



LANDMARK UNIVERSITY, OMU-ARAN

## COURSE COMPACT

**COLLEGE:** Science and Engineering  
**DEPARTMENT:** Biological Sciences  
**PROGRAMME:** Biochemistry

### Course

Course code: BCH 317

Course title: Food Biochemistry

Credit unit: 2 units

Course Status: Compulsory

### Lecturers Data

**Name of the lecturer:** Dr. A.F. Olaniran, Mrs. T.D. Olaolu

**Qualifications obtained:** Ph.D; M.Sc

**Department:** Biological Sciences

**College:** Science and Engineering

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**Office Location:** Room 141, First floor, Old College building.

**Consultation Hours:** Mon - Wed (1 – 2pm).

### INTRODUCTION TO THE COURSE

#### Course Description:

*This course explains in detail the methods for determining food constituents both physical and chemical, the techniques involved in the processing, preservation and storage of traditional foods. This course also exposes students to the concept of food poisoning, intoxication and its prevention and cure.*

#### Course Justification:

*Food is an important aspect of life that is important for survival, biochemists need to understand their role in the processing, preservation and storage of traditional foods in order to ensure the good health of individuals.*

#### Course objectives

At the end of this course, students should be able to:

- *Describe the physical and chemical methods for determining the constituents of food*
- *Explain in detail the techniques involved in processing, preservation and storage of traditional foods*

- *Explain the concept of food poisoning, intoxication as well as its prevention and cure.*

**Course Content:**

*An introduction to the theory and application of physical and chemical methods for determining the constituents of food. Processing, preservation and storage of traditional foods – root and stem tubers, fruit and fruit drinks, seeds and grains, greens and vegetables. Food poisoning and intoxication, prevention and cure.*

**Course Expectations:**

*This course is compulsory for Biochemistry 300 level students.*

S/N	GRADING	SCORE(%)
1.	<b>Continuous Assessments</b>	
	• C.AI	7%
	• C.AII (Mid-Semester Test)	15%
	• C.AIII	8%
2.	<b>Assignment</b>	10%
3.	<b>Practical (Laboratory work)</b>	
4.	<b>Final Examination</b>	60%
5.	<b>Total</b>	100

**Course Delivery Strategies:**

- *Face to face learning (Both lecture method and student-centred learning)*
- *Self-directed learning (Assignments, Continuous assessments)*

**Course Duration**

- *Two hours per week for 15 weeks (30hours)*

# LECTURE CONTENT

- **Week 1:** Introduction to the theory and application of physical methods for determining the constituents of food

- **Objectives**

The students at the end of the lectures for the week should be able to

- *list the physical methods of foods analysis*
- *describe the physical methods of analysis of foods.*

➤ **Description**

First hour: Introduction of the course and topic

Second hour: Enumeration and description of the physical methods for determining food constituents

➤ **Study Question:**

- Highlight the physical methods for determining food constituents

**Reading List:**

- Callanan A (Eds.). (2000). *Food and Nutrition handbook, Italy*. World Food Programme.
- Chutani AM (2006). *Nutritional biochemistry; Nutrition and dietary habits*. Retrieved from [www.nsdlniscair.res.in/jspui/bitstream/123456789/586/1/Nutritiondietary.pdf](http://www.nsdlniscair.res.in/jspui/bitstream/123456789/586/1/Nutritiondietary.pdf)
- Grade 12 Active healthy lifestyles, Module C: Nutrition. Retrieved from; [http://www.edu.gov.mb.ca/k12/cur/physhlth/frame\\_found\\_gr12/rm/module\\_c.pdf](http://www.edu.gov.mb.ca/k12/cur/physhlth/frame_found_gr12/rm/module_c.pdf)
- Wang D, Lin H, Kan J, Liu L, Zeng X, Shen S (Eds). (2012). *Food Chemistry*. New York: Nova Science Publishers Inc.
- FAO (2003). *Food energy – Methods of analysis and conversion factors*. Food and Agriculture organization of the United Nations, Rome.
- Nielsen S.S. (2010). *Food Analysis Laboratory Manual, Food Science Texts Series*, © Springer Science+Business Media. DOI 10.1007/978-1-4419-1463-7\_4,

**Week 2**

**Topic: The chemical methods for determining the constituents of food**

**Objectives:** at the end of the lecture, students should be able to

- Describe the chemical methods for carbohydrate, protein, fats and ash analysis.
- Enumerate the laboratory instruments for the chemical analysis of these food constituents.

**Description**

First hour: Description of the chemical methods for analysis of carbohydrates and fats

Second hour: Description of the chemical methods for analysis protein and ash

➤ **Study Questions:**

- Enumerate the chemical methods for analyzing proteins
- Describe the chemical methods for analyzing fats
- List the instruments used for the chemical analysis of proteins and fats

➤ **Reading List:**

- Callanan A (Eds.). (2000). *Food and Nutrition handbook, Italy*. World Food Programme
- Chutani AM (2006). *Nutritional biochemistry; Nutrition and dietary habits*. Retrieved from [www.nsdlniscair.res.in/jspui/bitstream/123456789/586/1/Nutritiondietary.pdf](http://www.nsdlniscair.res.in/jspui/bitstream/123456789/586/1/Nutritiondietary.pdf)
- Seideman S.C (2015). *Introduction to food analysis 1126. Extension food processing specialist cooperative extension service*. University of Arkansas. Retrieved from [http://www.uark.edu/ua/foodedu/Modules\\_of\\_Instruction/INTRODUCTION%20TO%20FOOD%20ANALYSIS.pps](http://www.uark.edu/ua/foodedu/Modules_of_Instruction/INTRODUCTION%20TO%20FOOD%20ANALYSIS.pps)
- Wang D, Lin H, Kan J, Liu L, Zeng X, Shen S (Eds). (2012). *Food Chemistry*. New York: Nova Science Publishers Inc.

### Week 3

#### Topic: Processing and Preservation of traditional foods (root and stem tubers)

**Objectives:** *at the end of the lecture, students should be able to*

- *describe the steps involved in processing at least one root and/or stem tuber.*

#### ➤ Description

First hour: *Description of the steps involved in processing cassava*

Second hour: *Description of the steps involved in processing yam*

#### ➤ Study Question:

- *Describe the process of making cassava flakes*
- *Highlight the steps involved in making yam flour*

#### ➤ Reading List:

- *Aderiye, J.B.I and Adebayo, C.O. (2012). Some Nigerian fermented foods: Production, technology, uses and storage. Goldprints Educational Publishers, Lagos, Nigeria.*
- *Callanan A (Eds.). (2000). Food and Nutrition handbook, Italy. World Food Programme.*
- *Wang D, Lin H, Kan J, Liu L, Zeng X, Shen S (Eds). (2012). Food Chemistry. New York: Nova Science Publishers Inc.*

### Week 4

#### Topic: Processing and Preservation of traditional foods (fruit and fruit drinks)

**Objectives:** *at the end of the lecture, students should be able to*

- *describe the techniques involved in processing some common Nigerian fruits*
- *State the methods of preserving fruits and fruit drinks*

#### ➤ Description

First hour: *Enumeration of some common Nigerian fruits and their botanical names. Description of the methods used in processing some of these fruits*

Second hour: *Description of the methods used in processing other fruits as well as preservation of these fruits.*

#### ➤ Study Question:

- *Highlight the techniques involved in processing oranges*
- *Enumerate 5 common Nigerian fruits and describe the methods used in processing them.*
- *Describe the methods used for preserving some traditional fruits and fruit drinks in Nigeria.*

#### ➤ Reading List:

- *Aderiye, J.B.I and Adebayo, C.O. (2012). Some Nigerian fermented foods: Production, technology, uses and storage. Goldprints Educational Publishers, Lagos, Nigeria.*
- *Callanan A (Eds.). (2000). Food and Nutrition handbook, Italy. World Food Programme.*
- *Olunike A.A (2014). Storage, preservation and processing of farm produce. Food Science and Quality management. 27: 28-32.*

- Wang D, Lin H, Kan J, Liu L, Zeng X, Shen S (Eds). (2012). *Food Chemistry*. New York: Nova Science Publishers Inc.

## Week 5

**Topic:** *Processing and Preservation of traditional foods (seeds and grains)*

**Objectives:** *at the end of the lecture, students should be able to:*

- *list and explain the methods involved in processing 2 named seeds and grains.*
- *discuss the steps involved in processing maize or sorghum into ogi*

### **Description**

First hour: *List common Nigerian seeds and grains with their botanical names,*

- *description of techniques in processing selected seeds and grains*

Second hour: *Description of the methods used in processing and preserving selected seeds and grains*

#### ➤ **Study Question:**

- *Highlight the steps in processing sorghum into ogi*

#### ➤ **Reading List:**

- Callanan A (Eds.). (2000). *Food and Nutrition handbook, Italy*. World Food Programme.
- Olunike A.A (2014). *Storage, preservation and processing of farm produce. Food Science and Quality management*. 27: 28-32.
- Wang D, Lin H, Kan J, Liu L, Zeng X, Shen S (Eds). (2012). *Food Chemistry*. New York: Nova Science Publishers Inc.

## Week 6

**Topic:** *Processing and Preservation of traditional foods (greens and vegetables)*

**Objectives:** *at the end of the lecture, students should be able to*

- *Highlight common greens and vegetables and describe the methods of processing them*

#### ➤ **Description**

First hour: *Highlight of common greens and vegetables, their botanical and common local names in Nigeria.*

Second hour: *Description of the methods of processing greens and vegetables: lettuce, cucumber, cabbage, amarantus, spinach, bitter leaf, water leaf,*

#### ➤ **Study Question:**

- *List 5 common vegetables in your locality and describe the methods of processing them.*

#### ➤ **Reading List:**

- Aderiye, J.B.I and Adebayo, C.O. (2012). *Some Nigerian fermented foods: Production, technology, uses and storage*. Goldprints Educational Publishers, Lagos, Nigeria.
- Callanan A (Eds.). (2000). *Food and Nutrition handbook, Italy*. World Food Programme.
- Wang D, Lin H, Kan J, Liu L, Zeng X, Shen S (Eds). (2012). *Food Chemistry*. New York: Nova Science Publishers Inc.

## Week 7: Mid semester Continuous Assessment

### ➤ Study Question:

- all study questions from previous lectures

### ➤ Reading List:

- All previous reading lists.

## Week 8:

### Topic: - Storage of traditional foods (Root and stem tubers, fruit and fruit drinks)

**Objectives:** at the end of the lecture, students should be able to

- describe the techniques used in storing cassava, yams and potatoes
- describe the methods for storing fruits

### ➤ Description

First hour: description of the methods for storing sweet potatoes, irish potatoes, yams and cassava

Second hour: description of the methods for storing oranges, mangoes, pawpaw, etc

### ➤ Study Questions:

- Enumerate and describe the techniques used in storing 5 named traditional fruits
- explain the modern and old methods used for storing roots and stem tubers

### ➤ Reading List:

- Aderiye, J.B.I and Adebayo, C.O. (2012). *Some Nigerian fermented foods: Production, technology, uses and storage*. Goldprints Educational Publishers, Lagos, Nigeria.
- Callanan A (Eds.). (2000). *Food and Nutrition handbook, Italy*. World Food Programme.
- Davies KM and Schwinn KE. (2006). *Molecular Biology and biotechnology of flavonoid biosynthesis*. In Anderson M. and Markham K.R (Eds), *Flavonoids; Chemistry, biochemistry and applications*. p 149 –
- Farabee, M.J. (2007): *Cells II: Cellular Organization* [www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookCELL2.html](http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookCELL2.html)
- Heldt, Hans-Walter (2005): *Plant Biochemistry, Third edition*. Elsevier Inc. Oxford, UK
- Inamdar, N; Edalat, S; Kotwal, V. B and Pawar, S.(2007): *Herbal drugs in milieu of modern drugs*, *Int J Green Pharm*, <http://www.greenpharmacy.info/text.asp?2008/2/1/2/39154> ISBN: 0-12-088391-033\
- Nelson, D. L. and. Cox, M. M. (2005): *Lehninger's.Principles.of.Biochemistry. 4th. Edition* (pp. 921-1081). W. H Freeman and Company, New York. ISBN: 1-4039-4876-3
- Srivastava N. (2009) *Flavonoids: the health boosters*. Indofine Chemical Company. p 1 – 23
- Voet D. and Voet J.G. (2011). *Biochemistry, fourth edition*. John Wiley and Sons Inc.
- Wang D, Lin H, Kan J, Liu L, Zeng X, Shen S (Eds). (2012). *Food Chemistry*. New York: Nova Science Publishers Inc.

## Week 9

### Topic: Storage of traditional foods (Seeds and grains, greens and vegetables)

**Objectives:** *at the end of the lecture, students should be able to*

- *describe the techniques used in storing seeds and grains*
- *Explain the methods for storing greens and vegetables*

➤ **Description**

First hour: *description of the techniques used in storing seeds and grains*

Second hour: *Description of the methods for storing greens and vegetables.*

➤ **Study Questions:**

- *Discuss the methods for storing*
- *describe the structural classes of flavonoids*

➤ **Reading List:**

- *Callanan A (Eds.). (2000). Food and Nutrition handbook, Italy. World Food Programme.*
- *Chutani AM (2006). Nutritional biochemistry; Nutrition and dietary habits. Retrieved from [www.nsdl.niscair.res.in/jspui/bitstream/123456789/586/1/Nutritiondietary.pdf](http://www.nsdl.niscair.res.in/jspui/bitstream/123456789/586/1/Nutritiondietary.pdf)*
- *Grade 12 Active healthy lifestyles, Module C: Nutrition. Retrieved from; [http://www.edu.gov.mb.ca/k12/cur/physhlth/frame\\_found\\_gr12/rm/module\\_c.pdf](http://www.edu.gov.mb.ca/k12/cur/physhlth/frame_found_gr12/rm/module_c.pdf)*
- *Wang D, Lin H, Kan J, Liu L, Zeng X, Shen S (Eds). (2012). Food Chemistry. New York: Nova Science Publishers Inc.*
- *FAO (2003). Food energy – Methods of analysis and conversion factors. Food and Agriculture organization of the United Nations, Rome.*
- *Nielsen S.S. (2010). Food Analysis Laboratory Manual, Food Science Texts Series, © Springer Science+Business Media.DOI 10.1007/978-1-4419-1463-7\_4,*

- **Week 10**

**Topic: Food poisoning and intoxication**

**Objectives:** *at the end of the lecture, students should be able to*

- *explain what food poisoning is in relation to food-borne diseases.*
- *enumerate the biological and chemical food contaminants*
- *highlight the most common biological and chemical food contaminants*

➤ **Description**

First hour: *Explain the major terms: food poisoning and intoxication, food-borne diseases, food-borne infections.*

Second hour: *Highlight the classes of food contaminants, the common ones of biological and chemical origin,*

➤ **Study Question:**

- *What is food poisoning.*
- *Discuss the classes of food contaminants with examples*
- *highlight 5 common chemical food contaminants.*
- *In a tabular form, discuss the biological food contaminants, diseases, causative organisms and the foods involved*

➤ **Reading List:**

- Callanan A (Eds.). (2000). *Food and Nutrition handbook, Italy. World Food Programme.*
- Chutani AM (2006). *Nutritional biochemistry; Nutrition and dietary habits.* Retrieved from [www.nsd.l.niscair.res.in/jspui/bitstream/123456789/586/1/Nutritiondietary.pdf](http://www.nsd.l.niscair.res.in/jspui/bitstream/123456789/586/1/Nutritiondietary.pdf)
- Grade 12 Active healthy lifestyles, Module C: Nutrition. Retrieved from; [http://www.edu.gov.mb.ca/k12/cur/physhlth/frame\\_found\\_gr12/rm/module\\_c.pdf](http://www.edu.gov.mb.ca/k12/cur/physhlth/frame_found_gr12/rm/module_c.pdf)
- Wang D, Lin H, Kan J, Liu L, Zeng X, Shen S (Eds). (2012). *Food Chemistry.* New York: Nova Science Publishers Inc.
- FAO (2003). *Food energy – Methods of analysis and conversion factors.* Food and Agriculture organization of the United Nations, Rome.
- Nielsen S.S. (2010). *Food Analysis Laboratory Manual, Food Science Texts Series,* © Springer Science+Business Media.DOI 10.1007/978-1-4419-1463-7\_4,

## **Week 11-14**

### **Topic: Laboratory and practical sessions**

**Objectives:** *at the end of the practical sessions, students should be able to*

- *analyze and test for carbohydrates, proteins and lipids in any given food substance*
- *calculate the food energy of a given food sample in calories*

#### ➤ **Description**

*Analysis of carbohydrates, proteins and lipids*

#### ➤ **Study Questions:**

- *Highlight the methods used in testing for reducing and non-reducing sugars.*
- *describe the techniques used to test for proteins*
- *how can you detect lipids in a given food sample*

#### ➤ **Reading List:**

- FAO (2003). *Food energy – Methods of analysis and conversion factors.* Food and Agriculture organization of the United Nations, Rome.
- Nielsen S.S. (2010). *Food Analysis Laboratory Manual, Food Science Texts Series,* © Springer Science+Business Media.DOI 10.1007/978-1-4419-1463-7\_4,

## **Week 15: Revision**

### **General Reading guide**

- Aderiye, J.B.I and Adebayo, C.O. (2012). *Some Nigerian fermented foods: Production, technology, uses and storage.* Goldprints Educational Publishers, Lagos, Nigeria.
- Callanan A (Eds.). (2000). *Food and Nutrition handbook, Italy. World Food Programme.*
- Davies KM and Schwinn KE. (2006). *Molecular Biology and biotechnology of flavonoid biosynthesis.* In Anderson M. and Markham K.R (Eds), *Flavonoids; Chemistry, biochemistry and applications.* p 149 –
- Farabee, M.J. (2007): *Cells II: Cellular Organization* [www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookCELL2.html](http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookCELL2.html)



- *Heldt, Hans-Walter (2005): Plant Biochemistry, Third edition. Elsevier Inc. Oxford, UK*
- *Inamdar, N; Edalat, S; Kotwal, V. B and Pawar, S.(2007): Herbal drugs in milieu of modern drugs, Int J Green Pharm, <http://www.greenpharmacy.info/text.asp?2008/2/1/2/39154>ISBN: 0-12-088391-033\*
- *Nelson, D. L. and. Cox, M. M. (2005): Lehninger's.Principles.of.Biochemistry. 4th. Edition (pp. 921-1081). W. H Freeman and Company, New York. ISBN: 1-4039-4876-3*
- *Srivastava N. (2009) Flavonoids: the health boosters. Indofine Chemical Company. p 1 – 23*
- *Voet D. and Voet J.G. (2011). Biochemistry, fourth edition. John Wiley and Sons Inc.*
- *Wang D, Lin H, Kan J, Liu L, Zeng X, Shen S (Eds). (2012). Food Chemistry. New York: Nova Science Publishers Inc.*

HOD's COMMENTS: Course compact is presented in the prescribed university format and captures the course curriculum.

NAME: Prof. Osemwegie,O.O

SIGNATURE

DATE 06/09/2016