



LIBE 120: Foundations and Frontiers of Science

Fall-2023 Syllabus

Course Information				
Course Code	Course Name	Location	Time	Instructional Modality
LIBE 120	Foundations and Frontiers of Science	Multiple classrooms	Different times for different sections	Face to Face

Instructor Information	
Name:	Mohammad Shikakhwa and Onur Benli
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Course Assistant	
Name:	
E-mail:	
Office:	

GENERAL INFORMATION

Course Description (3+0+0) 3 Credits / 6 ECTS

Prerequisites

None

Course Objectives

The main objective of this course is to provide students with knowledge of the scientific methodology and critical thinking approach as applied by the scientists in their study of natural phenomena and through the analysis of their use in real life examples from different scientific disciplines. The course further aims to introduce students a general knowledge of the basic ideas and methodologies of some of the major theories in physics, biology, geology, neuroscience/psychology, and inculcate the scientific habits of mind.

Learning Outcomes

Upon successfully completing the course, students will be able to:

- 1. Identify the basic constituents and terminology of scientific knowledge,*
- 2. Apply methods of reasoning used by scientists,*
- 3. Analyze common logical fallacies and perceptual biases that interfere with the ability to draw reasonable conclusions,*
- 4. Discuss key theories, methodologies, and evidence from various scientific disciplines,*
- 5. Distinguish science from pseudoscience by scientifically evaluating a wide variety of extraordinary claims that are common in our culture today.*

Course Materials

Textbook(s):

There is no single textbook for the course.

Recommended Readings:

The readings for each week will be posted under the respective week at the course page at LMS.

Supplementary Materials:

Videos to be watched will also be posted to LMS when applicable.

Student Workload

6 ETCS means a TOTAL workload of approximately 150 hours

Planned Learning Activities and Teaching Methods

*In this course, we will learn by doing things ourselves in the class, not just by listening to the instructor. The whole course is based on this learning approach. The classes will be an environment where students work on a set of tasks prepared by the instructors where they **apply** and **extend** what has been presented by the lecturer **AND in the reading material/videos assigned to them.***

Part of the activities that the student will do in the class will be graded and contribute to the total grade of the course. Therefore, make sure you attend ALL classes.

ASSESSMENT METHODS

Exam(s)

- *We will have a midterm exam and a final exam in this course. The midterm will take place around week 8 and students will be responsible for the material covered up to that week. The final exam will cover the **whole course material**. A variety of questions types might be expected in these exams, ranging from short response questions, e.g. T/F, multiple choice, fill in the blanks and matching tasks to more reflective open-ended questions. The weights of the exams are given below.*
- *Short Assessments (2-3) will also be delivered during the semester; the date and time of these will be announced to the students beforehand.*

Assignment(s)

Various assignments will be given during the course, mainly in response to an assigned reading or video watching. Also, a task applying something that was discussed in class might be assigned for you to complete.

In Class Activities:

*The activities range from questions of the T/F or multiple choice types to tasks and worksheets that need to be completed with students working either individually or in groups. As mentioned earlier, parts of the activities that the student will do in the class will be graded and will contribute to the total grade of the course. Therefore, make sure you attend ALL classes. **Students who are inert in the workshops and are not participating in the activities will be warned, and if this behavior persists, will be given an FX grade.***

GRADING

The course grade will be based on the following:

	<u>Weight</u>
Midterm	20 %
Final Exam	40 %
In class tasks and assignments	20 %
Short Assessments	20 %
Total	100 %

Grade Evaluation Scale

The grading system used in this course will be shared with the students as the semester rolls on.

Make-up

Students missing the midterm or final exam with a valid excuse, e.g. a medical condition documented by an accepted doctor report will be given a makeup. There are no makeups for the quizzes; in case a student misses a quiz with a valid excuse he/she will have the quiz grade calculated based on the remaining quizzes he/she takes.

COURSE POLICIES

Professionalism

Students are expected to attend ALL the classes, participate in the activities during the workshops, and read/watch the assigned readings/videos prior to attending the classes.

Plagiarism / Academic Dishonesty

This course adheres to the academic honesty policy. I expect that all work submitted and presented by you will be your own original work and that the contributions of others will be openly acknowledged. Failure to adhere to this policy will result in disciplinary action. For more information:

- a. Plagiarism is a form of dishonesty that occurs when a person passes off someone else's work as his or her own. This can range from failing to cite an author for ideas incorporated into a student's paper to cutting and pasting paragraphs from different websites to handing in a paper downloaded from the internet. All are plagiarism.



- b. All parties to plagiarism are considered equally guilty. If you share your coursework with another student and s/he plagiarizes it, you are considered as guilty as the one who has plagiarized your work since you enabled the plagiarism to take place. Under no circumstances should a student make his/her coursework available to another student unless the instructor gives explicit permission for this to happen. Copying someone's work is an extreme and straightforward act of plagiarism. More commonly, however, students plagiarize without realizing they are doing so. This generally happens when a student fails to acknowledge the source of an idea or phrasing. Avoid plagiarism by citing sources properly! For all rules and requirements of APA citations, please consult the 7th edition of the Publication Manual of the American Psychological Association.
- c. Read the academic honesty contract (<https://student.tedu.edu.tr/en/student/principles-of-academic-integrity>). By signing this contract, you certify that you have read, understood and complied to agree with all rules and regulations of academic honesty.

Cheating

You may neither receive help from nor give help to others during an in-class exam. During exams, you may not leave the room, talk, or use dictionaries, translators, cell phones or programmable calculators. And please keep your eyes on your own work.)

Attendance

This course requires your regular participation, attendance, and punctuality. It is expected that you attend the class on a regular basis and be on time. It is your responsibility to keep in touch with the instructor about the emergencies prior to class. The TEDU policy concerning attendance will be followed strictly. Moreover, since parts of the activities that the student will do in the class will be graded and will contribute to the total grade of the course, make sure you attend ALL classes

Late Assignment Submission Policy

Each assignment is to be turned in on time. Arrangements for accepting late assignments will be made only in unusual circumstances (e.g., major illness, death of loved one), and only if you are able to provide documentation to support your excuse. In all other cases, there will be a 25% point-reduction per day for late work, and the assignment will not be accepted after three days late.

Extra Credit

There is no rewriting or extra credit offered in this course.

Class Participation

Each and every student **MUST** participate in the activities and the discussions of the class, in particular, during the workshop part of the classes. Discussions involving the whole class will follow or accompany the tasks. Students might work individually or in groups on these activities.

Class Readings

Please read the assigned articles or chapters prior to class and watch the videos posted to LMS so that you may participate fully in the course discussions. Occasionally, Reading/Video Watching drop tests will be conducted at the beginning of the classes without prior notice.

Student Support and Accommodation

Instructors will, generally, be available in their offices during office hours to provide further help and discuss any issues or difficulties that you might face . Please let us know if you want to come or try to come during the first 20 minutes of the office hour.

Students assistants (names and contacts will be shared with you in the first week of classes) will be available to help you with tasks and assignments and recite some parts of the material in case you need that. The schedule and places for the help desks will be shared with you during the first week of classes.

Announcements

All announcements will be made on the LMS site for this course. It is your responsibility to keep your e-mail address operative all times. Check your e-mails regularly in order to stay informed.



PLANNED COURSE SCHEDULE

Week	Date	Topic	Reading*
1		We will introduce the course and outline it. We will then discuss what is Science and the Scientific Method.	
2		We will review the abstracts of many original research articles to identify the methods that practicing scientists apply and understand that it differs the standard scientific method we discussed earlier. We will also define some key terms that appear in Science, e.g. Hypotheses, Theories and Laws; give examples of them from various disciplines and understand how to distinguish them.	
3-6		In these weeks, we will discuss a major defining activity of the scientific practice: Measurement. Since the outcome of measurement is mainly Data, we will discuss general methods for representing and analyzing data; mainly graphical methods. We will also touch on some key statistical concepts, mainly distributions and measures of center and spread.	
7-9		In these three weeks, we will learn the reasoning that scientists use in making inference from observations and measurements and in making judgements about scientific statements. We will introduce and practice Logic; deductive, inductive and abductive, and discuss fallacies. We will see how scientists apply logic to make inference. We will also discuss two statistical ideas used to infer relations from data; correlation and tests of significance.	
10		In this week, another key activity of the scientific practice will be discussed: Experimentation. We will seek general answers of why and how to carry our good experiments by considering and analyzing examples from various scientific disciplines.	
11-12		We will start by reviewing cell molecular biology (DNA structure and replication and protein synthesis) to set the stage for discussion of Evolution; its definition, evidence and mechanisms.	
13-14		We will discuss the geological structure of our planet earth, and the theory of plate tectonics followed by the mechanisms that lead to earthquakes and the propagation of earthquake waves in different media and its relation to the damage inflicted.	
14		In this last week, we will be closing by discussing the differences between science, non-science and pseudoscience as well as the limitations of science.	

*Reading materials and other resources will be posted weekly to LMS under the respective week. Please make sure to check before the beginning of each week.