The Hashemite University

الجامعـــــة الهاشميـــــة

Deanship of Academic Development and International Outreach

عمادة التطوير الأكاديمي والتواصل الدولي

Syllabus*: Laboratory methods for analyzing and examining food components.

First Semester 2026 /2027

COURSE INFORMATION	
Course Name: Laboratory methods for analyzing and examining food components **Semester:** First semester **Department:** Department of Clinical Nutrition and Dietetics **Faculty: Applied Medical Sciences**	**Course Code: 2105021730** **Section:** 1 **Core Curriculum**: Compulsory
Day(s) and Time(s): Monday: 12:30-4:30 **Classroom:** **A.M.** 311	**Credit Hours:** 3 (2 Theory/2 practical) **Prerequisites**: None

COURSE DESCRIPTION

The course studies advanced chemical and biochemical laboratory techniques used in research as applied in nutrition and food science. Special emphasis is placed on the different chromatographic techniques, the use of isotopes, spectrophotometry, ELISA, PCR, and electrophoresis.

DELIVERY METHODS

The course will be delivered through a combination of active learning strategies. These will include:

- PowerPoint lectures and active classroom-based discussion
- Collaborative learning through small groups acting in an interdisciplinary context.
- Relevant films and documentaries
- Homework, and term paper.
- Video lectures
- Application in different labs in the practical part
- E-learning resources: e-reading assignments and practice quizzes through Model and Microsoft Team

FACULTY INFORMATION

Name	**Buthaina Mahmoud Alkhatib**
Academic Title:	**Assis.Prof.**
Office Location:	**1129-Groud Floor/ Faculty of A.M.S**

Telephone Number:	
Email Address:	
Office Hours:	**Sunday-Thursday** 11:00-12:00 *Please send an e-mail (**bkhatib@hu.edu.jo**) to meet at any other time.*

REFERENCES AND LEARNING RESOURCES

1- Required Textbook:

- **Nielsen,S S (editor). Food analysis, 2nd edition, Aspen Publication INC, USA. (1998),**
  P*rinciples of Instrumental Analysis*

There is no required textbook for purchase. All compulsory weekly readings are available electronically on Model.

Suggested Additional Resources: -

Useful Web Resources: original and review articles from google scholar, PubMed, ….

ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their Instructor to ensure that their individual needs are met. The University through its Special Need section will exert all efforts to accommodate for individual's needs.

Special Needs Section:
Tel:
Location:
Email:

STUDENT LEARNING OUTCOMES MATRIX*				
Core Curriculum Learning Outcomes	**Program Learning Outcomes**	**Course Objectives**	**Course Student Learning Outcomes**	**Assessment Method**
To promote independent creative problem-solving in the context of nutritional issues.	(KP1) Possess advanced and up-to-date information in the fields of therapeutic nutrition, diets, and food safety, according to the latest developments in scientific research.	1-To be familiar with food sampling for analysis 2- To gain a basic understanding of the chemistry and physical factors involved in chemical separations. 3- To become proficient in the use of chromatography for the quantitative analysis of compounds in food 4- To become familiar with the basic concepts of qualitative analysis of food samples using IR, NMR, and mass spectrometry	**A-Knowledge and Understanding** CLO1: list the general principles in food analysis CLO2:Understand the principles behind the analytical techniques CLO3: know the way to report results CLO4: Intellectual Analytical and Cognitive Skills. CLO5: Apply statistical principles for data evaluation. CLO6: Identify the methods used to determine food components such as vitamins, sugars..etc. CLO7: Identify the reasons of food components analysis **B- Skills** CLO8: Be able to write concise laboratory report. CLO9: Know methods of selecting the appropriate analytical techniques for a specific food component. **C-Competences**	EXAM ASSIGNMENT
	(KP2) Familiarity with advanced scientific research methodologies and creativity strategies.			
To review the scientific literature on therapeutic nutrition and food safety for practicing scientific writing.	(KP3) Demonstrate advanced knowledge of food safety principles and their application in managing foodborne diseases.			TERM PAPER
	(KP4) The ability to think critically in the field of therapeutic nutrition and food safety			
To prepare and support researchers who work on chronic illness prevention and treatment.	(SP1): Apply evidence-based nutrition and food safety information to resolve issues and apply advanced and integrated knowledge of food safety and nutrition-related health issues.			
To establish reputable nutrition departments in hospitals and other healthcare facilities.	(SP2): Design and implement innovative approaches for product development, quality control, and biological safety in food production			EXAM
	(SP3): Identify appropriate research methodology to evaluate food safety and nutrition-related medical issues.			CASE STUDY
To enhance experts and researchers in therapeutic nutrition and food safety for various academic institutions, research centers, and food plants.	(SP4): Write a professional and polished scientific report on therapeutic nutrition and food safety using appropriate mathematical/statistical techniques to analyze research problems.			
	(CP1): Continuous self-learning, self-assessment, and the ability to deal with and solve problems of a high degree of difficulty.			
	(CP2): Maintain ethical standards and best practices in research, product development, and public health initiatives related to nutrition and food safety.			
To help enhance food producers with experts in the field of product development,	(CP3): Demonstrate a high level of work ethic reflective of responsibility/commitment towards service to society based on validated study methodology for community-based nutritional status assessment.			EXAM

quality control, and biological safety.		5- To understand Transportation, handling, processing, record keeping, results, interpretation of results	CLO10: Be able to use library and internet pertaining to food analysis	
To disseminate food safety and nutrition-related information through a variety of tools, such as public and private business, marketing, and social media.	(CP4): Lead research and multidisciplinary projects on medical nutritional therapy and food safety, work within a team, evaluate its performance and contribute to professional knowledge.			
	(CP5): Establish and manage reliable nutrition and food safety programs in health facilities, public health organizations, and the food industry.			
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COURSE REGULATIONS

Participation

Class participation and attendance are important elements of every student's learning experience at Hashemite University, and the student is expected to attend all classes. A student should not miss more than 15% of the classes during a semester. *Those exceeding this limit of 15% will receive a failing grade regardless of their performance*. It is a student's responsibility to monitor the frequency of their own absences. **Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign-in; failure to do so will result in a non-attendance being recorded.**

In exceptional cases, the student, with the instructor's prior permission, could be exempted from attending a class provided that the number of such occasions does not exceed the limit allowed by the University. The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

Plagiarism

Plagiarism is considered a serious academic offense and can result in your work losing marks or being failed. HU expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behaviours that compromise his/her own integrity as well as that of Hashemite University.

Plagiarism includes the following examples and it applies to all student assignments or submitted work:

- **Use of the work, ideas, images or words of someone else without his/her permission or reference to them.**
- **Use of someone else's wording, name, phrase, sentence, paragraph or essay without using quotation marks.**
- **Misrepresentation of the sources that were used.**

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected

Late or Missed Assignments

In all cases of assessment, students who fails to attend an exam, class project or deliver a presentation on the scheduled date without prior permission, and/or are unable to provide a medical note, will automatically receive a fail grade for this part of the assessment.

- Submitting a term paper on time is a key part of the assessment process. Students who fail to submit their work by the deadline specified will automatically receive a 10% penalty.

Assignments handed in more than 24 hours late will receive a further 10% penalty. Each subsequent 24 hours will result in a further 10% penalty.

- In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with university regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.

Student Complaints Policy

Students at The Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

COURSE ASSESSMENT

Course Calendar and Assessment

Students will be graded using the following assessment methods. Their final grade will be calculated using the forms of assessment listed below, with their grade weighting taken into account. The criteria for grading are listed at the end of the syllabus.

Assessment	Grade Weighting	Deadline Assessment
Midterm exam	30%	***7-12-2026 Monday***
Term paper	15%	After midterm
presentation	15%	Continuous
Final Exam	40%	Based on the University calendar

Description of Exams

Test questions will primarily come from the material presented in the lectures. Semester exams will be conducted during the regularly scheduled lecture period. The exam will consist of a combination of multiple-choice, short answer, match, true-and-false, and/or descriptive questions.

Homework: Will be given for each chapter, while the chapter is in progress you are supposed to work on them continuously and submit them in the next lecture when I finish the chapter.

You are also expected to work on in-chapter examples, self-tests, and a representative number of end-of-chapter problems. The answers to self-tests and end-of-chapter exercises are given at the end of the book.

Quizzes: Unannounced quizzes will be given during or/and at the end of each chapter based on the previous lectures. It will enforce that you come prepared for the class.

No make-up exams, homework, or quizzes will be given. Only documented absences will be considered as per HU guidelines.

Grades are not negotiable and are awarded according to the following criteria*:

Letter Grade	Description	Grade Points
A+	Excellent	4.00
A		3.75
A-		3.50
B+	Very Good	3.25
B		3.00
B-		2.75
C+	Pass	2.50
C	Pass	2.25
C-	Fail	2.00

WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

Chapter 1	**Introduction And Sampling**	**Week 1**	**3 hours**
1.	Sampling: Sampling plane and statistical techniques in the validation of instrumental analysis.		
Chapter 2	**Spectrophotometer**	**Week 2 -6**	**15 hours**
2.1.	Visible spectrophotometry: Determination of enzymatic activity in milk and other food products		
2. 2.	Ultraviolet spectrophotometry: determination of tyrosine and tryptophan in different food samples.		
2. 3.	Flame photometry: Determination of Ca, Na, K in milk and other foods.		
2.4.	Atomic absorption spectroscopy: Determination of heavy metals, Ca, and Mg in milk.		
2.5.	Fluorometric assay: Determination of vitamin C in food.		
Chapter 3	**Chromatography**	**Week 7-10**	**12 hours**
3. 1	gas-liquid chromatography: determination of free fatty acids in oils and fats		
3. 2	Column chromatography: Separation and quantification of some natural pigments in food.		
3. 3	HPLC: Determination of water-soluble and fat-soluble vitamins.		
3. 4	Ion-exchange chromatography: Analysis of amino acids		
Chapter 4	**Electrophoresis**	**Week 11**	**3 hours**
4.	Electrophoresis: Whey protein electrophoretic mobility study.		
Chapter 5	**ELISA techniques**	**Week 12**	**3 hours**
5.	ELISA technique in food and nutrition applications		
Chapter 6	**PCR technique**	**Week 13**	**3 hours**
6.	PCR for GMOs determination		

Classroom Participation: Oral Presentation										
Element	**Excellent**		**Satisfactory**			**Needs Improvement**				***score***
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
Organization	▪ There is a logical sequence of information. ▪ Title slide and closing slide are included appropriately.		▪ There is some logical sequence of information. ▪ Title slide and closing slides are included.			▪ There is little or no logical sequence of information. ▪ Title slide and/ or closing slides are not included.				
Slide Design (text, colors, background, illustrations, size, titles, subtitles)	Presentation is attractive and appealing to viewers.		Presentation is somewhat appealing to viewers.			Little to no attempt has been made to make presentation appealing to viewers.				
Content	▪ Presentation covers topic completely and in depth. ▪ Information is clear, appropriate, and accurate.		▪ Presentation includes some essential information. ▪ Some information is somewhat confusing, incorrect, or flawed.			▪ Presentation includes little essential information. ▪ Information is confusing, inaccurate, or flawed.				
Language	▪ Spelling, grammar, usage, and punctuation are accurate. ▪ Fluent and effective		There are minor problems in spelling, grammar, usage, and/or punctuation.			▪ There are persistent errors in spelling, grammar, usage, and/or punctuation. ▪ Less or not fluent and effective.				
Delivery	▪ Ideas were communicated with enthusiasm, proper voice projection and clear delivery. ▪ There was sufficient eye contact with audience. ▪ There were sufficient use of other non-verbal communication skills. ▪ Appropriate delivery pace was used.		▪ There was some difficulty communicating ideas due to voice projection, lack of preparation, incomplete work, and/or insufficient eye contact. ▪ Insufficient use of non-verbal communication skills. ▪ Delivery pace is somewhat appropriate.			▪ There was great difficulty communicating ideas due to poor voice projection, lack of preparation, incomplete work, and/or little or no eye contact. ▪ No use of non verbal communication skills. ▪ Inappropriate delivery pace was used.				
Interaction with Audience	▪ Answers to questions are coherent and complete. ▪ Answers demonstrate confidence and extensive knowledge.		▪ Most answers to questions are coherent and complete. ▪ Answers somehow demonstrate confidence and extensive knowledge.			▪ Answers to questions are neither coherent nor complete. ▪ Is tentative or unclear in responses.				
Total score	***= (y*5/16)***									