

General Information – Fall 2020

Laboratory in Analytical Methods, 064326

5th semester

Lab 415, 4th floor

Mondays, 8:30-19:30, Thursdays, 12:30-13:30

Teaching Staff:

Instructor: Prof. Ayelet Fishman, Room 412, afishman@technion.ac.il

Office Hours: By appointment

TA's: posted on the Moodle website

Office Hours: By appointment

Prerequisites: Laboratory in Food Chemistry, Food Chemistry

Co-requisites: Food Analysis

Credits: 2 points

Study hours per 2 weeks: 5 lab hours, 8 preparatory hours, 6 semester assignments in total. Each lab will begin with an exam and result with a lab report. Students will also prepare an oral seminar.

Course Goals and Description

The aim of this course is to present to students basic methods in food analysis. The specific goals are:

- 1) To introduce methods for quantification of components in food
- 2) To compare different methods for analysis and the advantages/disadvantages of each
- 3) To compare experimental results with national standards
- 4) To become familiar with lab protocols and hands-on tools
- 6) To deliver a professional lecture on analysis methods in front of peers

The course is based on preparatory lectures (tirgul), lab experiments, and student seminars. Students are expected to read the respective chapters in the text books, as well as specific papers that will be provided in the course website. Students are expected to come prepared for the lab (compulsory) and attend peer seminars (compulsory).

Learning Outcomes

On successful completion of this course, students should be able to:

1. Measure and report the content of water, fat, proteins, sugars, antioxidants, caffeine in foods

2. Analyze an unknown oil sample and report the identity and chemo-physical status of the oil
3. Compare experimental results with national standards
4. Perform calculations and mathematical analyses of experimental results
5. Compare different methods of analysis and determine which method is suitable for a specific task
6. Perform quantitative analysis on GC-FID, HPLC, GCMS
7. Examine and report adulteration of ground meat, olive oil, and goat cheese

Assignments, Participation and Grading Procedures

Lab reports – 50%, preparatory exams – 20%, conduct and work in the lab – 10%, oral seminar – 20%. There is no final exam in the course.

Reports and seminar are in pairs.

- **Participation physically (!) in lab work and seminars is mandatory.**
- **Participation physically (!) in the opening lectures on the first week is mandatory (26.10.20).**
- **Tirgulim – it is advised to join in the teaching room but will also be recorded synchronically via zoom.**

We work according to the purple tag restrictions

The lab is not a pre-requisite to other labs or courses

Course Schedule (Topics, Assignments, Exams)

Topic	Weeks	Content	Homework
Introduction Safety in the lab	1	Course objectives, how to write lab reports, calculation of errors, safety procedures, MSDS	
Determination of water and starch	2-3	Determination of water by distillation, drying, Karl-Fischer, starch analysis with a polarimeter	#1
Lipid analysis	4-5	Lipid determination by Mojieniou, Soxhlet, free fatty acid content, iodine value	#2
Lipid analysis	6-7	Peroxide value, aldehyde analysis (TBA), refractive index, non-sponifiable content	#3
Meat analysis	8-9	Kjeldal method for protein content, nitrite determination, hydroxyproline content	#4
Immunochemical and instrumental methods	10-11	Adulteration of goat cheese and meat (ELISA), analysis of oils in GC-FID and GCMS, food preservatives in drinks using HPLC	#5
Antioxidants and caffeine in drinks	12-13	Measurement of salt in meat, quantification of caffeine and antioxidants in drinks	#6

Course Requirements & Course Policies

There will be 6 labs during the semester, working in pairs. Each lab will begin with a short exam on the lab procedures. Students must come prepared with flow sheets for the different protocols. A lab report will be handed within ~2 weeks after the lab (dates will be posted in the beginning of the semester). Failure to hand homework on time will result in "0" on the assignment. Copying is forbidden. Assignments that are identical will be graded as "0" and marked as "copied" and will be reported to the appropriate committee for misconduct in the Technion. You can work together, consult with each other, but must write your own assignment in pairs.

Attendance in the labs and seminars is compulsory.

Usage of any former slides, notes, or printed material is at your own risk and is not recommended. Slides and other materials change from year to year.

Text book(s) and/or other materials

Required text:

- Food Analysis: Theory and practice. 3rd Ed., Y. Pomeranz & C. E. Meloan, Chapman and Hall. 2000.
- Food Analysis, 3rd Ed. S. S. Nielsen, Aspen Publishers. 2003.
- Protocols and specific paper will be provided in the course website.

Academic Integrity

Any work submitted by a student in this course for academic credit will be the student's own work.

You are encouraged to study together and to discuss information and concepts covered in the lecture with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else.

During examinations, you must do your own work. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.