

# MATH 140 - Data Structures & Algorithms

## Spring 2015

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Meeting Time: Lect TTh: 12:00p-1:15p, rm 394  
Lab TTh: 1:25p-2:40p, rm 394  
Office Hours: MT: 8:00a - 8:50a , M: 12:00p - 12:50p,  
and by appointment

### Course Description

This course uses the Java programming language to introduce the fundamental concepts of data structures and the algorithms that proceed from them. Includes recursion, object-oriented programming, fundamental data structures (including stacks, queues, linked-lists, hash tables, trees, and graphs), and the basics of algorithm analysis. Examines implementation and analysis of sorting and searching algorithms.

### Course Prerequisite

A grade of “C” or higher in Math 130 (Introduction to Computer Programming), or equivalent

### Textbook and Materials

- *Algorithms (4th Edition)*, by Robert Sedgewick ISBN: 032157351X.
- Supplementary: We will also reference the supporting website, for this book, located at [algs4.cs.princeton.edu](http://algs4.cs.princeton.edu)

### Support Software Used in Lab Computers. See this document as a PDF to get links.

- Eclipse and Netbeans are commonly used IDE’s for programming in Java.
- Bluej is an educational tool to introduce Java and Object Oriented Programming.
- online or light weight Java compilers can be explored.

Use of a USB Flash Drive or some other external storage is encouraged.

This document, and other course-related material can be found at the instructor’s website: [dept.swccd.edu/bsmith/m140](http://dept.swccd.edu/bsmith/m140)

Exams may occasionally require a scientific calculator.

### Exams and Grades

The exams are *tentatively* scheduled as follows:

- MidTerm Exam: March 14, 2015
- Final Exam: cumulative, on May 26 (Tue), 10:30am - 12:30pm

Your grade for the course will be based on the following components: quizzes (40%), projects (20%), midterm (20%), and final exam (20%).

Minimum grade threshold scores: A = 90%, B = 80%, C = 70%, D = 60%, below 60% = F

No grade of “Incomplete” (I) will be given.

### **Student Learning Outcomes**

Upon completion of Math 140, the student should be able to 1) describe problem requirements and employ correct programming constructs and syntax to create a working solution, and 2) identify necessary data structures and existing algorithms to be used in solving programming related problems.

### **Notes on the Calendar**

There will be no classes on February 13 (Lincoln’s Birthday), February 16 (Washington’s Birthday), March 31 (Cesar Chavez’s Day), April 3 (Good Friday), March 30 - April 5 (Spring Break), orf May 25 (Memorial Day)

### **Other Important Dates**

Jan 24: Last day to:

1) get a refund in the Bookstore without proof of drop.

Feb 4: Last day to:

1) add classes; 2) withdraw from full-semester classes and qualify for a full refund; 3) get a refund for Student Activities stickers.

Feb 8: Last day to withdraw from a class without receiving a ”W” grade.

April 17th: Last day to withdraw from full-semester courses and receive a ”W” grade.

May 21: No classes/Flex Day

May 22 - 29: Finals Week

### **Make-ups**

No make-up exams or quizzes will be given without prior consent of the instructor. Students participating in an officially sanctioned, scheduled, college extracurricular activity will be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation.

### **Attendance**

Each student is expected to attend every class meeting. In the case of absence, it is the student’s responsibility to inform the instructor.

Mandatory First Day of Class: Instructors must drop any student who fails to attend the first class meeting if the class is at maximum enrollment and other students are waiting to enroll, unless the student notifies the instructor in advance.

Dropping for Absences: Per SWCCD Policy 5075, instructors may drop a student from a class if the student’s total hours of absences exceeds twice the number of lecture hour equivalent units (LHE) for the class. For example, if this is a 4-unit (4 LHE) class, when you have more than

eight hours of absences, you will be dropped and receive a “W” or an “F” depending the date dropped.

Dropping for Tardiness: A tardy is defined as arriving after the start time up to 10 minutes late. If you are more than 10 minutes late, this will count as an absence. Two (2) tardies will count as one (1) absence. This tardy policy also applies to students leaving before the end of class or returning late from a break. The tardy policy will begin after the end of the add period.

Dropping students for being tardy will be in accordance with SWCCD Policy 5075 stated above. Arriving late or leaving early is a problem for both the students and the instructor. Students are expected to be in class for the entire class period.

Late Adds: After the add period concludes, a student may add classes only: 1) If the instructor certifies that the student has been in attendance during the add period. 2) Submits a Late Add Form to the School Dean. 3) Receives the approval of the School Dean. 4) Submits approved form to Admissions and Records.

If an add code is given at the start of the semester, it must be used within 24 hours of receipt, at which point the code can be assigned to someone else.

### **Students with Disabilities**

Southwestern College recommends that students with disabilities or specific learning needs contact their professors during the first two weeks of class to discuss academic accommodations. If a student believes they may have a disability and would like more information, they are encouraged to contact Disability Support Services (DSS) at (619) 482-6512 (voice), (619) 207-4480 (video phone), or email at [DSS@swccd.edu](mailto:DSS@swccd.edu). Alternate forms of this syllabus and other course materials are available upon request.

### **Academic Success Center Referral**

Services are located in the ASC (420), the Writing Center (420D), the Reading Center (420), Math Center (426), the Library/LRC Interdisciplinary Tutoring Lab, MESA, specialized on-campus School tutoring labs, the Higher Education Center, and the San Ysidro Education Center. Online learning materials and Online Writing Lab (OWL) are available online at [swccd.edu/~asc](http://swccd.edu/~asc).

### **Classroom Policies**

No food or drinks allowed in the classroom (water bottles OK). Please switch all cell phones either off or to silent mode. No children or other visitors unless prior permission is obtained.

### **Misconduct**

Faculty may require a student who disrupts the classroom to meet with the Dean of MSE prior to the next class meeting. Also, instructors may exclude a student for misconduct on the day of the disruption, and an additional day if needed. Further disciplinary action may be pursued by the instructor or college administration.

Misconduct includes the following:

- Academic cheating and plagiarism: Academic dishonesty of any type by a student provides grounds for disciplinary action by the instructor or college. In written work, no material may be copied from another without proper quotation marks, footnotes, or appropriate documentation. Students (both the giver and the receiver) involved in cheating and/or plagiarism will receive a zero (failing) grade on the assignment (this assignment cannot be dropped) and, at the discretion

of the instructor, earn a failing grade in the class. Academic dishonesty of any type such as cheating and plagiarism can result in one or all of the following: a failing grade on the assignment, a failing grade in the class, and/or formal disciplinary action by the college.

- Disruption of instructional activities or administrative procedures.
- Continued disruptive behavior, continued willful disobedience
- Habitual profanity or vulgarity, and/or the open and persistent abuse of college personnel.
- Use, sale, or possession on campus, or campus premises under the influence of alcoholic beverages, narcotics, other hallucinogenic drugs or substances, or any poison classified as such by schedule “D” in section 4160 of the Business and Professions Code.
- Alteration or misuse of college documents, including acts of forgery and furnishing false information.
- Acts or threats of damage to or theft of property belonging to or located on college-controlled property or facilities.
- Act or threat of physical abuse of any person. Assault or battery upon any student, college personnel, authorized college guest, or any other person.
- Violation of college regulations or state laws.
- Additionally, please review course catalog ([swccd.edu/Catalog/](http://swccd.edu/Catalog/)), or Southwestern Community College District Procedure No. 5550 for more information.

### **Disciplinary Action Procedures**

- When a student conduct violation has occurred, the first attempt to resolve the misconduct will be an informal consultation between the student and the instructor (or college staff member).
- If the situation is unresolved, the Dean will meet with the instructor and the student(s) involved.
- If the situation remains unresolved, the instructor will complete a “Report of Student Misconduct” and file the report with the Dean of Student Services.
- In situations involving safety or if the College Police have become involved, steps 1 and 2 need not be adhered to.

# M140 Lecture/Lab Calendar

quiz dates to be given in class; dates herein are tentative and may change

TUE		THU	
Jan 20th	1	22nd	2
Lect: Course Overview, Review Java, Eclipse Lab: Hands-on Review		Lect: Java review, §1.1-1.2 Lab: Data Abstraction	
27th	3	29th	4
Lect: Java review, §1.1-1.2 Lab: File I/O		Lect: Stacks I (API, array-based) §1.3 Lab: Linked-lists	
Feb 3rd	5	5th	6
Lect: Stacks (list-based) Lab:		Lect: Iterators, Generics, §1.3 Lab: Stacks (list-based)	
10th	7	12th	8
Lect: Queues (API, array-based, List) Lab:		Lect: Recursion Lab: Divide and Conquer	
17th	9	19th	10
Lect: Union-Find, §1.5 Lab: Project/Quiz		Lect: Union-Find, §1.5 Lab: File I/O, Project	
24th	11	26th	12
Lect: Algorithm Analysis I §1.4 Lab: Project/Quiz		Lect: Algorithm Analysis II, §1.4 Lab: Project Work	
Mar 3rd	13	5th	14
Lect: Elementary Sorts, §2.1 Lab: Project/Quiz		Lect: Mergesort, §2.2 Lab: <b>Midterm</b>	
10th	15	12th	16
Lect: Mergesort II (Analysis), §2.2 Lab:		Lect: Quicksort I, §2.3 Lab: Quicksort II (Analysis)	
17th	17	19th	18
Lect: Priority Queues, §2.4 Lab: Project/Quiz		Lect: Maps/Symbol Tables - array-based, JCF, BST, §3.1 Lab: Project	
24th	19	26th	20
Lect: BST I: traversal, iterators, §3.2 Lab: Project		Lect: BST II: operations, §3.2 Lab: Project	

TUE	THU
31st No Class Holiday: Chavez No Class Holiday: Spring Break	Apr 2nd No Class Holiday: Spring Break
7th <b>21</b> Lect: BST III: node removal, comparison to QS, §3.2 Lab: Project	9th <b>22</b> Lect: Balanced Trees I: (2-3-4, Red-Black), §3.3 Lab: Project
14th <b>23</b> Lect: Balanced Trees II, §3.3 Lab: Project	16th <b>24</b> Lect: Hashing I, §3.4 Lab: Project
21st <b>25</b> Lect: Hashing II, §3.4 Lab: Project	23rd <b>26</b> Lect: Hashing III, §3.4 Lab: Hashing Implementations
28th <b>27</b> Lect: String Searching, §5.3 Lab: Project	30th <b>28</b> Lect: Substring Searching, §5.3 Lab: Project
May 5th <b>29</b> Lect: Graphs: intro, BFS/DFS, §4.1-4.2 Lab: Project	7th <b>30</b> Lect: Graphs: MST I, §4.3 Lab: Project
12th <b>31</b> Lect: Graphs: MST II, §4.3 Lab: Project	14th <b>32</b> Lect: Shortest Paths I, §4.4 Lab: Project
19th <b>33</b> Shortest Paths II, §4.4 Lab: Project/Quiz	21st <b>34</b> Lect: Discuss Final Exam Lab: Project/Quiz
26th Finals Week: M140 10:30am-12:30pm	28th Finals Week

Final Exam: May 26, Tues, 10:30am - 12:30pm