SCI 232 – Introduction to Food Science
Summer 2021

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Telephone: 8347
Secretary/TA: 
TA Office Hours: 
Course URL (if any): 

Course Teaching Methodology (Please mention following details in plain text)

- Teaching Methodology: A blend of both synchronous and asynchronous lecture. In case of obligatory online teaching live lecture will be delivered via Zoom followed by sharing of the recording link with students for off-line access.
- Lecture details: I will prefer in-class lectures; however, if online teaching is mandatory due to COVID-19 induced lockdown, 100% lectures will be recorded and available for off-line access.

Course Basics
Credit Hours: 03

<table>
<thead>
<tr>
<th>Lecture(s)</th>
<th>Nbr of Lec(s) Per Week</th>
<th>05</th>
<th>Duration</th>
<th>110 min each</th>
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<tbody>
<tr>
<td>Recitation (per week)</td>
<td>Nbr of Rec(s) Per Week</td>
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<td>Duration</td>
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<tr>
<td>Lab (if any) per week</td>
<td>Nbr of Session(s) Per Week</td>
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<td>Duration</td>
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<tr>
<td>Tutorial (per week)</td>
<td>Nbr of Tut(s) Per Week</td>
<td></td>
<td>Duration</td>
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Course Distribution
Core:
Elective: elective
Open for Student Category: SBASSE, MGSHSS, SAHSOL, SOE, SDSB
Closed for Student Category:

COURSE DESCRIPTION
In the current era of modern technologies and social media, a surge of fake news and misconceptions about food, health, diseases, and other important areas of human life is quite prevalent. Even an educated person can inadvertently fall victim to fake news propaganda if s/he does not have sufficient scientific knowledge. In this multidisciplinary course, students will learn fundamental sciences and modern technologies that will not only equip them against any unscientific myth, but also will ensure the safe and secure supply of food to consumers. Students will also apply fundamental and integrated concepts of engineering, biological and physical sciences to understand the nature of food, causes of food deterioration, principles underlying food processing, and improvement of food. This course is designed for everyone who is involved in any domestic and commercial aspect of food such as production, preparation, cooking, processing, handling, and of course consumption.
Lahore University of Management Sciences

### COURSE PREREQUISITE

- None, a prior basic school-level knowledge of chemistry, biology, and physics will help to perform better in this course but is not required.

### COURSE OBJECTIVES

- To provide scientific knowledge on the composition and constituents of Food Materials
- To provide scientific knowledge on the skills used in food safety, processing, quality assurance, analysis, and new product development
- To enhance the technical qualification of students interested in establishing a career in the Food Industry

### Learning Outcomes

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

- Describe the constituents and composition of major foods including cereals, grains, fruits and vegetables, meat, poultry, eggs, milk and dairy products, and confectionary products.
- Understand the scientific and functional properties of main food constituents including carbohydrates, proteins, fats, vitamins, colors, and flavors.
- Explain the basic principles of food processing operations (heating, cooling, drying, preserving etc).
- Explain how animal products such as meat, eggs, and dairy products are preserved.
- Describe the type of microorganisms found in food, the factors that affect their growth, and their role in food spoilage and food fermentation.
- Explain the nature of food additives, food preservatives, and food laws and regulation.

### Grading Breakup and Policy

- **Attendance:** 5%
- **Class Participation:** 15% (asking questions and voluntarily answering the question or initiating/participating in a discussion)
- **Assignments/homework:** 15% (~2-3)
- **Quizzes:** 15% (~5-6)
- **Mid-term exam/write up:** 20%
- **Final exam:** 30%

Instructor has the privilege to change the grading scheme, which, if availed, will be conveyed to the students well in time.

### Examination Detail

**Midterm Exam**
- **Yes/No:** Yes
- **Combine/Separate:**
- **Duration:** 180 min
- **Preferred Date:** Around the middle of the semester
- **Exam Specifications:** Closed books, Course material in any form is not permitted

**Final Exam**
- **Yes/No:** Yes
- **Combine/Separate:**
- **Duration:** 180 min
- **Exam Specifications:** Closed books, Course material in any form is not permitted
<table>
<thead>
<tr>
<th>Lectures</th>
<th>Topics</th>
<th>Recommended Readings</th>
<th>Objectives/ Application</th>
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<tbody>
<tr>
<td>Lecture 1</td>
<td>Introduction to Food Science: Food Patterns, health impact, determinants of palatability, judging food</td>
<td>Lecture notes and supplied text/material, Chapter 1</td>
<td>Student should be able to describe food behavior (nutritional need, health issues), aesthetic appeal of food presentation, and evaluation of food quality.</td>
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<tr>
<td>Lecture 2</td>
<td>Nutrition and Food: achieving good nutrients, cultural accent, retaining nutrients in food</td>
<td>Lecture notes and supplied text/material, Chapter 2</td>
<td>Students should be able to describe the essential nutrients in food, functions associated with key nutrients, and guidelines for achieving good nutrition.</td>
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<tr>
<td>Lecture 3</td>
<td>Food Safety: Potential microorganisms in foods, Food-borne illness, source and control of microorganisms</td>
<td>Lecture notes and supplied text/material, Chapter 3</td>
<td>Students should be able to explain food-borne illness and microorganism-based food poisoning, and their control by using high standards of hygiene.</td>
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<tr>
<td>Lecture 4</td>
<td>Factors in Food Preparation: Basic preparation and cooking equipment, safety in kitchen, temperature in food preparation</td>
<td>Lecture notes and supplied text/material, Chapter 4</td>
<td>Students should be able to explain the role of temperature (from freezing to boiling/frying) in the used preparation of food and heat transfer by conduction, convection, and radiation.</td>
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<tr>
<td>Lecture 5</td>
<td>Vegetable: Aspects of Palatability, Nutrient content, harvesting, marketing, and storage, factors in vegetable cookery</td>
<td>Lecture notes and supplied text/material, Chapter 5</td>
<td>Students should be able to explain the scientific rationale in the procuring and retaining essential nutrients while preparing vegetable-based food.</td>
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<td>Lecture 6</td>
<td>Fruits: Nutritional aspects of fresh, dried, canned, and frozen fruits</td>
<td>Lecture notes and supplied text/material, Chapter 6</td>
<td>Students should be able to describe the nutritional values of fresh and preserved fruits.</td>
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<td>Lecture 7</td>
<td>Salads and Salad Dressings: nutritional perspective, types of salads, principles of preparation</td>
<td>Lecture notes and supplied text/material, Chapter 7</td>
<td>Students should be able to describe the nutritional aspects of different types of salads and dressings.</td>
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<td>Lecture 8</td>
<td>Fats and Oils: Types of fats and oils, controversial ingredients, technological handling of fats</td>
<td>Lecture notes and supplied text/material, Chapter 8</td>
<td>Students should be able to describe very basic chemistry and functionality of edible oils and fats.</td>
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<td>Lecture 9</td>
<td>Carbohydrates: types of sugars in the Marketplace, Sweetening power, reactions of sugars</td>
<td>Lecture notes and supplied text/material, Chapter 9</td>
<td>Students should be able to describe mono- and disaccharides that are available in variety of food products.</td>
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<tr>
<td>Lecture 10</td>
<td>Carbohydrates: Starches and Cereals: polysaccharides, starch in food preparation, nutritional aspects of wheat, corn, rice, barley</td>
<td>Lecture notes and supplied text/material, Chapter 10</td>
<td>Students should be able to describe the physical and chemical changes occurring during preparation of food consisting of starches and cereals.</td>
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<td>Lecture 11</td>
<td>Proteins: Eggs, nutritional value, structure and changes, products from eggs-omelets, custards, cream puddings/pies, Meringues, Souffles, foam cakes</td>
<td>Lecture notes and supplied text/material, Chapter 11</td>
<td>Students should be able to describe the nutritional aspects of eggs, egg products, handling and storage conditions.</td>
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<tr>
<td>Lecture 12</td>
<td>Proteins: Meats, Poultry, and Fish</td>
<td>Lecture notes and supplied text/material, Chapter 12</td>
<td>Students should be able to define meat, describe its nutritional aspects, inspection and grading of meats and selection of meat cookery.</td>
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<td>Lecture 13</td>
<td>Leavening Agents: air, steam, carbon dioxide, and biological agents</td>
<td>Lecture notes and supplied text/material, Chapter 13</td>
<td>Students should be able to describe different technique of leavening in baked products.</td>
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<td>Lecture 14</td>
<td>Breads: Muffins, Biscuits, Cake doughnuts, waffles and pancakes, yeast breads</td>
<td>Lecture notes and supplied text/material, Chapter 14</td>
<td>Students should be able to describe different types of breads and scientific reasons behind their texture, taste, and appearance.</td>
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<tr>
<td>Lecture 15</td>
<td>Basics of Batters and Doughs</td>
<td>Lecture notes and supplied text/material, Chapter 15</td>
<td>Students should be able to describe different types of batters and doughs.</td>
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<tr>
<td>Lecture 16</td>
<td>Cakes, Cookies, and Pastries</td>
<td>Lecture notes and supplied text/material, Chapter 16</td>
<td>Students should be able to describe different types of cakes, cookies, and pastries and scientific reasons behind their texture, taste, and appearance.</td>
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<td>Lecture 17</td>
<td>Beverages: Coffee, tea, cocoa and chocolate, fruit beverages</td>
<td>Lecture notes and supplied text/material, Chapter 16</td>
<td>Students should be able to describe different types of beverages and scientific reasons behind their texture, taste, and appearance.</td>
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<td>Lecture 18</td>
<td>Persevering Food: canning, freezing, preserving with sugar and salt, drying</td>
<td>Lecture notes and supplied text/material, Chapter 17</td>
<td>Students should be able to describe different methods of preserving food and their scientific rational.</td>
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**Final Exam**

**Textbook(s)/Supplementary Readings**

Food Fundamentals, Margaret McWilliams, 10th edition, Pearson Education Limited, 2014 UK