جامعة الشرقية
A' SHARQIYAH UNIVERSITY

Course Descriptor

FSHN F311 FOOD ANALYSIS

ACADEMIC YEAR	2020-21		
Course Code and Title	FSHN F311 & FOOD ANALYSIS		
Credit hours	2	**Level of study**	Diploma/BSc
College / Centre	APPLIED SCIENCE		
Pre-requisites	CHEM281, CHEM201, FSHN F111	**Co-requisites**	CHEMISTRY 1 LAB

1. COURSE OUTLINE

Food is a complex mixture of chemical components that not only play a vital role on sensory (taste and aroma) and functional properties of food but also affect the nutritional and food safety aspects of food. In order to detect, identify and quantify such food components, this course of food analysis has been designed to encompass the chemical analysis of food beside physical analysis (rheological properties). Therefore, this course involves the application of various chemical analytical methods and techniques to determine such properties with the aid of instrumentation with the application of established standard methods, i.e., AOAC methods, for the determination of levels of food components with emphasis on nutritional and safety concerns. In summary, this course involves studies of the chemistry of food components with respect to their identification and quantification using classical and modern instrumental analytical techniques.

2. AIMS

This course is designed to provide students a clear understanding of basic principles behind various instruments that are commonly used in food industry and academic research labs with the following aims & objectives:

1. To explain the basic principle of food sampling, sample handling, contamination and sampling errors with statistical point of view.
2. To explain basic components of food (water content, protein, lipids/fats, carbohydrates, vitamins, & minerals), their importance and their quantity in various food products.
3. To explain the principles and applications of analytical methods for food characteristics by using different instruments, like pH meter, viscometer, spectroscopic techniques etc.
4. To analyze and evaluate the to comprehend knowledge of basic food analysis techniques for the advanced food science courses.

3. LEARNING OUTCOMES, TEACHING, LEARNING and ASSESSMENT METHODS (Indicative)

Learning Outcomes (Definitive)	Teaching and Learning methods (Indicative)	Assessment (Indicative)
1. Understand the basic principles of chemistry in food analysis	Class lectures, Power Point presentations.	*quiz /mid-term test / Final exam*
2. Understand the Statistical concept of Sample & population, sampling Methods, Data collection & assessment of food sampling protocols	Class lectures, Power Point presentations	*Assignment/quiz /mid-term test /Final exam*
3. To understand basic concepts of food composition; quality parameters used in chemical food analysis	Class lectures, Power Point presentations, Demonstration in Laboratory sessions.	*Assignment/quiz /mid-term test /Final exam*

4. To Understand the concept of proximate analysis of proteins, lipids, water, ash and acid in foods using different techniques; sample preparation.	Class lectures, power point Presentations, discussions, problem based learning through food sample preparation in lab Sessions.	*quiz /mid-term test /Final exam*
5. To gain hands-on experience on advance instrumentation, i.e., Brookfield Viscosity meter, Water activity meter, Kjeldahl protein analysis, soxhlet extraction procedures, the concept of spectrophotometer, Atomic Absorption Spectroscopy (AAS).	Class lectures, power point presentations, discussions, problem based learning & Demonstration in Laboratory sessions.	*Assignment/quiz /mid-term test /Final exam*

4. ASSESSMENT WEIGHTING

Assessment	Percentage of final mark (%)
Quizzes	20%
Online Discussion (class activities)	10%
Mid-term Examination	30%
Final Examination	40%
TOTAL	**100%**

5. ACHIEVING A PASS

Students will achieve **2** credit hours for this course by passing **ALL** of the course assessments*]* and achieving a **minimum overall score of 50%.**

6. COURSE CONTENT (Indicative)

LECTURE TOPIC	TIME (HOURS)
1. Introduction to food analysis, Government regulations and recommendations for maintaining the quality of food supply; Food inspection and grading;	2
2. Food Safety; Quality control; Characterization of raw materials; Monitoring of food properties during processing; Characterization of final product	2
3. Types of food properties; Composition, Structure; Physico-chemical properties (Optical, Rheological, Stability and flavor properties); Sensory Attributes	2
4. Statistical concept of Sample & population; Concept of accuracy and precision in sampling & data collection; How to analyze the data statistically; measure of central tendency of data; mean ; standard deviation; Sources of error; propagation of error	2
5. -Significant figures and rounding numbers; Standard curve preparation (regression analysis); rejection of data	2
6. Determination of moisture content in food samples; Properties of water in foods; Discuss important techniques of moisture content analysis such as evaporation methods	2

7. Distillation methods (Dean stark method), Chemical reaction methods (Karl-Fisher, Gas production); Physical methods (Density, electrical conductivity; refractive index) and Spectroscopic methods (UV-Visible, NMR etc.).	2
8. Discuss the methods for moisture content analysis in different Environment such as Vapor Pressure method; Thermogravimetric method; Calorimetric method; Spectroscopic method.	2
9. Determination of ash content in food samples; dry ashing; Wet Ashing; Low temperature plasma ashing; Gravimetric analysis; Calorimeteric method; Titration methods; Redox reaction methods;	2
10. Ion Selective electrodes; Atomic spectroscopy; Principles; Atomic absorption spectroscopy; its instrumentation; Atomic Emission Spectroscopy; its instrumentation; Practical consideration	2
11. Determination of total lipid concentration; different Solvent extraction methods such as Batch solvent extraction; Semi-continuous solvent extraction (Soxhlet method); Continuous solvent extraction; Non-solvent extraction methods (Babcock; Gerber; Detergent method);	2
12. Determination of lipid composition; Separation and analysis by chromatography (TLC; GC); chemical techniques (Iodine value; Saponification number; Acid value); Methods to analyze lipid oxidation in foods (Peroxide value; conjugated dienes; Thiobarbuturic acid; Accelerated oxidation tests)	2
13. Determination of protein concentration (Kjeldahl method); Biuret method; Lowry method; Turbimetric methods; other instrumental techniques; Protein separation and characterization (methods based on different solubility characteristics) ; Separation due to size differences	2
14. Protein separation and characterization; separation due to different adsorption characteristics; Separation due to size differences	2
15. Revision of course materials	2
TOTAL HOURS	**30**
Plus **RECOMMENDED INDEPENDENT STUDY HOURS**	**15**
TOTAL COURSE HOURS	**45**

7. RECOMMENDED READING

Textbook:

- *Food Analysis by Suzane Nielsen. 2017. 5th Edition. An Aspen publication, Gaithersburg, Maryland*

- Lecture Notes & Presentation material will be provided by the Instructor.

Reference:

- *Food Chemistry* 3rd edition by Fennema, O.,1996. Marcel Dekker, N.Y.

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http://www.fao.org/faostat/en/#data