

Course Syllabus

1	Course title	Carbohydrate Chemistry
2	Course number	0603725
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/ Master
11	Year of study and semester (s)
12	Final Qualification	Master of Science in Food Science and Technology
13	Other department (s) involved in teaching the course
14	Language of Instruction	English
15	Date of production/revision	June/7/2020

16. Course Coordinator: Prof.Ayed Amr, Ph.D.

Office number:074
Office hours: TBA.
Phone numbers (office: 22408, Mobile: 0777498806)
Email address: ayedamr@ju.edu.jo.

17. Other instructors:

None

18. Course Description:

the course discusses the chemistry of sugars with respect to structure , nomenclature, isomerization, ring forms and functional properties. Reactions of carbohydrates , their analysis as well as the major oligo and polysaccharides are also discussed. The course also deals with the chemistry of starch and gums as well as their derivatives , types and applications. The nutritional importance of some carbohydrate foods are highlighted throughout the course.

19. Course aims and outcomes:

Learning Objectives

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

1. Explain the main reactions of carbohydrates .
2. Become familiar with carbohydrate types and classes.
3. Know how to derive different starch-based compounds .
4. Know how to apply starch and gums in the food industry.
5. Identify the nutritional roles starch and gums play in human health.

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

Intended Learning Outcomes (ILOs):

Successful completion of the course should lead to the following outcomes:

A. Knowledge and Understanding: Student is expected to

- A1- Understand the basic theories of carbohydrate stereochemistry .
- A2- Know the basics of carbohydrate reactions.
- A3- Know the genesis of simple carbohydrates.
- A4- Understand the composition of complex carbohydrates.
- A5- Become familiar with the terminology of carbohydrate chemistry.
- A6- understand the modification of starch.

B. Intellectual Analytical and Cognitive Skills: Student is expected to

- B1- Solve problems related to carbohydrates.
- B2- Design an experiment in carbohydrate chemistry.
- B3- Interpret results of carbohydrate analysis.
- B4- Find references about food carbohydrates.

C. Subject- Specific Skills: Student is expected to

- C1- Learn how to extract and purify carbohydrates.
- C2- Learn how to synthesize carbohydrates.
- C3- Solve a technical problem related to a food item using carbohydrates.

D. Transferable Key Skills: Student is expected to

- D1- Use carbohydrates in food formulation.
- D2- Apply carbohydrates in food processing.
- D3- Protect foods from the carbohydrate spoilage.
- D4- Assay for carbohydrates in a food system.

20. Topic Outline and Schedule:

ILOs: Learning and Evaluation Methods

ILO/s	Learning Methods	Evaluation Methods
Knowledge and understanding (A1-A3)	Lectures, discussions	Exams, Presentations.
Intellectual and cognitive skills (B1-B3)	Discussions, reading homework.	Projects, exam presentation
Subject specific skills (C1-C3)	Project, discussion	presentation
Transferable key skills (D1-D4)	Projects, term paper	presentation

Course Contents (Instructor Prof. Ayed S. Amr, Ph.D.)

Content	Reference	Week	ILO/s	Evaluation
Monosaccharides(Structure and Nomenclature,Isomerization , Ring forms, Glycosides and Functions)	1,3	1 and 2	A1-A3	Quiz, Structural Model
<i>First Term paper Assignment</i>		<i>Due date: 5th week</i>		<i>Assigning Topics</i>
Carbohydrate reactions (Oxidation of the aldehydo groups , Anomeric and Nonanomeric Hydroxyl groups)	1	2,3	A1-A3, B1	Short Assignments
Oligosaccharides(Maltose, Lactose, Sucrose, Isomaltose, Fructoligosaccharides and others)	1,2	4,5	A1-A3, B1	Quiz
<i>Project</i> <i>Project Assignment</i>		<i>Due 11th week</i>		
Polysaccharides (Structure and modification)	1,3	5	A1-A3, B1	Presentation
Polysaccharide Properties(Water sorption, Glass transition, Solubility, Gum dissolution, Properties and Reology of Polysaccharide solutions, Gels and Gums	1	6,7	A1-A3, A5 A4, C1-C3	Short Assignment
Mid Term Examination		8		1 hour exam
Starch and its products(Granules, Amylose, Amylopectin, Gelatinizing and cold water swelling, Retrogradation and Staling, Resistant Starch, Starch Enzymes, Production of Syrups, Modified Starches, Starch Encapsulation and Manufacture)	1,4	8,9,10	B2-B4, C1-C3	Short Assignment
<i>Due Date for first term paper,</i>		<i>8</i>		Presentation of Term Paper
Cellulose(Powdered and other	2	11,12	B2-B4, D1-	Group

Cellulose Products).			D4	Discussion
Gums, Inulin and Alginates.	2	13	D1-D3, C3, D2, D3	Discussion
Carbohydrates in Nutrition(Glycemic load, response, index and impact, Dietary Fiber, Bulking Agents and Fat Mimetics)	2	14,15	D2-D3, C3, D2, D3	Group Discussion
Due Date for project		16		Presentation of Product
Final Exam	2			2 hour Exam.

21. Teaching Methods and Assignments:

Learning Methodology: The course is structured in lectures, group discussions, seminars term papers and projects.

22. Evaluation Methods and Course Requirements:

Evaluation

Evaluation	Point %	Date
Midterm Exam	30	7 th week
Projects	15	As indicated in syllabus
Term papers	15	As indicated in syllabus
Final Exam	40	15 th week

23. Course Policies:

A- Attendance policies: University Rules and Regulations are Applied.

B- Absences from exams and handing in assignments on time: only legal and verified excuses are accepted.

C- Health and safety procedures: Normal procedures.

D- Honesty policy regarding cheating, plagiarism, misbehaviour : University Rules and Regulations

are enforced.

E- Grading policy: 60% for Term Activities and 40% for Final Exam.

F- Available university services that support achievement in the course: Class rooms and audio visuals are available

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

None

25. References:

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

- 1- Be Miller, J. 2007, Carbohydrate Chemistry for Food Scientists.
AACC, Saint Paul, Mn,USA(**Text**).
- 2- Coultate, T.,2008, Food , the Chemistry of its Components. Royal Society of Chemistry.London.UK.
- 3- Shallengenger, R. and Birch, G. 1975. Sugar Chemistry. AVI. West Port, CT.
- 4- Different Articles from Die Starcke.

Recommended books, materials, and media:

- 1- Different Articles from Die Starcke.

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/7/2020

Head of curriculum committee/Department: _____ Signature: _____

Head of Department: _____ Signature: _____

Head of curriculum committee/Faculty: _____ Signature: _____

Dean: _____ -Signature: _____