

## Course Syllabus

1	<b>Course title</b>	Processing of Fruits and Vegetables
2	<b>Course number</b>	633448
3	<b>Credit hours (theory, practical)</b>	3 hrs (2 theory, 1 practical)
	<b>Contact hours (theory, practical)</b>	2 hrs/ wk and 3 hrs/ wk for practical
4	<b>Prerequisites/corequisites</b>	603341
5	<b>Program title</b>	Food Science and Technology
6	<b>Program code</b>	042
7	<b>Awarding institution</b>	The University of Jordan
8	<b>School</b>	Agriculture
9	<b>Department</b>	Department of Nutrition and Food Technology
10	<b>Level of course</b>	3 <sup>rd</sup> year
11	<b>Year of study and semester (s)</b>	2020
12	<b>Final Qualification</b>	BSc
13	<b>Other department (s) involved in teaching the course</b>	NA
14	<b>Language of Instruction</b>	English and Arabic
15	<b>Date of production/revision</b>	March, 2020

### 16. Course Coordinator:

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

**Prof Maher Al-dabbas**

### 17. Other instructors:

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

Dept head office, Ex. 22422 email; [m.aldabbas@ju.edu.jo](mailto:m.aldabbas@ju.edu.jo)

Office hrs: every day not determine according to courses given

### 18. Course Description:

As stated in the approved study plan.

The course includes such topics as nutritive value, quality, and postharvest physiology of fruits and vegetables and their products. Regulation of ripening; fruits and vegetables postharvest physiological, pathological and entomological disorders and their relation to quality. Harvesting, grading and packaging of fruits and vegetables as well as their storage and handling requirements. Common processing techniques are discussed such as canning, drying, freezing and concentrating. Some of the above processing techniques will be performed on some local fruit and vegetables in the practical part of this course.

**19. Course aims and outcomes:**

<p>A- Aims:</p> <ol style="list-style-type: none"> <li>1. To acquire a basic knowledge of in the field of fruit and vegetable processing</li> <li>2. To acquire a basic understanding of agriculture sector and processing of fruits and vegetables is of vital importance</li> <li>3. To develop an essential understanding of the scope of fruit and vegetable processing in the country or in any other Arab states.</li> <li>4. To acquire a fundamental background of the methods of fruit and vegetable processing.</li> <li>5. To practice the methods and techniques of fruit and vegetable processing at laboratory scale, and to evaluate the student`s produce in each lab.</li> </ol> <p>B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to</p> <p><b>A. Knowledge and Understanding:</b> Student is expected to</p> <p><b>A1-</b> Describe the contribution of the various source of fruits and vegetables to the human Intake of the needed nutrients.</p> <p><b>A2-</b> Describe the activities of respiration, transpiration, ethylene production ....etc of fruits and vegetables and factors affecting them.</p> <p><b>A3-</b> Determine indicators of ripening and senescence processes and factors affecting them.</p> <p><b>B. Intellectual Analytical and Cognitive Skills:</b> Student is expected to</p> <p><b>B1-</b> Choose the most appropriate method for the fruits and vegetables processing and preservation.</p> <p><b>B2-</b> Select, store, prepare and handle fruits and vegetables appropriately.</p> <p><b>B3.</b> Effect of processing techniques and ingredients on the quality of final products.</p> <p><b>C. Subject- Specific Skills:</b> Students is expected to</p> <p><b>C1-</b> Understand differences in food quality resulting from variations in preparation and/or ingredients.</p> <p><b>C2-</b> Determine indicators of ripening and senescence processes and factors affecting them</p> <p><b>C3-</b> Get familiar with the harvesting process, to indicate the importance of grading and to distinguish the different types and benefits of packaging of fruits and vegetables.</p> <p><b>C4-</b> Differentiate between the different types of fruit and vegetables disorders i.e. physiological, entomological and pathological in terms of causes and disadvantages</p> <p><b>D. Transferable Key Skills:</b> Students is expected to</p> <p><b>D1-</b> Understand the features as well as the benefits and limitations of several types of storage operations available for fruits and vegetables.</p> <p><b>D2-</b> Evaluate the quality of processed fruits and vegetables using sensory methods.</p> <p><b>D3-</b> Develop a detailed understanding of the different fruit and vegetable preservation techniques and practice them i.e. carry out experiments of canning, freezing, drying, pickling, vinegar, juice and squash making as well as describe processes needed to perform the above tasks.</p>
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**20. Topic Outline and Schedule:**

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
<p><b>-The nutritive value of fruit and vegetables and factors affecting their quality:</b></p> <p>*World and national production of fruit and vegetables, postharvest losses, nutritive values of fruit and vegetables</p> <p>* Preharvest factors affecting fruit and</p>	1 <sup>st</sup> and 2 wks	Prof. Maher Al-Dabbas	A1 and B1	Discussion	<p>1.Salunkhe, D.; Bolin, H.and Reddy,N.(1991). Storage, Processing and Nutritional Quality of Fruits and Vegetables, Vol. I. Fresh Fruits and Vegetables;</p> <p>2. Processed Fruits and vegetables VII.2<sup>nd</sup> · CRC Press, Inc, Boston</p>

vegetables quality: cultivars, environmental factors, light, location, ripening					
Freezing of fruits and vegetables and processing of frozen cauliflower and apples with some exercises on refrigeration and freezing load	1 <sup>st</sup> and 2 <sup>nd</sup> wk practical lab.	Prof. Maher Al-Dabbas	D1 and C1	Quiz and assignments	Ministry of Agriculture, Fisheries and Food (UK). Refrigerated storage of fruit and vegetables. Her Majesty's Stationery Office, London
- <b>Post harvest physiology of fruit and vegetables</b> *Introduction, changes after harvesting, developmental stages and physico-chemical changes * Respiration and some important aspects, climacteric and non-climacteric fruit and vegetables, ethylene production, transpiration losses, chilling injury	3 <sup>rd</sup> , 4 <sup>th</sup> and 5 <sup>th</sup> wks	Prof. Maher Al-Dabbas	A2, B1, B2, B3, C1, D2	Discussion and feedback	1. Salunkhe, D.; Bolin, H. and Reddy, N. (1991). Storage, Processing and Nutritional Quality of Fruits and Vegetables, Vol. I. Fresh Fruits and Vegetables; 2. Processed Fruits and vegetables VII.2 <sup>nd</sup> . CRC Press, Inc, Boston
Canning of fruits & vegetables and processing of date paste and green beans	3 <sup>rd</sup> and 4 <sup>th</sup> wk practical	Prof. Maher Al-Dabbas	C1, D2, A1	Discussion	Jongen, W. (2002). Fruit and vegetable processing. Woodhead Publishing Limited, Cambridge, England.
- <b>Harvesting, grading and packaging of fruit &amp; vegetables</b> *Introduction (description and situation), harvesting and handling (problems, cooperation, operations in the packing house), packing (containers, dumping), sorting *Grading, quality indices, packaging (advantages, objectives and specifications, packaging technology achievements,	6 <sup>th</sup> , 7 <sup>th</sup> and 8 <sup>th</sup> wk	Prof. Maher Al-Dabbas	A2, A3, B1, B2, B3, C1, C2, D3	Quiz	1. Salunkhe, D.; Bolin, H. and Reddy, N. (1991). Storage, Processing and Nutritional Quality of Fruits and Vegetables, Vol. I. Fresh Fruits and Vegetables; 2. Processed Fruits and vegetables VII.2 <sup>nd</sup> . CRC Press, Inc, Boston

palletization and premarketing treatments) *Packaging standardization of fruit and vegetables and the ISO models: packaging material, the box ISO model and its subsizes, the three main versions, loading and stabilizing pallets, air transport, sea transport					
Processing of dates jelly and preserves	5 <sup>th</sup> and 6 <sup>th</sup> wk practical	Prof. Maher Al-Dabbas	C1, D2, A1	evaluation sheet for each lab	Current literature such as papers presented in International symposium on processing of fruit and vegetables.
<b>Sensory and objective quality evaluation of fruit and vegetables</b> *Definition of quality of fruit and vegetables, attributes being used for quality evaluation minimum standards and systems of grading, minimum requirements for entering the international markets *Classes of quality for fruit and vegetables, quality measurement methods(subjective and objective), non-destructive quality evaluation(maturity, sorting machines, defects	9 <sup>th</sup> and 10 <sup>th</sup> wk	Prof. Maher Al-Dabbas	A1, A2, A3, B1, B2, B3, C1,C2 D3	Assignment	1.Salunkhe, D.; Bolin, H.and Reddy,N.(1991). Storage, Processing and Nutritional Quality of Fruits and Vegetables, Vol. I. Fresh Fruits and Vegetables; 2. Processed Fruits and vegetables VII.2 <sup>nd</sup> . CRC Press, Inc, Boston
- Processing of juices, concentrates and squashes	8 <sup>th</sup> and 9 <sup>th</sup> wk	Prof. Maher Al-Dabbas	A2, B1, B2, B3, C1,C2 D1, D2, D3	evaluation sheet for each lab	Nelson, P. E. and Tressler, D. K. (1980). Fruit and vegetable juice processing technology.
<b>Minimally processed fruit and vegetables(MPFV)</b> * Introduction and definition, physiological responses, microbiological concerns *Product preparation, packaging, modified atmospheres, and handling, quality	11 <sup>th</sup> and 12 <sup>th</sup> wk	Prof. Maher Al-Dabbas	A1, A2, A3, B1, B2, B3, C1,C2, D1, D2, D3	Midterm exam	. 1.Salunkhe, D.; Bolin, H.and Reddy,N.(1991). Storage, Processing and Nutritional Quality of Fruits and Vegetables, Vol. I. Fresh Fruits and Vegetables; 2. Processed Fruits and vegetables VII.2 <sup>nd</sup> . CRC Press, Inc, Boston

of MPFV, Jordanian practice with regard to MPFV					
Dehydration of fruits and vegetables	10 and 11 <sup>th</sup> wk	Prof. Maher Al-Dabbas	A2, B1, B2, B3, C1,C2 D1, D2, D3	evaluation sheet for each lab	Woodroof, J. and Luh,B.(1986). Commercial Fruit processing,2nd edition Champan& Hall, London
<b>Storage of fruit and vegetables</b> *Advantages and objectives of storage, undesirable changes due to improper storage, factors to be considered for successful storage *Types of storage - natural storage: in-soil, underground, ventilated, ice refrigeration - artificial storage: mechanical refrigeration storage, controlled and modified atmosphere storage, vacuum storage, subatmospheric storage, radurization	13 <sup>th</sup> , 14 <sup>th</sup> and 15 <sup>th</sup> wk	Prof. Maher Al-Dabbas	A1, A2, A3, B1, B2, B3, C1,C2, D1, D2, D3	Discussion	- 1.Salunkhe, D.; Bolin, H.and Reddy,N.(1991). Storage, Processing and Nutritional Quality of Fruits and Vegetables, Vol. I. Fresh Fruits and Vegetables; 2. Processed Fruits and vegetables VII.2 <sup>nd</sup> · CRC Press, Inc, Boston
Pickling of fruits and vegetables	12 <sup>th</sup> and 13 <sup>th</sup> wk	Prof. Maher Al-Dabbas	A2, B1, B2, B3, C1,C2 D1, D2, D3	evaluation sheet for each lab	Woodroof, J. and Luh,B.(1986). Commercial Fruit processing,2nd edition Champan& Hall, London
Processing of vinegar from dates	14 <sup>th</sup> and 15 <sup>th</sup> wk	Prof. Maher Al-Dabbas	A1, A2, A3, B1, B2, B3, C1,C2, D1, D2, D3	evaluation sheet for each lab	Downing, D. L. (1989). Processed apple product. Van Nostrand Reinhold, New York.
Scientific visit to an outstanding fruit and vegetables processing plant	16 <sup>th</sup> wk	Prof. Maher Al-Dabbas	A2, B1, B2, B3, C1,C2 D1, D2, D3	Discussion	Woodroof, J. and Luh,B.(1986). Commercial Fruit processing,2nd edition Champan& Hall, London

## 21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

**Lectures and discussion with assignments strengthen through practice (laboratories related to each topic). Creative thinking through questions given during lectures and ability of solving and analysing problems related to each topic.**

## 22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

**Exams, Quizzes and ability to analyze problems using on the spot questions or requirement of assignments.**

## 23. Course Policies:

A- Attendance policies: **Attendance sheet for each lecture and each lab.**

B- Absences from exams and handing in assignments on time: **Make up if there is an official excuse, assignment not accepted after specified date.**

C- Health and safety procedures: **Well seated without any drink on lecture**

D- Honesty policy regarding cheating, plagiarism, misbehavior: **Subjected to students punishment committee**

E- Grading policy: **According to average and University policy**

F- Available university services that support achievement in the course: **Requested before the course and available or provided on request.**

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

**Suitable lecture room and well equipped lab. with its needed tools, and training in suitable organization related to the field of study at graduation time .**

## 25. References:

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

**References available in library, text and handled sheets, movies related to specific subjects may be provided**

Recommended books, materials, and media:

**1. Salunkhe, D.; Bolin, H.and Reddy,N.(1991). Storage, Processing and Nutritional Quality of Fruits and Vegetables, Vol. I. Fresh Fruits and Vegetables;**


**2. Processed Fruits and vegetables VII.2<sup>nd</sup>. CRC Press, Inc, Boston**

**Other References**

1. Jongen, W. (2002). Fruit and vegetable processing. Woodhead Publishing Limited, Cambridge, England.
2. Woodroof, J. and Luh, B. (1986). Commercial Fruit processing, 2nd edition; Chapman & Hall, London.
3. Luh, B. and Woodroof, J. (1988). Commercial vegetable processing, 2nd edition; Chapman & Hall, London.
4. Downing, D. L. (1989). Processed apple product. Van Nostrand Reinhold, New York.
5. Goodenough, P. W. and Atkin, R. K. (1981). Academic Press, London.
6. Nelson, P. E. and Tressler, D. K. (1980). Fruit and vegetable juice processing technology. 3rd edition, AVI publishing Company, Westport, Connecticut.
7. Ministry of Agriculture, Fisheries and Food (UK). Refrigerated storage of fruit and vegetables. Her Majesty's Stationery Office, London.
8. Current literature such as papers presented in International symposium on processing of fruit and vegetables.

**26. Additional information:**

None

Name of Course Coordinator: Prof Maher Al-Dabbas. Signature:  Date: 1<sup>st</sup> March., 2020

Head of curriculum committee/Department: Prof Maher Al-Dabbas. Signature: 

Head of Department: Prof Maher Al-Dabbas Signature: 

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

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