Department of Fish Resources

College of Agriculture

University of Salahaddin

Subject: Biochemistry

Course Book – (Year 2)

Lecturer's name Dr. Nawal H. Sebo

Academic Year: 2023/ 2024

Course Book

1. Course name	**Cheese &Dairy Fermented Products processing] (Theory)**
2. Lecturer in charge	**Nawal Hurmiz Sebo**
3. Department/ College	**Agriculture/ Food Technology**
4. Contact	**e-mail - nawal.sebo@su.edu.krd :** **Tel: 07504451952**
5. Time (in hours) per week	**Theory: 2 + Practical: 6**
6. Office hours	**Sunday + Monday 9:30-12:00am**
7. Course code	
8. Teacher's academic profile	**M.Sc . 1987 , Ph.D. 2008 in food chemistry with excellent experience in different area of food technology subjects , Lecturing different subjects in food technology department for under graduate students, post graduate , assisting in laboratory sections teaching(Food Chemistry ,Dairy Chemistry Industrial Enzymes ,Cheese and Dairy Fermented product Technology ,Food and Dairy Science and Technology ,Biochemistry)and supervising many post**

	graduate thesis . **Participating in different activities in the college of Agriculture from administrational point of view and supervising the implementation of some dairy processing plants.**
9. Keywords	**This course is a natural continuation of a course in biochemistry, but the material is m** **The basic goal is to establish a connection between different macromolecules through t** **of them inequalities and feasible region. Some topics are water & its relation with the b** **molecules, carbohydrates, lipids, proteins, nucleic acid, also some knowledge about enz** **coenzymes.**

10. Course overview:

. The more general objective of this course is to continue providing a deeper understanding and working knowledge o

biochemistry, while in the process strengthening analytical skills increasing student's ability to communicate structur

macromolecules with their physiological functions, making them comfortable with reading and understanding their d

& subdivion of these substances & chemical structure own and continuing to develop their appreciation for abstract b

11. Course objective: The topics listed in the syllabus will be covered in the lectures. The students will be asked to stu
the lectures at home. To get the best of the course it is suggested that the students attend classes as much as possible. I
are for supporting not for submitting the reading material try as much as possible to participate in classroom prepari
assignments given in the course.

12. Student's obligation
1- Attendance at lectures and labs is required.

2-The student will write notes on their notebook which are written on whiteboard besides the lecture on the

data show.

3-Every lecture have a quiz.

13. Forms of teaching

1- Data show, 2-Power point , 3- White board

14. Assessment scheme
Course content is assessed through two written examinations and class participation with an emphasis on problem solving related to real life situations that one may encounter in the food industry and written report. Teamwork is critical to the project and grading. Grades will count as below:

Time	theoretical	Practical

During semester	**20**	**15**
Participation Conservation and activity, quizzes	**5**	
Final	**40**	**20**

15. Student learning outcome:

1-: Students will demonstrate knowledge of the major core concepts in biomolecules.-

2Students will be able to describe the fundamentals of living cell components.

3- Students will be able to explain, analyse and evaluate scenarios related to various biomolecules.

4-The students will also be capable of using research literature on the subjects and analyzing. situations in which the cheese and dairy fermented products processing principles may be utilized.

5-Understand the relationship between this subject and human life and health.

16. Course Reading List and References:

1• Thomas M .Devlin ,Text book of biochemistry ,sixth edition (2006).
2• Pattabiraman T.N.P ,Text book of biochemistry(2002) 3. Stryer ,biochemistry(2005).

17. The Topics:

	Title of the Subject	Lecture's name
1st	**Definition of Biochemistry Cells & their biological structure , physical & chemical properties of water , body water & its distribution**	**Dr.Nawal H. Sebo**
2nd	**Carbohydrates , Amonomers & polymer , types of polymer Classification of carbohydrate, monosaccharisdes contain a single polyhydroxy aldehyde or ketone (e.g., glucose, fructose). • Disaccharides consist of two monosaccharide units linked together by a covalent bond (e.g., sucrose). • Oligosaccharides contain from 3 to 10 monosaccharide units (e.g., raffinose)**	**Dr.Nawal H. Sebo**
3rd	**Forms of monosaccharides: 1- L & D isomers 2- Pyranose & furanose ring 3- α & β anomers 4- Epimers 5- Deoxy sugars 6-**	**Dr.Nawal H. Sebo**
4th	**Important disaccharides with their properties- Sucrose ,lactose & maltose**	**Dr.Nawal H. Sebo**
5th	**Polysaccharids: starch , amylose , amylopectin ,**	**Dr.Nawal H. Sebo**

6th	**Glycogen , cellulose , Lipids, Chemical Structure of lipids , classification of fats & Oil, axes**	**Dr.Nawal H. Sebo**
7th	**Reaction of fats & oil ,Complex Lipids ,Phospholipids, Glycolipids , Lipoprotein , Steroid**	**Dr.Nawal H. Sebo**
8th	**Lipid deterioration**	**Dr.Nawal H. Sebo**
9th	**Proteins , peptides , amino acids , Structures of amino acids**	**Dr.Nawal H. Sebo**
10th	**protein structure**	**Dr.Nawal H. Sebo**
11th	**Classification of proteins**	**Dr.Nawal H. Sebo**
12th	**Enzymes nomenclature ,chemical nature , factor affected enzyme activity**	**Dr.Nawal H. Sebo**
13th	**Enzyme function and Kinetic**	**Dr.Nawal H. Sebo**
14th	**Nucleic Acids, structure**	**Dr.Nawal H. Sebo**

18. Practical Topics (If there is any)

The Topics:	Lecturer's name

In this section The lecturer shall write titles of all practical topics he/she is going to give during the term. This also includes a brief description of the objectives of each topic, date and time of the lecture

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19. Examinations:

Q1\ Choose the BEST answer to the question by writing the appropriate letter.

1-Which of the following molecules or substances contain fatty acids?

E. All of the above.

2-Which of the following molecules or substances contain nitrogen as the main element?

C. Amino Acids

3- Which vitamin is derived from cholesterol?

C. D

4. Which of the following monosaccharides is not an aldose?

C. Fructose

5- Which of the following is an epimeric pair?

A. D-Glucose and D-Mannose

6-Which of the following monosaccharides rotate polarized light to a in the anti-clockwise.

C. Fructose

7- Which of following is an anomeric pair?

C. α-D-Glucose and β -D-Glucose

8-When the linear form of glucose cyclizes, the product is an:

B. Hemiacetal.

9. Starch and glycogen are both polymers of:

A. α -D-Glucose.

10- Which of the following is a choline containing lipid?

A. Phosphatidyl tri-methyl ethanolamine

Q2\ Define Seven of the following: **(14 marks)**

Racemic mixture, ,

Raffinose,

Mirror images isomers ,

Sphingosine ,

Tributyrin ,

Sphingomyelin ,

Cephaeline ,

Xylitol,

Anomers.

Q3/ Write the structure for Six of the following: - **(18 marks)**

Maltose, Lecithin , Myricylpalmitate, α-D-glucose-6-phosphate , C18:allcis $\Delta^{9,12,15}$, Gluconic acid, Mannitol, Triglyce

Q4/ A-what are the Functions of lipids? **(6 marks)**

B- what are the differences between?

1-Fats, Oils and Waxes. **(9 marks)**

2-Amylopectin and glycogen. **(6 marks)**

3-Ribose and Deoxyribose. **(6 marks)**

Q5\ A-Found the number of possible isomers of the following sugar depending on their structure. **(12 marks)**

Glucose, Dihydroxy acetone, Glyceraldehyde, Ribulose.

B-Match these molecules to their biological roles. **(9 marks)**

1. Carbohydrate storage in plant	**A. Sucrose**
2. Structural component of plant cell walls	**B. Starch**
3- Disaccharide	**C. Amino sugars**
4. Exoskeleton of crustaceans	**D. Cellulose**
5. components of glycolipid	**E. Omeg-3**
6- Moroctic acid	**F- Chitin**

Q1\ Choose the BEST answer to the question by writing the appropriate letter. (20 marks)

1-Which of the following molecules or substances contain fatty acids?

A. Glycerolphospholipids B. Beeswax C. Triglycerides D. Sphingolipids

E. All of the above.

2-Which of the following molecules or substances contain nitrogen as the main element?

A. Starch B. Cellulose C. Amino Acids D. Triglycerides

E. no one of the above

3- Which vitamin is derived from cholesterol?

A. A B. B12 C. D D. K E. E

4. Which of the following monosaccharides is not an aldose?

A. Ribose B. GLucose C. Fructose D. Glyceraldehyde E. Erythrose

5- Which of the following is an epimeric pair?

A. D-Glucose and D-Mannose B. D-Lactose and D-Maltose

C. α-Maltose and α- Cellobiose D. L-Mannose and L-Fructose

E. D-Glucose and L-Glucose

6-Which of the following monosaccharides rotate polarized light to a in the anti-clockwise.

A. Xylose B. Glucose C. Fructose D. Dihydroxy acetone E. Mannose

7- Which of following is an anomeric pair?

A. D-Glucose and L-Glucose **B. D-Glucose and D-Fructose**

C. α-D-Glucose and β -D-Glucose **D. α-D- Glucose and β-L- Glucose**

E. D-Glucose and L-Fructose

8-When the linear form of glucose cyclizes, the product is an:

A. Glycoside. B. Hemiacetal. C. Anhydride. D. Lactone. E. Oligosaccharide.

9. Starch and glycogen are both polymers of:

A. α -D-Glucose. B. β -D-Glucose. C. Glucose-1-phosphate. D. Sucrose. E. Fructose.

10- Which of the following is a choline containing lipid?

A. Phosphatidyl tri-methyl ethanolamine **B. Phosphatidylglycerol**

C. Phosphatidylserine **D. Phosphatidylethanolamine** **E. Tristearin**

Q2\ Define Seven of the following: **(14 marks)**

Racemic mixture, , Raffinose, Mirror images isomers , Sphingosine , Tributyrin , Sphingomyelin , Cephaeli
Anomers.

Q3/ Write the structure for Six of the following: - **(18 marks)**

Maltose, Lecithin , Myricylpalmitate, α-D-glucose-6-phosphate , C18:allcis $\Delta^{9,12,15}$, Gluconic acid, Mannitol, Triglyce

Q4/ A-what are the Functions of lipids? **(6 marks)**

B- what are the differences between?

1-Fats, Oils and Waxes. **(9 marks)**

2-Amylopectin and glycogen. **(6 marks)**

3-Ribose and Deoxyribose. **(6 marks)**

Q5\ A-Found the number of possible isomers of the following sugar depending on their structure.
(12 marks)

Glucose, Dihydroxy acetone, Glyceraldehyde, Ribulose.

B-Match these molecules to their biological roles. **(9 marks)**

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2. Structural component of plant cell walls	**B. Starch**
3- Disaccharide	**C. Amino sugars**
4. Exoskeleton of crustaceans	**D. Cellulose**
5. components of glycolipid	**E. Omeg-3**
6- Moroctic acid	**F- Chitin**

20. Extra notes:

Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.

21. Peer review **پێداچوونەوەی هاوەڵ**

This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.

(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).

یت لهلایهن هاوهڵێکی ئهکادیمیهوه سهیر بکرێت و ناوهرۆکی بابهتهکانی کۆرسهکه پهسهند بکات و جهند ووشهیهک بنووسێت لهسهر شیاوی ناوهرۆکی
ی لهسهر بکات.
که زانیاری ههبێت لهسهر کۆرسهکه و دهبیت پلهی زانستی له مامۆستا کهمتر نهبێت.