| COURSE TITLE BLACKBOARD SITE | MCS 2534 Data Structures  
Fall 2011 – [my.ltu.edu](http://my.ltu.edu) and select CRN 2033 |
|-------------------------------|---------------------------------------------------------------|
| INSTRUCTOR | David Fawcett  
Math & Computer Science  
Contact Information: fawcett@ltu.edu, djfawcett@comcast.net  
248-760-1077 (mobile & text)  
Office hours by appointment |
| SCHEDULE | August 31 – December 22, 2011  
Students please refer to [http://www.ltu.edu/registrars_office/calendar_final_exam_index.asp](http://www.ltu.edu/registrars_office/calendar_final_exam_index.asp) for the last date to withdraw and other important registration related information. |
| LEVEL/HOURS PREREQUISITE | Undergraduate Degree / 4 credit hours  
MCS 2514 (CS II) & MCS 2523 (Discrete Math) |
Authors web site: [http://www.aw.com/cssupport](http://www.aw.com/cssupport)  
| ADDITIONAL RESOURCES | LTU Online student resources: [http://www.ltu.edu/ltuonline/](http://www.ltu.edu/ltuonline/) |
| TECHNICAL SUPPORT | Technical support for using Blackboard is provided by the Helpdesk, 248.204.2330 or helpdesk@ltu.edu. Send the Help Desk a form detailing any issues by clicking here: [http://tinyurl.com/3ygryne](http://tinyurl.com/3ygryne). |
COURSE SCHEDULE FOR TRADITIONAL SEMESTER COURSES

This fully online course begins with a partial week online course orientation period to familiarize yourself with the online learning environment and to meet online or via the phone with your instructor. Each subsequent week starts on a Monday and ends on a Sunday. All assignments due at end of week (EOW) unless otherwise noted.

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<tr>
<th>Dates</th>
<th>Modules</th>
<th>Topics / Readings</th>
<th>Assignments Due</th>
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<td>Prior to Semester</td>
<td>Module 0</td>
<td>Overview of textbook</td>
<td>Course orientation</td>
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<td>Start and Aug 31 –</td>
<td>Module 0</td>
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<td>Quiz 1</td>
<td>HW Ch2 P.64 2.1 &amp; 2.2</td>
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<td>Week of Sep 12 – Sep</td>
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<td>Week of Sep 19 – Sep</td>
<td>Module 3</td>
<td>Chapter 3 Stacks, Queues Linked Lists</td>
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<td>Quiz 2</td>
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<td>Week of Sep 26 – Oct</td>
<td>Module 4</td>
<td>Lab 1</td>
<td>Code Bucket Sort/Radix</td>
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<td>Sort. Post graphs and discuss</td>
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<td>Due in 3 Weeks.</td>
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<td>Week of Oct 3 – Oct</td>
<td>Module 5</td>
<td>Chapter 5 Hashing</td>
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<td>Week of Oct 10 – Oct</td>
<td>Module 6</td>
<td>Chapter 5 Hashing continued</td>
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<td>Week of Oct 17 – Oct</td>
<td>Module 7</td>
<td>Lab 2</td>
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<td>Post graphs and discuss</td>
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<td>Due in 3 Weeks.</td>
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<tr>
<td>Week of Oct 24 – Oct</td>
<td>Module 8</td>
<td>Chapter 4 Trees</td>
<td>Read chapter</td>
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<tr>
<td>30</td>
<td></td>
<td></td>
<td>Bb Discussion Board</td>
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<td></td>
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<td>Practice Module (part 1)</td>
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</tbody>
</table>
### Dates | Modules | Topics / Readings | Assignments Due
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Week of Oct 31 – Nov 6 | Module 9 | Chapter 4 Trees continued Quiz 4 | Practice Module (part 2)
Week of Nov 7 – Nov 13 | Module 10 | Chapter 6 Priority Queues Quiz 5 | Read chapter.
Week of Nov 14 – Nov 20 | Module 11 | Lab 3 | Simulation
Week of Nov 21 – Nov 27 | Module 12 | Lab 3 continued *Light Week – Thanksgiving Break* | Bb Discussion Board
Week of Nov 28 – Dec 4 | Module 13 | Chapter 7 Sorting | Read chapter
Week of Dec 5 – Dec 11 | Module 14 | Chapter 7 Sorting continued Quiz 6 | Read chapter
Week of Dec 12 – Dec 18 | Module 15 | Chapter 9 Graphs Quiz 7 | Read chapter
Week of Dec 19 – Dec 22 | Final Exams | Course Summary End of Course | Course evaluation

**STUDENT EVALUATION**

The course has the assignments listed below. Letter grades are awarded based on the total number of points achieved. Points are deducted for late assignments.

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Points</th>
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<tr>
<td>7 Practice Module Assignments</td>
<td>14</td>
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<td>7 Text book HW Problems</td>
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<td>3 Labs</td>
<td>30</td>
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<td>7 Quizzes</td>
<td>14</td>
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<td>Final Exam</td>
<td>20</td>
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<td>Online Participation</td>
<td>15</td>
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<tr>
<td><strong>Total Points</strong></td>
<td><strong>100</strong></td>
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</table>
EDUCATIONAL GOALS
The student will know about the common data structures and algorithms used in computer science and see the mathematical basis for them.
The student will program these data structures and algorithms and measure the performance for him/her self so that they can use this skill in their outside work.

STUDENT LEARNING OBJECTIVES / OUTCOMES
(1) The student will be able to evaluate existing computer programs to determine how to improve scalability by using appropriate data structures and algorithms used in industry.

(2) The student will be able to synthesize (new) computer programs and methods so that they have the best/most appropriate data structures and algorithms that give the desired performance.

PREREQUISITE SKILLS
The student must have completed Computer Science II and Discrete Mathematics.
The student must be able to write computer programs in C++.
The student must be willing and able to use MS Visual Studio C++ 2008 or 2010 when doing the labs.

INSTRUCTIONAL METHODS AND COURSE ORGANIZATION

Blackboard Learning Environment – Blackboard at my.ltu.edu contains the syllabus, all assignments, reading materials, streaming videos, narrated PowerPoint mini-lectures, podcasts, written lecture notes, chapter quizzes, links to Web resources, and discussion forums. You will submit all assignments via Blackboard, and are expected to participate regularly in discussion topics. Please take time to familiarize yourself with the organization of the Blackboard site. You will want to check the site frequently for announcements reminding you of new resources and upcoming assignments.

Student/Instructor Conversations – Students keep in touch with the instructor via e-mail messages, telephone conference calls, and short IM conversations.

Self-Assessments – Pre- and post- self-assessment tools will help students measure their entering skills and progress during the course.

Required Reading – Textbook chapters should be read according to the schedule outlined in the syllabus. Chapters will be discussed online.

Publisher Web Site – A publisher web site at http://www.aw.com/cssupport includes instructional materials, PowerPoint slides, case studies, application exercises, and practice quizzes. You should make use of as many of these resources as you need to be successful.
Assignments – Most Modules listed above will have a corresponding Practice module. This practice module will contain source code to be evaluated, or instructions and/or guidance for using the Data Structure Workbench (DSB) or Web to learn more about a topic. The practice module will have detailed instructions. In addition there will usually be a homework assignment from the text. Each chapter has a quiz.

CLASS POLICIES AND EXPECTATIONS

I plan to offer you a valuable learning experience, and expect us to work together to achieve this goal. Here are some general expectations regarding this course:

Each student has a LTU email account. If you wish to use a different email address for this course, please change your email address in Blackboard under “Blackboard Tools”, then “Personal Information” and send an email to me to store your email address in my directory.

Readings, discussion forum participation, and written assignments must be completed according to the class schedule. It is important to contact the instructor as needed to discuss personal needs regarding course requirements and assignments.

It is essential that all students actively contribute to the course objectives through their experiences and working knowledge.

All assignments must be submitted on schedule, via Blackboard, and using Microsoft Office compatible software. If you need to submit an assignment via email, contact the instructor in advance.

Assignments must be completed to an adequate standard to obtain a passing grade. Requirements for each assignment are detailed in this syllabus.

Be prepared to log into Blackboard at least once each day. Please focus your online correspondence within the appropriate Blackboard discussion forums, so that your colleagues may learn from you.

At midterm and at the end of the course, you will be invited to participate in a University evaluation of this course. Your feedback is important to the University, to LTU Online, and to me as an instructor, and I strongly encourage your participation in the evaluation process.

It is important for you as students to know what to expect from me as your instructor:

- I will be available to you via e-mail and phone, and will promptly reply to your messages.
- I will be available to you for face-to-face appointments as requested.
- I will maintain the Blackboard web site with current materials, and will resolve any content-related problems promptly as they are reported to me.
- I will send out a weekly e-mail update to all class members to guide upcoming work and remind you of assignment due dates.
- I will return all assignments to you promptly, and will include individualized comments and suggestions with each assignment.
- I will hold our personal written or verbal communications in confidence. I will not post any of your assignments for viewing by the class without requesting your approval in advance.
- I will treat all members of the class fairly, and will do my best to accommodate individual learning styles and special needs.
- If any of these points need clarification, or should special circumstances arise that require my assistance, please contact me so that we may discuss and resolve the matter.
PRACTICAL GUIDELINES FOR CLASS LOAD EXPECTATIONS

A three-credit course generally requires at least nine hours per week of time commitment. Here are some practical guidelines to help schedule your time commitments for this online course:

- A 14-week semester (the Summer semester is compressed into 10 weeks) would require at least 126 hours of time commitment to successfully complete all readings, activities, assignments, and texts as described in this syllabus.
- You should reserve at least 6 hours per week to read the required textbook chapters and resources, participate in online discussions, review presentation materials, and work through online quizzes. This effort will total at least 84 hours over the course of the semester.
- You should organize your remaining time to roughly correspond with the point value of each major assignment. This means that you should plan to spend at least:
  - 8-9 hours preparing your case study review;
  - 24-40 hours working with your group on the three parts of your semester-long project;
  - 8-9 hours working on the various components of your reflective consolidation (final exam).

These guidelines may not reflect the actual amount of outside time that you – as a unique individual with your own learning style – will need to complete the course requirements. The number of hours each week will vary based on assignment due dates, so please plan ahead to insure that you schedule your academic, work, and personal time effectively. The following graphic may be used to guide you in planning your weekly course work to remain on schedule:

ASSIGNMENT DETAILS

Course assignments and evaluation criteria are detailed below. Please review these requirements carefully. See the section Academic Resources / Assessment Guidelines for information about assessment of written and oral presentations.

Details for all assignments are shown below. Please note that you should not submit any assignments to the Blackboard “Digital Drop Box.” All assignments are submitted using the Blackboard “Assignments” or “SafeAssign” function. Some assignments are also posted to the Blackboard Discussion Forum for student comments.
Assignments from Text Problems (70 Points)

Assignments from the text are as follows:
1. HW Ch2 P.64 2.1 & 2.2
2. HW Ch3 Modify instructor code LL.zip to add backward pointer and then print the list backwards.
3. HW Ch4 P. 175&176 4.9 & 4.19
4. HW Ch5 P. 208 5.1 & 5.2
5. HW Ch6 P. 252 6.4
6. HW Ch7 P. 306 7.1, 7.3, and 7.4
7. HW Ch9 P.396 9.1, P.397 9.5 a & b, P.397 9.7 a & b

Each of these assignments is worth 10 points. Deliverable is a turned in assignment with the answers to the homework problems just like in a F2F class.

Assignments from Practice Modules (140 points) Deliverables are in italics.
Seven Practice Module assignments are all worth 20 points each and are:
1. Big-O – Bucket and Insertion Sort (Run code examples and produce graphs)
2. Using Data Structure Workbench (DSWB) (Learning how to use this resource – interactive exercise with instructor/student – participation)
3. What are Stacks, Queues and Linked Lists Good For? (Essay based on Web research)
4. Hashing Algorithms and the Internet. (Essay based on Web research)
5. Splay Trees – Why do they work? (Essay based on Web research)
6. Invent your own increment sequences. (A creative exercise in improving a sorting algorithm – produce an equation, or set of equations that generate a sequence that is used by an insertion sort algorithm to improve the Big-O – more improvement is better!)
7. Understanding the behavior of Dijkstra’s Algorithm with negative weight edges. (Essay based on the text and Web research and your homework).

Deliverables and Evaluation – Submit your homework assignments via Bb. Word, Excel or Journal format is preferred; however I will accept text (txt, rtf), Excel, or scans. Submit code assignments by zipping the Visual Studio project folder (after deleting the debug folder) and submitting via Bb assignments.

Evaluation of your work:
Homework from the text – Your homework is noted and returned to you for you to grade – I will post the homework solutions. If you do the HW you get 1 point (each assignment), otherwise you get zero points. If you have questions on the homework solution, you can contact me individually.
Web research and discussion: A few paragraphs usually will suffice. Don’t just cut and paste, give your own interpretation of what you found. Discuss how it meshes with what we are learning. Provide URLs.
Practice Module problems:
These problems contain C++ code plus questions about the code. You are expected to already be a competent programmer. Mainly you will be just downloading and executing the code, then giving your responses to the questions about your observations.
Labs:
The labs assignments have you writing your own code in a “shell” that I provide. Most of the “grunt work” is done for you. You only have to write the algorithm and instrumentation. You are expected to already be a competent programmer. I am not grading you on style or documentation; however, SOME comments are useful. You have three weeks to complete the lab assignments. The shell I give you produces the graphs which you can see in the Data Structure Workbench – you don’t have to use Excel, and you don’t have to know how to produce graphs. The shells are C++ Console (DOS window) applications. I will look at your code, execute your code and inspect the graphs that are produced. If the code is not “grade-worthy” I will return the code with guidance for you to fix it. I will accept multiple attempts until time runs out.

Quizzes and Online Participation

Each student is expected to actively participate in online activities. Class participation is evaluated to a maximum of 15 points based on: whether you submit a post, and quality of post.

Reading the required text chapters and working through the online practice quizzes according to the class schedule is worth up to 14 points.

Actively participating in Blackboard discussion forums, responding to questions posted by the instructor, and interacting positively with other students is worth 15 points.

Quizzes are graded just like they would be if done in a face to face (F2F) class. Quizzes will be in MS Word or Excel. Return the completed quiz via Bb assignments. Partial credit is given. You may use OneNote or Journal or Word, Excel. If more than one file or file type is needed, compress (zip or “rar”) them into one file.

Assignment submitted on time – Late penalty: 10% off for each day.

SYLLABUS ADDENDA

Please see the LTU Online “Current Students” web site http://www.ltu.edu/ltuonline/ for comprehensive information about Lawrence Tech’s academic services, library services, student services, and academic integrity standards. The content of this web site is explicitly included in these syllabus requirements.

The LTU Online “Current Students” web site also includes grading rubrics used by your instructor to evaluate written assignments, discussion forum participation, and group assignments. Please note that the SafeAssign anti-plagiarism product will be used for written assignments submitted for this course. Please see the instructions included on the eHelp web site regarding the use of the SafeAssign product.

Undergraduates: Leadership Transcripts

The leadership transcript enables students to track co-curricular activities that are undertaken above and beyond the requirements of the LTU curriculum. The leadership transcript serves students by enhancing the leadership portfolio; providing the opportunity for a transcript of distinction; enhancing their resumes; and assisting in articulating leadership experience. It can be accessed by logging on to Banner Web and clicking the Student and Financial Aid tab. Leadership Activities is located at the bottom of the list.