

## Course Syllabus

1	Course title	Proteins in Nutrition
2	Course number	0603953
3	Credit hours (theory, practical)	3 theory
	Contact hours (theory, practical)	0 practical
4	Prerequisites/co requisites	Master level
5	Program title	Human Nutrition and Dietetics
6	Program code	031
7	Awarding institution	The University of Jordan
8	School	School of Agriculture
9	Department	Department of Nutrition and Food Technology
10	Level of course	Doctoral level
11	Year of study and semester (s)	Second semester 2019/2020
12	Final Qualification	PhD in Human Nutrition and Dietetics
13	Other department(s) involved in teaching the course	None
14	Language of Instruction	English
15	Date of production/revision	January 2020

### 16. Course Coordinator:

Office numbers, office hours, phone numbers, and email addresses should be listed.

**Prof. Mousa Numan Ahmad**

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Office No. 036

962-6-3550000-22412

Office hours					
Day/Time	Sunday	Monday	Tuesday	Wednesday	Thursday
Day	*	*	*	*	
Time	9-10	9-10	9-10	9-10	

### 17. Other instructors:

Office numbers, office hours, phone numbers, and email addresses should be listed.

### 18. Course Description:

An advanced study, based on the physiological and biochemical principles of protein digestion, absorption, metabolism and regulation; certain physiological, biochemical, and nutritional problems concerned with proteins and amino acids such as use of amino acids as supplement in health and disease; brief account of protein biosynthesis; study of various methods used in the nutritional evaluation of food proteins, taking into consideration human protein requirements.

## 19. Course aims and outcomes:

<b>A- Aims:</b>
<ol style="list-style-type: none"><li>1. Acquire an advanced knowledge of the physiological, molecular and biochemical transformation of proteins in man.</li><li>2. Develop a distinctive understanding of the metabolic interrelations/integration of proteins and their related compounds at the cellular level, and of the uniqueness of individual tissues and organs in metabolism.</li><li>3. Develop an advanced understanding of the homeostatic regulation of proteins and their related compounds cellular level.</li><li>4. Be able to relate the biochemical events proteins at the cellular level to physiological processes occurring in whole body.</li><li>5. Develop a distinctive understanding of dietary protein quality, methods of evaluation, nutritional and clinical applications.</li><li>6. Be able to relate nutritional and biochemical concepts of proteins to clinical situations.</li></ol>
<b>B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to:</b>
<p><b>A. Knowledge and Understanding:</b> Student is expected to</p> <p><b>A1-</b> Appreciate the basics of protein nutrition and biochemistry, emphasizing amino acid nutrition and their reactions and interactions and explanations of related physiological and clinical phenomena.</p> <p><b>A2-</b> Realize the concepts on which all metabolism is based including methods and approaches in metabolism, kinetics and thermodynamics.</p> <p><b>A3-</b> Describe the oxidative and degradative pathways of protein and amino acid metabolism, their control and integration in health and how failures of this integration explain a number of diseases and, hence how they can be treated.</p> <p><b>A4-</b> Know the metabolism of amino acids and how can be introduced into the metabolic scheme and examined from the standpoint of control and integration in health and disease.</p> <p><b>A5-</b> Understand the synthetic pathways of proteins and amino acids together with a range of clinical topics such as obesity, diabetes mellitus cardiovascular diseases and selected inborn errors of metabolism.</p> <p><b>A6-</b> Be familiar with unique metabolic profile of major body organ systems, mainly brain, muscle, liver and adipose tissue in relation to proteins and amino acids.</p> <p><b>A7-</b> Understand the integration of substrate/ amino acid metabolism in different body organs under normal and disease conditions, and how it is controlled by hormones and neurotransmitters.</p>
<p><b>B. Intellectual Analytical and Cognitive Skills:</b> Student is expected to</p> <p><b>B1-</b> Realize the essentials of structure, nomenclature and shorthand conventions for proteins and amino acids.</p> <p><b>B2-</b> Gain knowledge about the thermodynamic relations of the reactions in various metabolic pathways.</p> <p><b>B3-</b> Gain advanced knowledge of the various aspects in protein metabolic regulation, including allosteric interaction, enzyme sensitivity, hormones and compartmentation, as well as the general metabolic integration of the catabolic and anabolic pathways and their clinical correlations.</p> <p><b>B4-</b> Develop a distinctive understanding of dietary protein quality, methods of evaluation and nutritional and clinical applications.</p> <p><b>B5-</b> Appreciate the uniqueness of individual body tissues and organ systems in protein metabolism.</p>

**C. Subject- Specific Skills:** Students is expected to

**C1-** Describe the integrated metabolic pathways of proteins and amino acids, and how to pinpoint the metabolic defect(s) that occur(s) in protein and amino acid related diseases and, hence how they can be treated or managed.

**C2-** Identify, define and describe the tools that are available for studying and investigating the various topics of protein nutrition, and biochemistry in health and disease.

**C3-** Describe and design experiments that show the relation between dietary proteins and biochemical processes in the body, and how these processes can be disturbed by defective protein utilization.

**D. Transferable Key Skills:** Students is expected to

**D1-** Locate research literature related to normal and clinical protein nutrition, biochemistry and physiology, and how to interpret them with the advancement of knowledge in these fields.

**D2-** Critically evaluate information both of protein nutrition, biochemistry and disease, such as evaluating sources of facts, claims, doubts, bias, conflicts and assumption, and how to utilize them to open new avenues of research- develop a research problem or hypothesis for investigating a specific topic in protein nutrition and biochemistry.

**D3-** Gain essential skills to relate the body metabolic status with protein nutritional status.

**20. Topic Outline and Schedule:**

[Note: Topics usually vary depending on instructors, scientific perspectives, and student needs]

Topic	Reference	Week	Achieved ILO/s	Instructor
<ul style="list-style-type: none"> <li>• Introduction and General Review:</li> <li>- Proteins nutrition and metabolism.</li> <li>- Proteins in nutrition and Health.</li> <li>- Proteins and amino acids requirements.</li> <li>- Specialized proteins and amino acids.</li> <li>- Role of enzymes in metabolic function.</li> <li>- Role of proteins in communication &amp; transport</li> </ul>	1, 2	1 <sup>st</sup> - 3 <sup>rd</sup>	A1, A2, B1, B2	Prof. Mousa Ahmad
<ul style="list-style-type: none"> <li>• Nutrition and Metabolism of Proteins:</li> <li>- Chemistry, physiology and nutrition.</li> <li>- Structure and function of proteins.</li> <li>- Membrane structure and function.</li> <li>- Protein synthesis, translation and sorting.</li> <li>- Transdeamination and amino acid oxidation.</li> <li>- The urea cycle.</li> <li>- Molecules derived from amino acids.</li> <li>- Haeme metabolism,</li> <li>- NO synthesis and catecholamine biosynthesis.</li> <li>- Hormones: Physiology and metabolism.</li> <li>- Biosynthesis and degradation of nucleotides.</li> <li>- Nucleic acids: Structure and metabolism.</li> <li>- Uniqueness of individual organs and tissues.</li> <li>- Selected nutritional and clinical correlations</li> </ul>	1- 3	3 <sup>rd</sup> – 7 <sup>th</sup>	A3-A5, B2- B5, C1- C3,D1- D3	Prof. Mousa Ahmad
<ul style="list-style-type: none"> <li>• Protein Quality and Evaluation Methods:</li> <li>- Dietary protein quality: Concept and criteria.</li> <li>- Protein quality and human requirements.</li> <li>- Protein quality evaluation: Biological methods</li> <li>- Protein quality evaluation: Chemical methods.</li> <li>- Protein quality: Nutritional applications</li> </ul>	1- 3	7 <sup>th</sup> – 10 <sup>th</sup>	A1-A7, B4, B5, C3, D2, D3	Prof. Mousa Ahmad

<ul style="list-style-type: none"> <li>• Regulation of Protein Metabolism <ul style="list-style-type: none"> <li>- Metabolic control-Basic concepts.</li> <li>- Control mechanisms-Key enzymes and regulators.</li> <li>- Metabolism of individual tissues &amp;/ organs.</li> <li>- Control of protein metabolism</li> </ul> </li> </ul>	1- 3	10 <sup>th</sup> – 13 <sup>th</sup>	A3- A6, B2, B4, B5, C1- C3, D1-D3	Prof. Mousa Ahmad
<ul style="list-style-type: none"> <li>• Proteins in Nutrition and Health <ul style="list-style-type: none"> <li>- Protein-energy malnutrition.</li> <li>- Apolipoproteins• and cardiovascular disease.</li> <li>- Dietary proteins and gout.</li> <li>- Dietary proteins in relation to weight control.</li> <li>- Selected nutritional and clinical correlations.</li> </ul> </li> </ul>	1- 3	13 <sup>th</sup> – 15 <sup>th</sup>	A6, A7, B5, C3, D3	Prof. Mousa Ahmad
<ul style="list-style-type: none"> <li>• Overall Review and Presentations</li> </ul>	1-3	15 <sup>th</sup> - 16 <sup>th</sup>	A1-A7, B1-B5, C1-C3, D1-D3	Prof. Mousa Ahmad

## 21. Teaching Methods and Assignments:

<p>Development of ILOs is promoted through the following teaching and learning methods:</p> <p>a) <b>Assignments:</b> Each student is given several homework exercises in which he/she explores the literature through use of the library or the internet, and then writes a short report.</p> <p>b) <b>Learning Resources:</b> Related published literature, articles, reports of related organizations and institutes and use of documentation systems (e.g. use of journal systems of writing and publishing, and instructions to write course report and prepare oral presentation).</p> <p>c) <b>Learning/ Teaching Methods:</b> Lectures, group discussions and presentations for previously assigned topics, seminars and term papers of assigned topics by individual students (individual skills and self expression development).Teaching tools include: Slides, transparencies, power point, handouts, demonstrations and case study analysis.</p>
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## 22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:		
ILO/s	Learning Methods	Evaluation Methods
A. Knowledge and Understanding (A1-A7)	Lectures, discussions	Exams, assignments, home works, quizzes,
B. Intellectual Analytical and Cognitive Skills (B1-B5)	Lectures, discussions	Exams, assignments, home works, quizzes
C. Subject Specific Skills (C1-C3)	Lectures, discussions	Exams, assignments, home works, quizzes
D. Transferable Key Skills (D1-D3)	Project, Presentations	Project and presentation evaluation .

Evaluation	Point %	Date
Midterm Exam	30	
1 Assigned Quiz	10	
Course Project/ Presentation	20	
Final Exam	40	

### 23. Course Policies:

#### A- Attendance policies:

Students are expected to attend punctually all lectures and to participate in course assignments and activities as described in the course syllabus. A student's participation in the work of the course is a precondition for receiving credit for the course. However, in the case of absences, the university instructions and regulations will be applied. For only emergency absences accompanied by a written explanation of sickness from a physician (or other pertinent documentation related to the particular situation), a notice should be given to the instructor no later than 48 hours from the absence in order to make reasonable arrangements. A student missing 15% or more of the class meetings will be dropped from the class and will be given a grade of "failure for absences".

#### B- Absences from exams and handing in assignments on time:

Generally, in the case of absences, the university instructions and regulations will be applied. For only medically explained absences, a notice should be given to the instructor no later than the last class before the anticipated absence in order to make reasonable arrangements. In this case, a make-up assignments or presentation or exam will be arranged according to the university regulations.

#### C- Health and safety procedures:

The University of Jordan is committed to providing safe, healthy and supportive learning environments for all students which address their educational needs.

#### D- Honesty policy regarding cheating, plagiarism, misbehaviour:

Students are expected to be honest and forthright in their academic endeavours. To falsify the results of one's work, to steal the words or ideas of another, to cheat on an examination, to allow another person to commit, or assist another in committing an act of academic dishonesty, corrupts the essential process by which knowledge is advanced. In the case of dishonesty, cheating, plagiarism, and misbehaviour, the university of Jordan's instructions and regulations will be strictly applied.

#### E- Available university services that support achievement in the course:

The University of Jordan Library and Computer and Information Technology Centre.

### 24. Required equipment: (Facilities, Tools, Labs, Training....)

Lecture room, electronic facilities, audiovisual aids, smart boards, and library facilities.

### 25. References:

#### Required book (s), assigned reading and audio-visuals:

1. Devlin T.M. Textbook of Biochemistry with Clinical Correlations. New York: John Wiley, 2016-2018/ Latest edition.
2. Brody T. Nutritional Biochemistry. New York: Academic Press, Latest edition.
3. Martin O.W. *et. al.* Harper's Review of Biochemistry. California: Lange Medical Publications, Latest edition.

#### Recommended books, materials, and media:

4. Gropper SS, Smith JL & Groff JL. Advanced Nutrition and Human Metabolism. Wadsworth, Cengage Learning. Belmont, CA, USA, Latest edition.
5. Shils M.C., Olson T.A. & Shike M. Modern Nutrition in Health and Disease. Philadelphia: Lea and Febiger, Latest edition.
6. Stryer L. Biochemistry. New York: W.H. Freeman, Latest edition.
7. Rolfes S.R, Pinna K. and Whitney E. Understanding Normal and Clinical Nutrition. U.S.A: Thomson-Wadsworth, Latest edition.

8. Mahan LK, Escott-stump S & Raymond JL. Food and the Nutrition Care Process. Philadelphia: W.B. Saunders, 2018.

9. Bender DA. Introduction to Nutrition and Metabolism. London: Taylor and Francis, Latest edition.

10. Most Recent Nutritional Biochemistry Textbooks and Articles.

11. Selected Internet Sites :

1. [www.nutrition.org](http://www.nutrition.org)    2. [www.faseb.org/ascn](http://www.faseb.org/ascn)    3. [www.webmed.com](http://www.webmed.com)    4. [www.fda.gov](http://www.fda.gov)  
 5. [www.asns.org](http://www.asns.org)    6. [www.ilsa.org](http://www.ilsa.org)    7. [www.usda.gov](http://www.usda.gov)    8. [www.diabetes.org](http://www.diabetes.org)  
 9. [www.dietitians.ca](http://www.dietitians.ca)    10. [www.nas.edu](http://www.nas.edu)    11. [www.dietetics.com](http://www.dietetics.com)    12. [www.apha.org](http://www.apha.org)  
 13. [www.bda.uk.com](http://www.bda.uk.com)    14. [www.nse.org](http://www.nse.org)    15. [www.fao.org/food](http://www.fao.org/food)    16. [www.who.int](http://www.who.int)

**26. Additional information:**

Name of Course Coordinator: Prof. Mousa Numan Ahmad    Signature: \_\_\_\_\_    Date: 2/2/2020

Head of curriculum committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of curriculum committee/Faculty: ----- Signature: -----

Dean: ----- -Signature: -----