1	**Course title**	Advanced Cereal Chemistry
2	**Course number**	603726
3	**Credit hours (theory)**	3
	Contact hours (theory)	3
4	**Prerequisites/corequisites**	
5	**Program title**	Food Science and Technology
6	**Program code**	037
7	**Awarding institution**	University of Jordan
8	**School**	Agriculture
9	**Department**	Nutrition and Food Technology
10	**Level of course**	graduate
11	**Year of study and semester (s)**	---------
12	**Final Qualification**	M.S.
13	**Other department (s) involved in teaching the course**	None
14	**Language of Instruction**	English
15	**Date of production/revision**	June./2020

16. Course Coordinator:

Office numbers, office hours, phone numbers, and email addresses should be listed.
074/ Office Hours, TBA Tel. Land. 22408/0777498806/ayedamr@ju.edu.jo

17. Other instructors:

None

18. Course Description:

This three credit hour course covers in depth the chemical , physical and functional properties of the chemical constituents of cereals with emphasis on wheat including carbohydrates, proteins, lipids and pigments . It covers their interactions and roles in the production of the various cereal foods as well as their effects on some properties like hardness, and milling behavior. Such phenomena as gelatinization, retrogradation, swelling, and bread staling are discussed. The course covers the amino acid analysis and protein fractionation techniques and profiles of cereals and relates them to their

rheological , nutritional and biological properties including wheat allergins. Role of enzymes in cereal processing is also discussed.

19. Course aims and outcomes:

A- Aims:

After completing this course, the student should be able to:

1. Explain the physical, chemical and functional of wheat products.
2. Become familiar with wheat proteins, lipids and carbohydrates with respect to their fractions, isolation and roles in bakery products .
3. Explain the effects of wheat constituents on the physical properties of wheat and rheology of its flour and dough.
4. Choose the right method for analysis of the various wheat constituents.
5. Understand the nutritional properties of wheat constituents.

6-Solve the nutritional problems caused by the major wheat allergens.
7- Enumerate wheat enzymes and detail their mode of action.

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to

A-Knowledge and Understanding: Student is expected to
A1- Appreciate the importance and aims of wheat chemistry.
A2- Explain the roles cereal enzymes play in their products.

B. Intellectual Analytical and Cognitive Skills: Student is expected to
B1- Explain the relationship between the different cereal components and the quality of their products.

B2- Manipulate the components of cereal foods to obtain new products with high quality.

C. Subject- Specific Skills: Students is expected to
C1- Explain such phenomenon as swelling, gelatinization, retrogradation and others.

C2- relate them to changes in cereal foods during processing or storage including bread staling.

C3- Discuss, in a scientific way, the chemical nature of the cereal components.

D. Transferable Key Skills: Students is expected to
D1- Know how to analyze cereal components.
D2-Establish a cereal laboratory.
D3- Design and conduct a scientific experiment in the area of cereal chemistry and interpret its results.

20. Topic Outline and Schedule:

ILOs: Learning and Evaluation Methods

ILO/s	Learning Methods	Evaluation Methods
Knowledge and understanding (A1-A2)	Lectures, discussions	Exams, Presentations.
Intellectual and cognitive skills (B1-B2)	Discussions, reading homework.	Projects, exam presentation
Subject specific skills (C1-C3)	Project, discussion	presentation
Transferable key skills (D1-D3)	Projects, term paper	presentation

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Review of wheat grain anatomy and components.	**1**	Ayed Amr	A1	Quiz	Ref. 1
Review of wheat milling, and baking.	**2-3**	Ayed Amr	A1,A2	Quiz	Ref.1
Cereal starches, the granule, retrogradation and gelatinization	**3**		A1,A2	Quiz	Ref.3&4
Non-starch polysaccharides. Cellulose, hemicelluloses, and pentosans.	**4-6**	Ayed Amr	B1,B2	Quiz	Ref.3&4
Midterm Exam		Ayed Amr		1hour exam.	
Lipids and pigments	**7**	Ayed Amr	B2	Homework.	Ref.3

in wheat and wheat flour.					
Lipid classes, extraction and quantification	**8-9**	Ayed Amr	C1,C2,D1,D2	Quiz .	Ref.2&3
Cereal Proteins	**10-11**	Ayed Amr	C1,C3, D1,D2	Quiz	Ref.3,5**&6**
Cereal enzymes, amylases, proteases, and lipoxygenase.	**11-13**	Ayed Amr	C2,C3,D1,D3	Quiz	Ref.3&5
Rheology of cereal products	**14-15**	Ayed Amr			2,3&5

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods: The course will be structured in lectures and discussions and project. The course comprises overviews, from general understanding to expert knowledge on key topics, and learning based on lectures as well as independent learning.

22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements: Quizes , Exams, Lab. Reports, Problem Sets.

23. Course Policies:

A- Attendance policies: according to university rules. B- Absences from exams and handing in assignments on time: Make up is given in case of absence with valid excuses. Late assignments are not accepted. C- Health and safety procedures: According to college and department measures. D- Honesty policy regarding cheating, plagiarism, misbehaviour : University Rules. E- Grading policy: Midterm=30, Semester Activities:30, Final=40. F- Available university services that support achievement in the course: Classrooms, Audio-visuals .

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

Internet, data show and library

25. References:

1- Kent, N, and Evers, A. 1994. Kent,s Technology of Cereals. 4th edition. Pergamon Press. London.

2- Koehler,P, and Wieser H. 2013 . Chemistry of Cereal Grains. In Handbook on Sourdough Biotechnology, Springer.

3- Pomeranz, Y. 1988. Wheat Chemistry & Technology. 3rd edition. AACC. Saint Paul, MN. USA. Vol. 2.

4- Radly, J. 1986. Starch and its Derivatives. 4th. Ed. Chapman and Hall.London.

5- Šramkováa, Z, Gregováb,E, Šturdíka, E. 2009. Chemical composition and nutritional quality of wheat grain. Acta Chimica Slovaca, Vol.2, No.1, 115 - 138

6- Cauvain, S. and Young,L. 2007. Technology of Breadmaking, Second Edition, Springer.

26. Additional information:

- Concerns or complaints should be expressed in the first instance to the module lecturer; if no resolution is forthcoming, then the issue should be brought to the attention of the module coordinator (for multiple sections) who will take the concerns to the module representative meeting. Thereafter, problems are dealt with by the Department Chair and if still unresolved the Dean and then ultimately the Vice President. For final complaints, there will be a committee to review grading the final exam.
- For more details on University regulations please visit: http://www.ju.edu.jo/rules/index.htm

Name of Course Coordinator: Ayed S. Amr Signature:  Date: June/2020

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

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

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

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