Data Structures: COSC 5321
School of Engineering & Computing Sciences
Spring 2016

A. COURSE INFORMATION

Course number/section: 5321.001
Class meeting time: MWF 08:00-08:50AM (Lecture)
Class location: CI-126
Course Website: www.sci.tamucc.edu/~lli/ and https://bb9.tamucc.edu/

B. INSTRUCTOR INFORMATION

Instructor: Dr. Longzhuang Li
Office location: CI-323
Office hours: M 11:00 AM – 12:00 PM
TR 10:00 AM - 12:00 PM
Telephone: 825-2406
e-mail: Longzhuang.Li@tamucc.edu
Appointments: Call me or by email

C. COURSE DESCRIPTION

This course provides a thorough study of standard structures used in the storing and retrieving of data and the process by which these structures are created and manipulated. Topics include: abstract data types, lists, trees, hashing, stacks, queues, sorting, searching, and recursion.

D. PREREQUISITES AND COREQUISITES

Prerequisites
COSC 1436 and MATH 2305

Corequisites
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)

Optional Textbook(s) or Other References
Starting Out with C++: From Control Structures through Objects, 8th Edition by Tony Gaddis, Addison-Wesley (ISBN: 978-0133769395)
Starting Out with C++: From Control Structures through Objects, 7th Edition by Tony Gaddis, Addison-Wesley (ISBN: 978-0132576253)
Supplies
Some way to archive your documents (Flash drive, Dropbox/Cloud, etc)

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

- Understand and use searching and sorting algorithms.
- Understand the concept of algorithm efficiency and be able to determine the Big-O efficiency of an algorithm.
- Understand the concept of object-oriented programming through the use of abstract data types.
- Understand and use dynamic memory allocation to create list, stack, and queue data structures.
- Understand and use dynamic memory allocation to create tree data structures.
- Be able to analyze and select appropriate data structures to implement a solution to a problem.
- Understand and use recursion to solve a problem.
- Understand the basic concepts of graph data structures and some of the algorithms associated with graphs.

By the end of this course, students should be able to:

1. Use knowledge of both computing and mathematics to obtain an efficient and cost-effective solution for a computing problem
2. Analyze a given problem or a system
3. Design a computer-based system, process, component, or program to meet desired needs
4. Apply current software development methodologies or techniques
5. Understand the differences in space/time complexity of algorithms.
6. Apply software principles to solutions to problems of varying complexity

G. INSTRUCTIONAL METHODS AND ACTIVITIES

This course will be a mixture of lectures and discussions. The student is expected to actively participate in all class activities. The student is also expected to do outside work on
assignments and reading.

Please note the dates of the exams on the course schedule below and plan accordingly.

As part of this class, you will have many programming assignments, or labs. These lab assignments are all individual efforts unless otherwise specified. There is a two-hour lab session associated with this course. This time is used for supplemental instruction and for you to work on your programming assignments. Attendance will be monitored in these labs; however, you may leave early if you complete and submit the lab early. Labs may be submitted late, for a maximum of 80% of the total points, up to 48 hours after the original due date. There will be no resubmissions of labs.

You are expected to attend class, participate, and complete the assigned reading. In order to encourage and reward these behaviors, regular quizzes will be given. Know the answers to the “Examples,” “Quick Reviews,” and “Exercises” in the textbooks. Most, but not all, quiz questions will be pulled from this material. There are no make-ups for missed quizzes.

H. MAJOR COURSE REQUIREMENTS AND GRADING

Grade Scale:  A (90-100%)  B (80-89%)  C (70-79%)  D (60-69%)  F (<60%)

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Exam 1</td>
<td>20</td>
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<tr>
<td>Exam 2</td>
<td>20</td>
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<tr>
<td>Programming Assignments (Labs)</td>
<td>30</td>
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<tr>
<td>Class Attendance</td>
<td>5</td>
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<td>Final Exam</td>
<td>25</td>
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I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Introduction and Overview</td>
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<td>Read Chapter 1, 2</td>
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<tr>
<td>Week 2</td>
<td>Software Engineering Principles, Object-Oriented Design (OOD)</td>
<td>1, 2</td>
<td>Read Chapter 2, 3</td>
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<td>Week 3</td>
<td>Object-Oriented Design (OOD), Pointers</td>
<td>2, 3</td>
<td>Read Chapter 5</td>
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<td>Week 4</td>
<td>Linked Lists</td>
<td>5</td>
<td>Read Chapter 6</td>
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<td>Week 5</td>
<td>Recursion</td>
<td>6</td>
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<tr>
<td></td>
<td>Exam 1</td>
<td>1, 2, 3, 5, 6</td>
<td>Read Chapter 7</td>
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<tr>
<td>Week 7</td>
<td>Stacks</td>
<td>7</td>
<td>Read Chapter 8</td>
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<tr>
<td>Week</td>
<td>Topic</td>
<td>Read Chapter</td>
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<tr>
<td>8</td>
<td>Queues</td>
<td>8</td>
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<tr>
<td>9</td>
<td>Searching and Hashing Algorithms</td>
<td>9</td>
<td></td>
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<tr>
<td>10</td>
<td>Searching and Hashing Algorithms</td>
<td>9</td>
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<td></td>
<td>Exam 2</td>
<td>7, 8, 9</td>
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<td>12</td>
<td>Sorting Algorithms</td>
<td>10</td>
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<td>13</td>
<td>Binary Trees and B-Trees</td>
<td>11</td>
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<tr>
<td>14</td>
<td>Graphs</td>
<td>12</td>
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<td>15</td>
<td>Review</td>
<td>10, 11, 12</td>
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<td></td>
<td>Final Exam (08:00–10:30 AM)</td>
<td>10, 11, 12</td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

Attendance/Tardiness
You are expected to be in attendance, punctual, and prepared for class. If you are more than 5 minutes late to class, you will be counted as tardy. Please make sure that you will never be tardy to any of your classes or accept the consequences.

Late Work and Make-up Exams
NO makeup exams, labs, or quizzes will be allowed unless I have agreed prior to the exam, lab, or quiz time and been provided with official supporting documents.

Extra Credit
There is NO EXTRA CREDIT - don’t bother asking.

Cell Phone Use
You are required to turn off your cell phone in class and pay attention to class discussions.

Laptop Use
Use of laptops and other electronic devices is restricted to taking notes.

Food in Class
Eating food in class is Not Allowed.

Missed Exam
Missed exams will be graded as ‘0’.
Participation
Class discussions and information provided in class are considered regular course material; it is your responsibility to take appropriate notes. You are expected to attend lectures and actively participate in class discussions.

Others
Read Section L!!!
demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  http://disabilityservices.tamucc.edu/

L. **OTHER INFORMATION**

These guidelines are designed to inform scholars of their responsibilities and of the course requirements in order to make this course a positive experience. The instructor is always available for consultation and discussion with students on any aspect of a course and of these general guidelines.

1. Consider yourself as a **scholar** rather than a student. The term “student” may imply some passivity, whereas the term “scholar” implies active participation, understanding and searching. We will use these terms interchangeably with the meaning of “scholar” implied. Osmosis does not work in a learning environment!

2. Further, define yourself as a “thinking explorer”. You are responsible for your education; an instructor can only be a guide and a facilitator. An instructor cannot learn for you. If you come across something that really interests you, explore it further.

3. Your experience at this University should not consist of passing a series of courses to earn a degree. Your experience should rather be a series of activities that will give
4. Concentrate on “learning to learn”. You will have to be a life-long learner to survive in your chosen career.

5. There is no such thing as a stupid question; there is such a thing as a stupid answer. So ask questions, the instructor is taking all the risks! Ask questions of your instructor and of your fellow scholars. Many times questions are more important than answers.

6. The Internet is a tremendous resource and also a great danger. When you find information on the Internet, you have no idea if it is correct. View such information with caution. But, use the Internet to explore topics that interest you. Do not only prepare for the exam in a course – learn as much as you can on the topics introduced to you by the course material. You are responsible for the extent of your education! READ MINDFULLY !!!!

7. In addition to details of the syllabus given in class, the syllabus for the course includes all the chapters of the required textbook/s unless indicated otherwise by the instructor.

8. The final letter grade for the class will be based on the raw composite numerical score obtained from the weighted average of the tests, quizzes, exams, labs, etc. as indicated by the instructor. The raw composite numerical score may be adjusted (curved) based on the highest score, the statistical profile of the scores and other academic standards or other considerations. Generally the letter grade of A is 90% and over of the adjusted score, a B is between 80% and 89% (inclusive) of the adjusted score, a C is between 70% and 79% (inclusive) of the adjusted score, a D is below 70% of the adjusted score and an F is below 65% of the adjusted score. An incomplete (I) will only be given in very unusual circumstances. The University regulations on incomplete grades state: “An incomplete notation may be given to a student who is passing but has not completed a term paper, examination, or other required work for reasons beyond the student’s control other than the lack of time”. Students are expected to take ALL tests, quizzes, exams, etc., and to complete and hand in all labs and other assignments. There is no provision for “extra credit”. No final grades will be given via the telephone, e-mail, etc.

9. All University rules, regulations and expected student conduct apply to this course. Students are held responsible for the information given in the current Catalog and Student Handbook.

10. All labs, assignments, etc. must be handed in on the assigned due date. Scholars having problems must notify the instructor well before the due date. Marks will be deducted for poor and sloppily presented work.

11. Labs, etc. handed in after the due date may be subject to a penalty of loss of marks. Labs, etc. handed in after the graded labs, etc. have been returned to students will get zero marks but must be handed in to the instructor.

12. Scholars are asked to take special note of the penalties, which the University attaches to Academic Dishonesty. Consult the Student Handbook.

13. All work handed in to the instructor must be the student's own work. Extracts, excerpts, etc. from the work of others must be suitably noted, acknowledged and properly referenced. Any Group Work will be judged in the same way. That is, it is
the work of the group and the extracts, excerpts, etc. of others must be acknowledged.

14. All written and graphical work handed in must be presented neatly printed. Student’s written work will be judged on written communication skills, critical thinking and problem solving ability.

15. There are NO provisions for making up missed exams except in cases where prior arrangements have been made and agreed to by the instructor.

16. Students must keep their given university e-mail address (i.e. firstname.lastname@islander.tamucc.edu). This will be the means of the instructor communicating with students.

17. All work submitted to the instructor (via e-mail or other means) must be clearly marked with the student’s name and the name and number of the course – this is especially important when work is submitted as an attachment to an e-mail.

18. The instructor reserves the right to make changes to the above with due notice to the students. These changes will be announced to the class (see 16 above) and each student is responsible for keeping herself/himself informed of such changes.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.