Syllabus for "Course 1-02-435: Distributed Algorithms for Network Communications"
Kinneret College on the Sea of Galilee
School of Engineering

Instructor: Michael J. May

Semester 2 of 5770

1 Course Details

The course meets **12:00pm** – **2:00pm** on Wednesdays. The Targil for the course is **2:00pm** – **3:00pm** on Wednesdays.

The course has **2** hours of lecture and **1** hour of Targil. The room for the course is Caravan 513. The room for the Targil is Computer Room 201 in the Sciences Building.

2 Prerequisites

The prerequisites for this course are "Course 1-02-431: Distributed Information Systems", "Course 1-02-327: Introduction to Networks", and "Course 1-02-218: Algorithms."

3 Overview

The course is a followup to previous courses on network communication and distributed systems. The goal of this course is to introduce a design and implementation study of *distributed algorithms*, where data, computation, and resources are distributed across a network. The course will take a formal approach to algorithmic analysis.

The topics for the course include some or all of the following:

Peer-to-Peer asynchronous network communication
Primitives and building primitive distributed algorithms
Data distribution algorithms
Request-Reply algorithms
Search and traversal algorithms
Breaking symmetry and election algorithms
Topology discovery
Routing
Building and maintaining trees
Synchronization
Fault tolerance and recovery
Proving correctness of distributed algorithms
Complexity of distributed algorithms

The material for the course is taken from a variety of sources, but mostly from the Tel book [1].

4 Lecture Schedule

The course lectures are structured in the following way. The relevant chapters the Tel (T) book is in the indicated columns. Material not covered well in the books may be supplemented from papers or other sources as shown in the O column. The column will be updated during the course of the semester to reflect supplemental information included during the course of the semester as time permits.

#	Date	Subject	T	O
1	3 March	Introduction and Graph Theory	1.1, 1.3.1, App A&B.1	
2	10 March	Graph Types, Intro to Models	B.1 – B.2, 2.1–2.1.1	
3	17 March	Comm. Models, Fairness, Inv.	2.1.2–2.3.3	
4	7 April	Wave algorithms	6.1, 6.2	
5	14 April	Traversal Algorithms	6.3	
6	21 April	Depth first search algorithms	6.4	
7	28 April	Comm. protocols (Balanced Sliding Window)	3.1	
8	5 May	Comm. protocols (Timer-based protocol)	3.2	
9	12 May	Routing algorithms 1	4.1, 4.2	
10	26 May	Routing algorithms 2	4.3, 4.4.1, 4.4.2	
11	2 June	Election algorithms 1	7.1, 7.2.1, 7.2.2	
12	9 June	Election algorithms 2	7.3.2–7.3.5, 7.4	
13	16 June	Termination-detection algorithms	8.1, 8.2.1, 8.3.1, 8.3.2, 8.4.1	
14	23 June	Snapshot algorithms	10	

Since this is an advanced course, students **are expected to come to class having read the material listed above in the lecture schedule**. Students who do not come prepared will find themselves at a significant disadvantage.

5 Quizzes

There will be (a maximum of) four in class short quizzes at the beginning of lectures during the course of the semester. The quizzes will take place from 12:00pm-12:10pm. There will be (a maximum of) one quiz during weeks 1–3, one between weeks 4–7, one between weeks 8–10, and one between weeks 11–14. The quiz material will come from the readings assigned for the lecture on which the quiz is given. Students will be told of the upcoming quiz **in class the week before the quiz**.

Students may skip or drop the grade of one of the quizzes without penalty.

Students who arrive in class after 1:10pm will not be given the opportunity to take the quiz.

5.1 Tentative Quiz Schedule

Quizzes will tentatively take place on the following dates and on the following material:

#	Date	Topic	Source
1	17 March	Graph Theory, Models	App B, 2
2	21 April	TBA	
3	12 May	TBA	
4	9 June	TBA	

The above dates may change during the course of the semester.

6 Assignments

There will be up to four assignments during the course of the semester. Each assignment can be done in groups of two (2) or three (3) students. More details of the projects will be distributed during the course of the semester.

7 Recitations

Since this is more formal course on algorithms and their analysis we will focus more on the review of material in the recitations. As appropriate some programming exercises may be introduced.

Recitations may include examples or proofs that students will do during the session. In all cases the material will not be graded and will not contribute directly to the final grade in the course.

8 Attendance

Students are responsible for all material presented in class, recitation, and laboratory sessions, all assigned readings, and all material provided for additional reading out of class.

Attendance of lectures and targil sessions is expected and required for this course. As per College policy, a student who misses 20% or more of the lectures of targil sessions may not be permitted to take the final exam. Attendance will be taken from time to time, but will not be taken directly into consideration in the calculation of the course grade. Students who miss lectures do so at their own risk and expense and will be expected to make up missed material on their own.

Students who know they will be missing two or more lectures due to circumstances beyond their control should inform the instructor as soon as possible before or after the fact to prevent misunderstandings or problems at the end of the semester.

Students who miss a lecture or targil are recommended to contact their classmates to get notes or find out what material was covered. The course syllabus and web page will also indicate the material covered and have the slide sets presented at all lectures.

8.1 Decorum

Students who attend lecture are expected to give their full attention to the material. Talking on cellular phones, text messaging, or other disturbing behavior will not be tolerated. Students who need to speak on the phone during lecture time or are expecting urgent messages *must* leave the classroom quietly, conduct their business, and return when they can participate fully in the class.

Students must arrive to lectures **on time, within the first 5 minutes of class.** As per college policy, the instructor reserves the right to expel from the classroom any student who enters more than 5 minutes late for lecture or who is disturbing others.

9 Submissions

9.1 How to Submit Work

To ensure timely submission of projects and work, students may only submit work via one of the following mechanisms:

- the Telem system
- in person
- via email to the course address: `ise435@gmail`

Materials sent via email to any other address risk being ignored or ungraded without consideration of their merits. Technical issues with the Telem software should be directed to the information technology support staff in Kinneret College who will address them in a timely manner.

9.2 Late Submission Policy

Students are expected to be on time with their project submissions and assignments. Each assignment must be turned in by the date it is due.

Each student may turn in **one** assignment up to 7 days late without penalty. Subsequent assignments will be assessed a 20% penalty for up to 4 days late and a 30% penalty for up to 7 days late. After 7 days, any assignment will be accepted with a 60% penalty until January 24, the last day of classes in the semester, until the solutions are posted on line, or any date announced by the instructor.

Students who are called up to Miluim duty will have their assignment deadlines extended in accordance with college policy.

10 Cheating

Cheating of any sort will not be tolerated. Student collaboration is encouraged, but within limits as set forth in the college's rules on academic integrity. Any students caught cheating will be immediately referred to the office of the Deacon and may receive a failing grade for the course.

Cheating includes:

- Copying information, content, or verbatim text to answer questions, solutions, or aid in programming projects from other students, internet sites, books (other than the ones listed in the bibliography), other other unaffiliated individuals.
- Copying source code **without attribution** from other students, **web sites**, online repositories, text books, open source programs, or other unaffiliated individuals.
- Other forms of academic misconduct as described on the site: `www.vpul.upenn.edu/osl/acadint.html` or as reasonably assessed by the instructor, program head, or deacon.

11 Exams

There will be a single exam at the end of the course. The final exam will be worth **60%** of the course grade and will be scheduled in accordance with the Mador Bechinot of Kinneret College. In accordance the School of Engineering rules, the final will be three (3) hours long, will cover all of the material in the course, and is a required element of the course grade.

12 Grading

Final grades will be calculated by combining grades from projects, laboratory assignments, and exams. The grades are weighted as follows:

4%	Quizzes
16%	Assignments
80%	Final exam

The instructor will not address questions about specific individual grades during the lecture or review sessions. Students may contact the instructor *in person* during office hours or after the lecture/review sessions at the instructor's convenience.

Students may request a regrade for exams or programming projects using the regrade request form found on the course web site. The instructor will regrade the entire item submitted, without prejudice to the grade previously assigned to it.

13 Books

The following book is used for the class: Tel [1].

The library has copies of the book, but students are encouraged to purchase the books as needed.

A bibliography of the books and articles used in the course of the semester is shown below.

14 Contact Information

Instructor:	Michael J. May
Email:	`mjmay@kinneret.ac.il`
Office Hour:	Wednesdays 11:00am – 12:00pm or by appointment

References

[1] Gerard Tel. *Introduction to Distributed Algorithms.* Cambridge University Press, Cambridge, UK, 2nd edition, 2000.