

COURSE TITLE BLACKBOARD SITE	MCS 4663 – Operating Systems Fall 2012 – http://my.ltu.edu and select CRN 1957
INSTRUCTOR	Mohammed El-Bathy Adjunct Faculty at Math & Computer Science Department Office hours by appointment
SCHEDULE	August 29, 2012 – December 21, 2012 Refer to 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	Graduate or Undergraduate Degree / 03 credit hours <u>Admission / prerequisite requirements:</u> Undergraduate level MCS 3653 Computer Architecture or Undergraduate level MCS 3663 Computer Architecture & Assembly Lang..or Undergraduate level EEE 3233 Microprocessor
REQUIRED TEXT (See Blackboard for additional resources)	Silberschatz, Galvin, Gagne – Operating System Concepts , Essential Publisher: John Wily & sons, Inc., ISBN-13: 978-0-470—88920-6 Authors web site http://www.wiley.com/college/silberschatz Available for online purchase through LTU Bookstore at: http://lawrence-tech1.bkstore.com/bkstore/TextbookSelection.do?st=489
ADDITIONAL RESOURCES	LTU Online student resources: 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/3yqrvne .

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.

Dates	Modules	Topics / Readings	Instructional Activities
<u>Prior to Semester Start</u> Aug. 29 – Sept. 02	Module 0	<ul style="list-style-type: none"> • Online Learning Orientation • Course Orientation • Overview of textbook 	<ul style="list-style-type: none"> • Course orientation • Instructor conversation • Individual pre-assessment
Week of Sept. 03 – Sept. 09	Module 1	<u>Introduction:</u> <ul style="list-style-type: none"> • Operating system organization • Operating system architecture • Multiprogramming & Timesharing • OS Dual-operation • Operating system operations • Distributed systems • Special-purpose systems • Computing Environment 	<ul style="list-style-type: none"> • Read Chapter 1 • Review Lecture Presentations • Practice Self Review # 1 • Bb Discussion # 1- start
Week of Sept. 10 – Sept 16	Module 2	<u>Operating System Structure</u> <ul style="list-style-type: none"> • Operating-system services • Operating system interfaces • System Calls • Operating system design and implementation • OS Structures • Virtual Machines • Group Formulation 	<ul style="list-style-type: none"> • Read Chapter 2 • Review Lecture Presentations • Practice Self Review # 2 • Bb Discussion # 1 – end • Essay Out
Week of Sept. 17 – Sept 23	Module 3	<u>Processes:</u> <ul style="list-style-type: none"> • Process management concepts • Process scheduling • Operations on processes • Inter-process communication 	<ul style="list-style-type: none"> • Read Chapter 3 • Review Lecture Presentations • Practice Self Review # 3 • Bb Discussion # 2- start
Week of Sept. 24 – Sept 30	Module 4	<u>Threads:</u> <ul style="list-style-type: none"> • Process threads • Multithreading models • Threads libraries • Threads issues 	<ul style="list-style-type: none"> • Read Chapter 4 • Review Lecture Presentations • Practice Self Review #4 • Bb Discussion # 2 - end • Programming Problem 1 - Out
Week of Oct. 01 – Oct. 07	Module 5	<u>CPU Scheduling:</u> <ul style="list-style-type: none"> • CPU Scheduling • Scheduling Criteria • Scheduling algorithms • Multiple-Process scheduling 	<ul style="list-style-type: none"> • Read Chapter 5 • Review Lecture Presentations • Practice Self Review #5 • Bb Discussion # 3 – start
Week of Oct. 08 – Oct. 14	Module 6	<u>Process Synchronization:</u> <ul style="list-style-type: none"> • Critical section problem • Peterson's Solution • Synchronization hardware 	<ul style="list-style-type: none"> • Read Chapter 6.1 - 6.6 • Review Lecture Presentations • Practice Self Review #6 • Bb Discussion # 3 – end

Dates	Modules	Topics / Readings	Instructional Activities
Week of Oct. 15 – Oct. 21	Module 7	<u>Process Synchronization:</u> •Semaphores- •Monitors •Synchronization Examples Deadlocks	<ul style="list-style-type: none"> • Read Chapter 6.7 – 6.10 • Review Lecture Presentations • Practice Self Review #6 • Bb Discussion # 4 – start • Programming Problem 1 – Due
Week of Oct. 22 – Oct. 28	Module 8	<u>Main Memory:</u> •Main Memory background •Swapping – paging Contiguous memory	<ul style="list-style-type: none"> • Read Chapter 7 • Review Lecture Presentations • Practice Self Review #7 • Bb Discussion # 4 – end • Programming Problem 2 – Out • Midterm Exam
Week of Oct. 29 – Nov. 04	Module 9	<u>Virtual Memory:</u> •Background •Demand paging •Copy-on-Write •Page Replacement	<ul style="list-style-type: none"> • Read Chapter 8.1 – 8.4 • Review Lecture Presentations • Practice Self Review #8 • Bb Discussion #5 – start
Week of Nov. 05 – Nov. 11	Module 10	<u>Virtual Memory:</u> •Allocations of Frames •Thrashing •Memory-Mapped Files •Allocating Kernel Memory •Other Considerations Operating System Examples	<ul style="list-style-type: none"> • Read Chapter 8.5 – 8.11 • Review Lecture Presentations • Practice Self Review #9 • Bb Discussion # 5 – end
Week of Nov. 12 – Nov. 18	Module 11	<u>File-System Interface:</u> •File-Concepts •Access Methods •Directory and disk structure File Sharing	<ul style="list-style-type: none"> • Read Chapter 9 • Review Lecture Presentations • Practice Self-Review # 10 • Bb Discussion # 6 – start • Programming Problem 2 - Due
Week of Nov. 19 – Nov. 25	Module 12	<u>File System Implementation:</u> •File-system structure •Directory implementation •Allocation Methods •Free space management •Efficiency & Performance Recovery	<ul style="list-style-type: none"> • Read Chapter 10 • Review Lecture Presentations • Practice Self Review 11 • Bb Discussion # 6 – end • Programming Problem 3 - Out
Week of Nov. 26 – Dec. 02	Module 13	<u>Mass Storage Structure:</u> •Mass-Storage structure •Disk structure and attachment •Disk scheduling algorithms •Disk management RAID structure	<ul style="list-style-type: none"> • Read Chapter 11 • Review Lecture Presentations • Practice Self Review #12 • Bb Discussion # 7 - start
Week of Dec. 03 – Dec. 09	Module 14	<u>I/O Systems:</u> •Overview •I/O Hardware •Application I/O Interface •Kernel I/O Subsystem •Transforming I/O Requests to Hardware Operations	<ul style="list-style-type: none"> • Read Chapter 12 • Review Lecture Presentations • Practice Self Review #13 • Bb Discussion # 7 – end • Essay Due

Dates	Modules	Topics / Readings	Instructional Activities
		<ul style="list-style-type: none"> •STREAMS •Performance 	
Week of Dec. 10 – Dec. 16	Module 15	Review all the concepts, theories and implementations of operating systems.	<ul style="list-style-type: none"> • Review All Chapter • Review All Lecture Presentations • Practice Self Review 14 • Programming Problem 3 – Due
Week of Dec. 17 – Dec. 21	Final Exams	• End of Course	• Course Evaluation

STUDENT EVALUATION

The course has **(7)** seven Blackboard Discussions, **(3)** three Programming Assignments, **(1)** One Essay, **(1)** one Midterm exam, and a Final Exam. For practice and testing your understanding, The Course also includes Self-Review Exercise for each Module for practice. These Self-Review Exercises are **UNGRADED** activities. Letter grades are awarded based on the total number of points achieved. Points are deducted for late assignments.

Assignments	Total Points	Weight
7 Online Discussions – 40 pts each	280	28%
3 Programming Problems – 100 pts each	300	30%
1 Essay	120	12%
1 Mid Term	150	15%
1 Final Exam	150	15%
Total Points	1000	100%

Class Points	Letter Grade
96% and above	A
90% – 95.99%	A-
87% – 89.99%	B+
83% – 86.99%	B
80% – 82.99%	B-
77% – 79.99%	C+
73% – 76.99%	C
70% – 72.99%	C-
61% – 70.99%	D (Undergrad Only)
60.99% and below	E

Note: Grades lower than a “B” fall below the LTU graduate standard

EDUCATIONAL GOALS

Operating Systems course focuses on the core concepts that underlie contemporary operating systems. It introduces the structure and responsibilities of operating systems, discusses the cutting edge advanced in computing that are redefining operation systems, and addresses design considerations, such as performance, fault tolerance, security, modularity, and cost.

Typical topics include Operating System Architecture, Process Concepts and Management, Thread Concepts, Asynchronous concurrent Execution, Concurrent Programming, Deadlock and indefinite Postponement, Processor Scheduling Algorithms, Real Memory Organization and Management, Virtual Memory Organization and Management, Disk performance Optimization, and RAID, File systems, and case studies.

STUDENT LEARNING OBJECTIVES / OUTCOMES

Upon successful completion of *Operating systems course*, student will be able to:

1. Describe the major components of operating systems and its basic organization.
2. Describe the services an operating system provides to users, processes and other systems.
3. Explain the various ways of structuring an operating system.
4. Evaluate the various features of process management, including creation, termination, communication, notion of threads, CPU-scheduling algorithms, and the criteria for selecting a scheduling for a particular system.
5. Present both software and hardware solutions of the critical-section problem and explore classical problems in process synchronization.
6. Analyze various memory-memory management concepts and techniques, including demand paging, page replacement algorithms, segmentation and virtual-memory system.
7. Discuss file-system implementation strategies, and its design tradeoffs, including access methods, file sharing, locking, allocation algorithms and directory structures.
8. Explain the functions and the interfaces of file systems.
9. Discuss the principles and complexities of I/O hardware and their structures as well as the performance aspects of I/O hardware and software.
10. Apply operating system concepts and algorithms in the design and implementation of an operating system.
11. Examine, compare and contrast the design and implementation of current operating systems including Windows 7 and Linux.

PREREQUISITE SKILLS

- Student must have completed Basic Data Structure, and Computer Organization courses.
- Student must be able to write computer programs in C, C++, or Java
- Student must be willing and able to use MS Visual Studio C++ 2008 or 2010 for programming assignments.

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 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.wiley.com/college/silberschatz> 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 – For each module, assignments will be posted on the Blackboard with due dates.

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 Wimba classroom.
- I will promptly reply to your messages.
- 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.

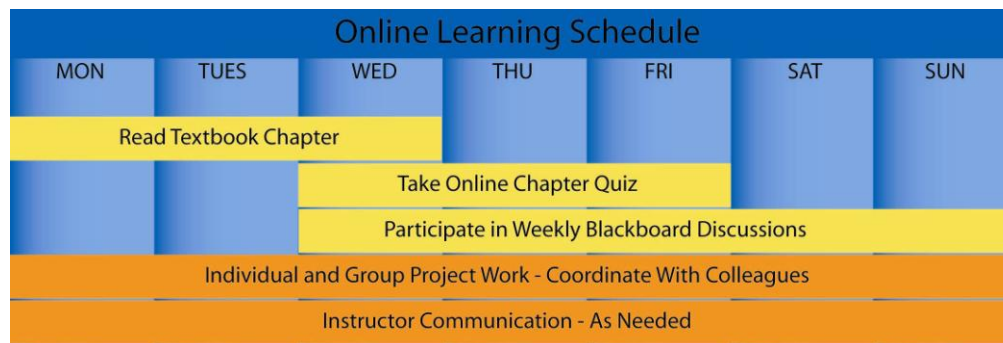
- I will treat all members of the class fairly, and will do my best to accommodate individual learning styles and special needs.
- If any of these points need clarification, or should special circumstances arise that require my assistance, please contact me so that we may discuss and resolve the matter.

PRACTICAL GUIDELINES FOR CLASS LOAD EXPECTATIONS

A three-credit course generally requires 10-12 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 140 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

Overview

This course features several Self-Review Exercises, Class Discussion, and Teamwork/Essay/Case Study, Homework, and Programming Problems/Projects activities.

Self-Review Exercises:

Each module contains self-review exercise that addresses important operating systems concepts. These exercises are ungraded activities; they are designed to enable you to test your knowledge, get immediate feedback and gauge your understanding of material. These exercises also help prepare you for the quizzes and exams. Some of the self-review exercises cannot be answered only from the material presented in their corresponding modules; these are additional teaching and learning opportunities.

Class Discussions:

- Class discussions are a fundamental part of individual student work (other individual work might include worksheets, essays, web assignments, etc.).
- Class discussions are intended to mimic discussions that take place in a brick and mortar classroom. Therefore, students are almost always expected to post a substantial initial response and to reply to contributions from other students and the instructor.
- **Your post and responses must be substantial and innovative contribution to the discussion**
- The minimum expectation for each Class Discussion is to post one quality Main Post and at least two quality-responses to others (others include your classmates and/or me).
- I will read each of your posts in these areas and will provide you with open-ended/ exploratory/ expanding responses.
- It's important that you to participate in each Class Discussion and Teamwork forum. Always proofread and spell check your posts.
- There will be **seven (7)** Bb discussions in the area of operating system. Each Class Discussion assignment is worth a total of 40 points (4% of the final grade). Earn up to 20 points for each initial post and up to 10 points for each response, depending on quality).

Teamwork/Essay/Case Study:

- **Your Essay must be substantial and innovative contribution**
- Essays must be formatted according to APA Document formatting protocol and organized according to "How to Organize your Essay" document (listed under Course Information.)
- There will be 1 teamwork/Essay/Case Study activity in the area of operating systems.
- Teamwork/Essay/Case Study assignment is worth a total of 120 points (12% of the final grade.) Earn up to 60 points for your participation/effort and up to 60 points for the deliverable (composition of your document and PowerPoint developed by you and/or your team, depending on quality).

Programming Assignments:

- Emphasize the concepts presented in the course using Java, Win32 APIs, or POSIX
- Simulate processes, threads, shared member and/or process synchronization.
- There will be 3 programming Assignments.
- Each programming assignment is worth of total of **100 points (10%** of the final grade):

Assignments' Due Dates

- Essay/Teamwork/case study Activity is published at the beginning of the week of **module 2** and due by the end of the week of **module 14**.
- Blackboard Discussions:

Homework	Published Date	Due Date	Grade Points	Grade Weight
Blackboard Discussion # 1	Beginning of Module # 01	End of Module # 02	40 pts	4%
Blackboard Discussion # 2	Beginning of Module # 03	End of Module # 04	40 pts	4%
Blackboard Discussion # 3	Beginning of Module # 05	End of Module # 06	40 pts	4%
Blackboard Discussion # 4	Beginning of Module # 07	End of Module # 08	40 pts	4%
Blackboard Discussion # 5	Beginning of Module # 09	End of Module # 10	40 pts	4%
Blackboard Discussion # 6	Beginning of Module # 11	End of Module # 12	40 pts	4%
Blackboard Discussion # 6	Beginning of Module # 13	End of Module # 14	40 pts	4%
TOTAL			280 pts	28%

- Programming Project Assignments:

Programming Assignment	Published Date	Due Date	Grade Points	Grade Weight
First Program	Beginning of Module # 04	End of Module # 07	100 pts	10%
Second Program	Beginning of Module # 08	End of Module # 11	100 pts	10%
Third Program	Beginning of Module # 12	End of Module # 15	100 pts	10%
TOTAL			300 pts	30%

Deliverables and Evaluation:

- Essays must be formatted according to APA Document formatting protocol and organized according to “How to Organize your Essay” document (listed under Course Information.)
- Teamwork/Essays/case studies are submitted via Bb. Word, Excel or Journal format is preferred; however I will accept text (txt, rtf).
- Programming Problem assignments are submitted by zipping the Visual Studio project folder (after deleting the debug folder) and submitting via Bb assignments.

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.