



الكيمياء الحيوية Biochemistry حلية العلوم

Course Syllabus

BIOC 314: Biochemistry of Nutrition

Fall semester 2021

Instructor	Dr. Wedam Alghazzawi	Sections	EAR, FAR, and FBR
Office	2-132	Office Hours	Sun and Tuesday: 1:00 pm to 2:00 pm Monday, Wednesday, and Thursday: 1:00 pm to 3:00 pm
E-mail	walghazzawi@kau.edu.sa	Class time	Sunday: Section EAR, 10:00 am to 10:50 am & Sections FAR & FBR, 11:00 am to 11:50 am Tuesday: Section EAR, 10:00 am to 10:50 am & Sections FAR & FBR, 11:00 am to 11:50 am
URL	http://walghazzawi.kau.edu.sa	Lab time	Ms. Hala Marzouki Tuesday: Section EAR, 11:00 am to 1:50 pm Tuesday: Section FAR, 8:00 am to 11:00 am Ms. Khadija Balubaid Thursday: Section FBR, 11:00 am to 1:50 pm
Classroom	Blackboard	Lab room	

Note: Appointments outside office hours can be arranged by e-mail. Please use only your KAU e-mail account and update it in your OdusPlus account.

I. COURSE DESCRIPTION:

The overall goal of the course is to study the six classes of nutrients essential for health (their food sources, digestion, absorption, transport, main roles, recommendations, deficiency symptoms and health effects). In addition, it aims to provide the basics of energy balance, weight control and designing a healthful diet.

II. COURSE PREREQUISITES

BIOC 231: Enzymes





III. COURSE MAIN OBJECTIVE:

By the end of the course the students will be able:

- Identify the six classes of nutrients essential for life.
- Describe the digestion, absorption, and transport processes that make nutrients in food available for use by the body.
- Recognize the food sources, main roles in the body and deficiency symptoms and diseases for each of the six classes of nutrients.
- Explain the positive and negative effects of nutrients on the body's health.
- Evaluate the health of body weight by calculating BMI, measuring body fat content and fat distribution pattern.
- Calculate the energy requirements for basal metabolism, physical activity, dietary thermogenesis and total needs.
- Analyze total energy and nutrients of a diet by using food composition tables and food analysis programs and then compare it with standards.
- Plan a healthy diet by using the six-basic diet-planning principles and the three tools (Saudi dietary guidelines, food labels and the healthy food palm). Perform different techniques of food analysis.

	Aligned PLOs	
1	Knowledge:	
1.1	Identify the six classes of nutrients essential for life	K1/K2
1.2	Describe the digestion, absorption, and transport processes that make nutrients in food available for use by the body	K5
1.3	Recognize the food sources, main roles in the body and deficiency symptoms and diseases for each of the six classes of nutrients	K2
2	Skills :	
2.1	Explain the positive and negative effects of nutrients on the body's health	S2
2.2	Evaluate the health of body weight by calculating BMI, measuring body fat content and fat distribution pattern	S2
2.3	Calculate the energy requirements for basal metabolism, physical activity, dietary thermogenesis and total needs.	S2
2.4	Analyze total energy and nutrients of a diet by using food analysis programs and then compare it with standards	\$3
2.5	Perform different techniques of food analysis	S1/S4
3	Competence:	
3.1	Plan a healthy diet by using the six-basic diet-planning principles and the three tools (Saudi dietary guidelines, food labels and the healthy food palm).	C3
3.2	Emphasize all learning outcomes	C2

IV. LEARNING OUTCOMES





V. ASSESSMENT METHODS:

- The exams will contain several types of questions such as MCQs, fill in the blanks, match, short answer questions, essay questions
- Assignments
- Non-graded take home assignments and exams
- Case study
- Practical examination

VI. COURSE TOPICS:

A. An overview of nutrition

- Food choices
- The nutrients
- Dietary Reference Intakes

B. Digestion and absorption

- Digestion
- Absorption
- The circulatory system
- The health and regulation of the GI tract

C. Carbohydrates

- The chemist view of carbohydrates
- Digestion and absorption of carbohydrates
- Glucose in the body
- Health effects and recommended intakes of sugar
- Health effects and recommended intakes of fibers

D. Lipids

- The chemist view of fatty acids and triglycerides
- The chemist view of phospholipids and sterols
- Digestion, absorption and transport of lipids
- Lipids in the body
- Health effects and recommended intakes of saturated fatty acids, trans fats and cholesterol
- Health effects and recommended intakes of monounsaturated fatty acids and polyunsaturated fatty acids





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E. Proteins

- The chemist view of proteins
- Digestion and absorption of proteins
- Proteins in the body
- Proteins in foods
- Health effects and recommended intakes of proteins

F. Water soluble vitamins

- The vitamins- an overview
- The main roles, deficiency symptoms, recommendations and food sources of each of the B vitamins
- The main roles, deficiency symptoms, recommendations and food sources of Vitamin C

G. Fat soluble vitamins

• The role in the body, deficiency, toxicity, recommendations and food sources of Vitamin A, Vitamin D, Vitamin K and Vitamin E.

H. Water

- Water balance and recommended intakes
- Blood volume and blood pressure
- Fluid and electrolytes imbalance

I. Major and trace minerals

- The main roles, deficiency symptoms and food sources for each of the essential trace minerals including sodium, chloride, potassium, calcium, phosphorus, magnesium and sulfate
- The main roles, deficiency symptoms and food sources for each of the essential trace minerals including iron, zinc, iodine, selenium, copper, manganese, fluoride, chromium and molybdenum





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VII. LAB COMPONENTS:

A. Determination of carbohydrates:

- Colorimetric determination of sugars in dates by using phenolsulphuric acid method
- Differentiation between starch in white and whole-wheat bread

B. Determination of lipids:

Determination of total lipids in food by Bligh and Dyer method

C. Determination of protein:

Determination of protein in food by Kjeldahl method

D. Determination of vitamins:

- Determination of vitamin C in foods by iodometric assay
- Determination of nicotinic acid in food

E. Determination of minerals:

• Determination of chloride content in cheese

F. Determination of water:

Determination of water content in cow's milk

G. Determination of food preservatives:

Determination of citric acid content in fruit juices

H. Energy balance and healthy body weights

I. Food composition tables

J. Planning a healthy diet:

- Principles of meal planning and food labels
- Saudi Dietary guidelines and the healthy food palm

VIII. TEACHING LEARNING STRATEGIES:

To do well, students should attend class and take very detailed notes. You should rely on your lecture notes. You will be responsible for everything covered only in lecture.

To get most out of the lectures, it is recommended you read the text before lecture, and then reread the text in more detail after the lecture to make sure you understand all concepts.





The lectures move quite rapidly, so reading the text before lecture will improve your comprehension. Always go over your lecture notes within a day of the lecture.

Reading and studying from the textbook are very important, and do not depend on the Power Point only.

IX. COURSE POLICIES

- Attendance is mandatory. Any student-missing class/classes will be counted absent and her absence will fall within the 25% absence range.
- Unexcused absences of 25% of the total number of lectures will lead to DN (i.e. not allowed to attend final exam). The study and exams regulations can be found at https://prod.kau.edu.sa/admission/Guides/STUDENT.PDF
- Ten minutes are marked late, and thirty minutes are counted as absent for that lecture.
- Grades in both lecture and laboratory are required to pass the course. Failure in either of these will result in failure of the course.
- It is the student's responsibility to make sure she is not missing any exam, quizzes or any other course class assignments. All students are responsible for work missed during their absence. The course instructor is NOT obliged to repeat her lecture or coursework missed by the student due to her absence.
- Any late/missed assignments will not be accepted after the due date, automatically resulting in a zero.

X. ACADEMIC INTEGRITY:

In academic work, you can share ideas with your course partners and classmates, but copying is not acceptable. It means you are responsible for submitting the assignment individually and writing using your own words. The plagiarized work will receive a zero grade for the assignment. Please read more about <u>avoiding plagiarism in scientific research</u>.

Indicator	Points
Periodical exam 1	15
Periodical exam 2	15
Practical exam	25
Case study report	8
Activity	2
Final exam	35
Total	100

XI. COURSE EVALUATION/GRADING



King Abdulaziz University Faculty of Science Department of Biochemistry



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XII. GRADING SCALE

XIII. TEXTS & MATERIALS

Required Textbooks:

Understanding Nutrition by E. Whitney and S. Rolfes (2018), 15th edition. Cengage Learning (USA).

Essential References Materials:

- Wardlaw's perspectives in nutrition by Carol Byrd-Bredbenner, Gaile Moe, Jaqueline Berning and Danita Kelley (2019), 11th edition .New York, NY
- Essentials of Nutrition & Diet Therapy by Sue R. Williams and Eleanor D. Schlenker (2016), 11th edition. Mosby, St. Louis
- Contemporary nutrition by A. Smith, and A. Collene (2015), 10th edition. McGraw-Hill (USA).
- Nutrition an Applied Approach by J. Thomson and M. Manore (2018), 5th edition. Pearson (USA)
- Krause's Food, Nutrition and Diet therapy by K. Mahan and S. Escott-Stump (2004), 11th edition. Saunders (USA).
- Nutrition Now by J. Brown (2017), 8th edition. Cengage (USA).
- Metabolism and Nutrition by A. Appleton and O. Vanbergen (2015), 4th edition. MOSBY ELSEVIER.

Electronic Materials

- Blackboard
- U.S. Department of Agriculture (USAD) (<u>https://www.usda.gov)</u>
- U.S Food and Drug Administration (FDA) (https://www.fda.gov)
- World Health Organization (<u>https://www.who.int</u>)
- Center for Disease Control and Prevention (<u>https://www.cdc.gov</u>)
- American society for nutrition (<u>https://nutrition.org</u>)
- The British Dietetics Association (<u>https://www.bda.uk.com</u>)
- American heart Association (<u>https://www.heart.org</u>)
- Saudi Society for Food and Nutrition (<u>http://ssfn.org.sa/en/)</u>

Wedam Alghazzawi





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Other Learning Materials

Different food analysis programs such as food processor, NDSR,....etc.

XIV. COURSE PLAN

Week #	Date 1442	Торіс	References		
1	11/115/1	Course introductory	-		
2	18/122/1	An overview of nutrition	Chapter 1		
3	25/129/1	Digestion and absorption	Chapter 3		
4 & 5	3/27/2 10/214/2	Carbohydrates	Chapter 4		
6	17-2-1442	Exam 1 (15X)	Chapters 1,3, and 4		
6 & 7	17/221/2 24/228/2	Lipids	Chapters 5		
8&9	1/35/3 8/312/3	Proteins	Chapter 6		
10 & 11	15/319/3 22/326/3	Water soluble vitamins	Chapter 10		
11	24-3-1442	Exam 2 (15X)	Chapters 5,6 and 10		
12	29/34/4	Fat soluble vitamins	Chapter 11		
13	7/411/4	Water	Chapter 12		
14	14/418/4	Major and trace minerals	Chapters 12 and 13		
Final aroma (25V)					

Final exams (35X)