**CIT 238 – Algorithms**

# Course Details

**Meeting Times:** Monday, Wednesday and Friday, 10:00AM – 10:50AM

**Location:** Weisberg Applied Engineering Complex (WAEC) Rm. 1104

**Catalog Description:** This is a three (3) credit hour course. Covers algorithm-design methods, algorithm performance analysis, and optimization techniques. Covers algorithm applications used in solving frequently occurring problems, such as pattern matching, data compression, searching and sorting.

**Prerequisites**: CIT or IST 236: Data Structures

**Required Texts:** zyBooks’ online textbook *Data Structures Essentials*

1. Sign in or create an account at learn.zybooks.com
2. Enter zyBook code: MARSHALLCIT238MundellSpring2018
3. Subscribe. A subscription is **$58** and will last until May 17, 2018.

# Instructor

**Name:** Matthew Mundell

**Office:**  Prichard Hall 208

**Phone:**  (304) 696-3436

**Email:**  mundell2@marshall.edu

**Office Hours:** MWF 12-1PM

 TR 12:30-2PM

Or by appointment.

# Objectives

There will be three (3) contact hours of classroom lecture and discussion per week. Coursework will include classroom lectures, assignments, and exams along with in-class discussion.

|  |  |  |
| --- | --- | --- |
| **Learning Outcomes** | **Practice** | **Assessment** |
| Students will be able to analyze the performance and complexity of algorithms. | In class lecture and hands-on examples and discussion | Assignments 1-7, Midterm Exam, Final Exam |
| Students will be able to demonstrate familiarity with fundamental algorithms and data structures. | In class lecture and hands-on examples and discussion | Assignments 2-7, Midterm Exam, Final Exam |
| Students will be able to apply efficient algorithm design in applicable programming situations. | In class lecture and hands-on examples and discussion | Assignments 1-7, Midterm Exam, Final Exam |

# Policies

## Computer Requirements

Course materials will be provided through MUOnline (<http://www.marshall.edu/muonline/>). Class announcements and other communications will be sent using your Blackboard account. You can reach me by emailing me through MUOnline or at my Marshall email (mundell2@marshall.edu). Please use your official Marshall University email address when sending class related communications. It’s good practice to check your email and MUOnline frequently (at least once a day). If you have a smart phone, I encourage you to setup your Marshall account on it so you get notified as soon as possible when you receive email.

This class will use C++ in Microsoft Visual Studio. Visual Studio is provided on university computers. As students in a College of Science class, you also have access to put it on your personal computers via <http://www.marshall.edu/cos/software/>. Alternatively, a free community version is available to anyone at <https://www.visualstudio.com/vs/community/>.

## Grading

Coursework will account for the following percentages of your final grade:

Assignments: 50%

Midterm Exam: 15%

Final Project: 15%

Attendance: 10%

Reading: 10%

Final letter grades are determined based on the following scale:

90-100% A

80-89% B

70-79% C

60-69% D

0-59% F

The instructor reserves the right to change these values depending on overall class performance and/or extenuating circumstances.

### Submission Guidelines

Assignments will be given and turned in through MUOnline unless otherwise noted. Programming projects should be submitted as a compressed .zip file containing all relevant files, including solution (.sln), source and header files, .exe, and output files if applicable. Submissions should follow the following naming convention:

CIT238\_*LastName*\_*FirstInitial*\_*AssignmentName*.zip

### Assessment of Work

Grading of coursework will primarily be based on correctness; in other words, if a given program compiles without error and exhibits the required functionality. However, points may also be deducted for redundant or unnecessary code, lack of proper documentation, poor readability (indentation, naming schemes, etc.), lack of robustness (how easily your code can be broken), and remaining warnings or logical errors.

While students are encouraged to help each other learn and study, you are responsible for turning in your own work. If you give or receive assistance to/from another student OR use an online example as a reference to study from, **you must** include a comment about it with your submission, or it may be investigated as Academic Dishonesty (see below).

### Late Policy

All Assignments are due by midnight on the provided due date. However, because your understanding of the material is top priority, late work will still be accepted at a penalty of 5% lost per day late after the first day. In other words, if you turn something in an hour late, there will be no penalty. If you turn something in a day late, you will lose 5% off your final score, so you can still get at most a 95%.

I will put in 0’s for late assignments until they are turned in so that you know they are late and what the resulting impact on your overall grade would be.

The absolute last day for submitting late work is **Friday, May 4**.

## Attendance

Attendance is worth 10% of your final grade. Your attendance grade will be reduced for each **unexcused** absence after your 3rd (In other words, you can miss 3 classes before it starts to hurt your grade).

If you miss class, **you are still responsible for all assignments and exams.**  If you have obligations which will cause you to miss an exam and inform me ahead of time OR you provide a University Excused Absence for an exam day, a make-up exam time will be arranged. Otherwise, missed exams will receive a grade of zero (0).

## Inclement Weather

Students can find information concerning Marshall’s policy regarding inclement weather regarding inclement weather online via <http://www.marshall.edu/ucomm/weatheremergency-closings/>. Please note that a two-hour delay means that classes that 8/9AM classes are cancelled and classes that begin at 10:00 a.m. begin on time. Classes that begin at 9:30 a.m. meet at 10:00 a.m. and continue for the remaining period of that class.

## Withdrawal Policy

This course follows standard University policy for withdrawals. The last day to drop this course with a “W” is March 16.

## Cell Phones

Please be respectful of others and set your phone to ‘Silent’ or ‘Vibrate’ during class. If you need to take a call, please take it outside.

## Academic Dishonesty

As described in the Marshall University Creed, Marshall University is an “Ethical Community reflecting honesty, integrity and fairness in both academic and extracurricular activities. ”Academic Dishonesty is something that will not be tolerated as these actions are fundamentally opposed to “assuring the integrity of the curriculum through the maintenance of rigorous standards and high expectations for student learning and performance” as described in Marshall University’s Statement of Philosophy. A student, by voluntarily accepting admission to the institution or enrolling in a class or course of study offered by Marshall University accepts the academic requirements and criteria of the institution. It is the student’s responsibility to be aware of policies regulating academic conduct, including the definitions of academic dishonesty, the possible sanctions and the appeal process. For the purposes of this policy, an academic exercise is defined as any assignment, whether graded or ungraded, that is given in an academic course or must be completed toward the completion of degree or certification requirements. This includes, but is not limited to: Exams, quizzes, papers, oral presentations, data gathering and analysis, practical and creative work of any kind.

If you are found cheating on projects or plagiarizing answers from the Internet or other sources there will be no second chance. In this course, STUDENTS ARE NOT TO “COPY & PASTE” MATERIAL FROM A SOURCE INTO ANY ASSIGNMENT UNLESS SPECIFICALLY AUTHORIZED BY THE INSTRUCTOR. Your penalty is that you will receive a failing grade for the course. In those cases in which the offense is particularly flagrant or where there are other aggravating circumstances, additional, non-academic, sanctions may be pursued through the Office of Judicial Affairs. Notice of an act of academic dishonesty will be reported to the Department Chair, Dean of the College of Science, and to the Office of Academic Affairs. Please refer to the Marshall University Undergraduate Catalog for a full definition of academic dishonesty.

## Policy for Students with Disabilities

Marshall University is committed to equal opportunity education for all students, including those with physical, learning and psychological disabilities. University policy states that it is the responsibility of students with disabilities to contact the Office of Disability Services (ODS) in Prichard Hall 117 (304.696.2467) to provide documentation of their disability. Following this, the ODS Coordinator will send a letter to each of the student’s instructors outlining the academic accommodation he/she will need to ensure equality in classroom experiences, outside assignment, testing, and grading. The instructor and student will meet to discuss how the accommodation(s) requested will be provided. For more information, access the website for the Office of Disabled Student Services: <http://www.marshall.edu/disabled>

## University Policy

By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to [www.marshall.edu/academic-affairs](http://www.marshall.edu/academic-affairs) and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to [www.marshall.edu/academic-affairs/policies/](http://www.marshall.edu/academic-affairs/policies/).

*Academic Dishonesty/Excused Absence Policy for Undergraduates/Computing Services Acceptable Use/Inclement Weather/Dead Week/Students with Disabilities/Academic Forgiveness/Academic Probation and Suspension/Academic Rights and Responsibilities of Students/Affirmative Action/Sexual Harassment*

# Schedule

The following is a tentative class schedule with topics and due dates. Please note this may change based on class progress or extenuating circumstances.

|  |  |  |  |
| --- | --- | --- | --- |
| Week 1 | 8-Jan | Overview and Syllabus |  |
| 10-Jan | Chapter 1: O Notation, Searching  |  |
| 12-Jan |  |  |
| Week 2 | 15-Jan | No Class – Martin Luther King, Jr. Holiday |  |
| 17-Jan | Chapter 1: Sorting |  |
| 19-Jan |  |  |
| Week 3 | 22-Jan |  | Assignment 1 Due |
| 24-Jan |  |  |
| 26-Jan |  |  |
| Week 4 | 29-Jan | Chapter 2: Data Structures |  |
| 31-Jan |  |  |
| 2-Feb |  |  |
| Week 5 | 5-Feb |  | Assignment 2 Due |
| 7-Feb |  |  |
| 9-Feb |  |  |
| Week 6 | 12-Feb | Chapter 3: Hash Tables |  |
| 14-Feb |  |  |
| 16-Feb |  |  |
| Week 7 | 19-Feb | Chapter 4: Trees, Binary Search Trees | Assignment 3 Due |
| 21-Feb |  |  |
| 23-Feb |  |  |
| Week 8 | 26-Feb |  |  |
| 28-Feb | Midterm Review |  |
| 2-Mar | Midterm Exam |  |
| Week 9 | 5-Mar | Chapter 5, 7: Tree Variations | Assignment 4 Due |
| 7-Mar |  |  |
| 9-Mar | Heaps and Heapsort |  |
| Week 10 | 12-Mar |  |  |
| 14-Mar |  |  |
| 16-Mar | Sorting in Linear Time | Assignment 5 Due |
| Week 11 | 19-Mar | No Class - Spring Break |  |
| 21-Mar | No Class - Spring Break |  |
| 23-Mar | No Class - Spring Break |  |
| Week 12 | 26-Mar | Pattern Matching |  |
| 28-Mar |  |  |
| 30-Mar |  |  |
| Week 13 | 2-Apr | Greedy Algorithms | Assignment 6 Due |
| 4-Apr |  |  |
| 6-Apr |  |  |
| Week 14 | 9-Apr | Dynamic Programming |  |
| 11-Apr |  |  |
| 13-Apr |  |  |
| Week 15 | 16-Apr | Chapter 6: Graphs | Assignment 7 Due |
| 18-Apr |  |  |
| 20-Apr |  |  |
| Week 16 | 23-Apr |  |  |
| 25-Apr |  |  |
| 27-Apr |  |  |
| Week 17 | Mon, Apr 30 | No in class Exam | Final Project Due |