grade.

Examination - There will be a comprehensive final examination.

* This examination will account for 10% of your final grade.

GRADING SCALE:

Your final grade will be the average of the above. The standard 10-point scale will be used:
A = 90% – 100%, B = 80% – 89%, C = 70% – 79%, D = 60% – 69%, F = 0% – 59%

ACADEMIC SERVICES: The Royer Center for Academic Development (Miller Library, main level) is open to all students who need academic assistance in any class.

ACADEMIC INTEGRITY AND COLLABORATION:

Strict honesty is fundamental to education. The college expects that both students and teachers will be honest in all their academic dealings. Academic dishonesty includes (but is not limited to) cheating on tests, turning in others' work as your own (plagiarism), and submitting false reports about required activities. A student who is guilty of academic dishonesty can be failed on the project or failed in the course. In extreme cases, or if a pattern of dishonesty is evident, a student can be suspended from the college.

Each student is expected to act in complete compliance with the college policy regarding academic honesty. A student caught cheating on any test or assignment will receive a zero grade. At the discretion of the instructor, an automatic course grade of F may be assigned in extreme cases. Programming assignments must be completed individually; all code you submit must be your own work. You may discuss general ideas of how to approach an assignment, but should never involve details of how to code a solution. You must abide by the following rules:

- You may not work as a partner on an assignment unless assigned as partners.
- You may not show another student your solution to an assignment, nor look at his/her solution for any reason until after assignment grades have been finalized.
- You may not have another person describe in detail how to solve it. You also may not provide such help to another student.
- You may not post your homework code online to ask others for help. This includes public message boards, forums, file sharing sites and services, or any other online system.

Under our policy, a student who gives inappropriate help is equally guilty with one who receives it. Instead of providing such help to someone who does not understand an assignment, point them to other class resources such as lecture examples, the textbook, LMS, or instructor. Please be careful, and contact the instructor if you are unsure whether a particular behavior falls within our policy.

DISABILITY/EMERGENCY CLAUSE: If you have any condition or situation that you feel prevents you from doing your best work in this course, it is your responsibility to bring that condition or situation to the attention of the instructor or the college administration. Effort will be made to assist you in your learning in this course. It is important that we are informed early in the term so that we can make appropriate arrangements for that assistance. Immediate changes to course work requirements will only be applied in the event of emergency situations.

DISCLAIMER: Changes in the syllabus and/or schedule may be made at any time during the term by announcement in class or on-line. It is the student's responsibility to check on-line regularly for additional course information. The instructor will communicate all substantial modifications both to the Chief Academic Officer and to students enrolled in the course, prior to enacting these modifications. The distribution of grades between homework assignments, class participation, mini-projects with presentations, quizzes, and the final exam will not change. There is a lot of material – we will concentrate on what will help you the most in the real world.

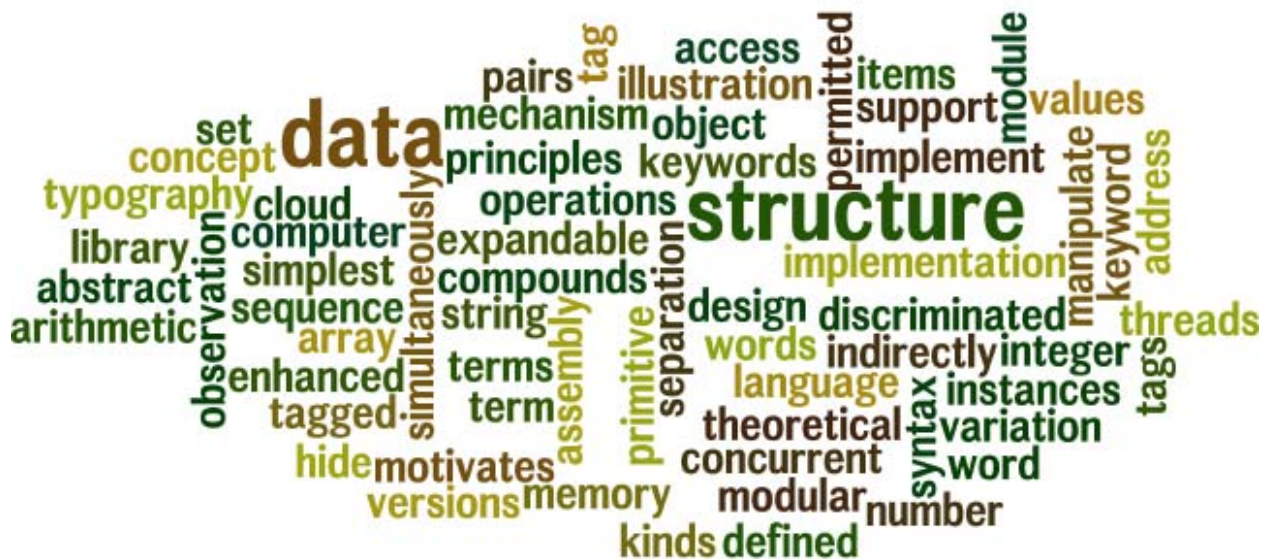
COURSE SCHEDULE:

Plan to meet every MWF except when NO CLASS is listed:

Aug 21	Friday	First Day of Class
Sept 7	Monday	Labor Day – NO CLASS
Sept 29	Tuesday	Down Grades Posted (Grades only posted if you have a D or F)
Oct 2	Friday	Conference – NO CLASS
Oct 14	Wednesday	Midterm – Online Exam – NO CLASS
Oct 15	Thursday	Fall Break Begins – NO CLASS
Oct 18	Sunday	Fall Break Ends – Class on Monday
Oct 20	Tuesday	Midterm Grades Posted
Nov 25-29	Wed.-Sun.	Thanksgiving Break – NO CLASS
Dec 4	Friday	Final Day of Class
Dec 7	Monday	Final Exam: 10:30am-12:30pm *

*NOTE: You must notify me before Fall Break, October 14, if there is any acceptable reason that you need to take the final exam at a different time.

ONE FINAL NOTE: Data Structures is not intended to be a difficult course. However, I recognize that new programs and languages can be challenging. Please feel free to visit me in my office frequently if you require extra help outside of class time. I will be happy to help you out with this stuff and I can arrange a schedule that meets your needs. If problems arise, please let me know. I would like this to be an enjoyable semester for all of us!



IT 201 DATA STRUCTURES SCHEDULED TOPICS

	Introduction & Discussion of Syllabus/Review of Control Statements Game of Life Project Review
	Review of Arrays and Program Structures Assignment: Completion of Target Application
	Relations and Directed Graphs (Digraphs) Assignment: Diagramming
	Stacks and Queues Assignment: Stacks and Queues Program
	Object Oriented Programing Parameters and Methods
	OOP Programming – Lab Time Assignment: Stacks and Queues Implemented as OOP Objects
	Software Development – Big O Notation Sort and Search Introduction
	Big O calculations - Pseudocode of sorting methods using arrays Assignment: Sorting
	OOP Multiple Constructors, Default Accessors – Lab Time Assignment: Constructors/Accessors
	Recursive Functions and Pseudocode of searching methods Assignment: Binary Search/Fibonacci Sequence
	Sets and Relations - Partially Ordered Sets Assignment: Sets
	HashSets and TreeSets – Lab Time Assignment: Sets using Hash/Tree
	Sets and Mapping Assignment: Union/Intersect/Difference/Sub-Supersets
	Doubly Linked Lists & Circular Linked Lists – Lab Time Project Corewars
	Tree Traversals / Binary Trees Assignment: RPN
	Tree Searches and Coding – Lab Time Assignment: Binary Tree Search
	Lexical Analysis and Encoding Assignment: Huffman Encoding
	Inheritance and Operator Overloading – Lab Time Assignment: OOP Exercise
	Data Bases: Flat vs Relational Assignment: Database Possibilities
	Data Base Relationships – Lab Time Assignment: Airport Queues Relations Mapping
	Database Design Assignment: Database Project Definition
	Data Abstraction – Lab Time
	GUI Introduction – Lab Time Assignment: GUI Frames
	GUI Interaction – Lab Time Assignment: GUI Application: Walker/Target
	Database Presentations
	Introduction to Alternate Platforms Assignment: Web Research

Homework will be overlapping in order to provide time for in-class discussions as needed before it due.
You will do prep work & informal presentations occasionally - you are part of everyone's learning experience.