

# Southwest University

## Graduate Course Syllabus

### Course Unit: School of Food Science

Course No.	1108320060	Course	Physical Properties of Food								
Course category (√)	Compulsory courses ( ) Elective courses (√)	Credit hour	2	Total class hours	40	Lecture hours	30	Discussion Hours	10	Experiment hours	0
Lecturer	Xia Yangyi	Job title Degree	lecturer on-the-job Ph.D.		Specialties		Food engineering				
Range of application by majors: Agricultural products processing and storage engineering, food science											
Prerequisites: General Physics, Physical Chemistry, Principles of Food Engineering											
<p>Teaching objectives and requirements:</p> <p>The food is the researching objects in Physical Properties of Food (including food raw materials), which is based on physics, chemistry, biology and other modern basic disciplines and modern engineering test technology, and it is also a marginal discipline by using the modern physical methods to study the basic structure of food materials, physical properties as well as a variety of physical factors and biological material interaction and transformation.</p> <p>1. teaching purposes</p> <p>Physical Properties of Food is one of the basic disciplines of food engineering design and food research and development. It is not only closely related to food processing, but also closely related to the control of food quality. you can solve the following problems through this course:</p> <ol style="list-style-type: none"> <li>① understand the physical properties related with the food and processing &amp; cooking, and provide the basis for the design or processing technology of food processing equipment.</li> <li>② Establishing the method of objective evaluation of food quality, namely, instrument testing method, establishing the model of the sensory evaluation of food physical properties, and find out the instrument testing method to replace the sensory evaluation.</li> <li>③ Through the experimental study of the food physical properties &amp; food materials, it is easy to understand the organizational structure of food and biochemical changes, which simply and accurately reflect the complex food structure, chemical composition.</li> <li>④ Quantify the indicators measured by the instrument, reproduce the flavor characteristics of food in scientific, and improve the flavor of food depending on this, and provide a scientific basis by food hobby function to ensure and improve the taste of food quality.</li> <li>⑤ Determination of molecular structure in food by means of physical property measurement, and provide experimental basis for studying molecular theory of food.</li> </ol> <p>In short, more and more facts show that the study of food physical properties has become an indispensable field for food engineering and food science research, which is also the basic knowledge that food science and technology personnel must master, like food chemistry and biochemistry.</p>											

## 2. teaching requirements

Physical Properties of Food is a highly practical technical course in the teaching of food science and engineering. Through the study of this course, the basic physical properties, mechanical properties, thermological properties, electrical properties and color properties of food are studied systematically. The basic experimental techniques and methods of food property measurement are grasped, and it also can be used in food engineering and food Processing of production research in the comprehensive use.

Teaching methods and test methods (it should be conducive to cultivate graduates' innovative thinking and innovation ability):

The multimedia is used in the course teaching, and use the logical reasoning, case analysis and classroom discussion, teaching the basic theory of food properties, the latest development and practical use, and master the basic methods and skills of food property determination.

The test method of this course is to write the paper as the main way, and supplement the classroom discussion and experimental skills test results. The total score of the course includes the results of the paper (70%), classroom discussion (30%).

## **Course content and course hours allocation**

Introduction and Prospects of Food Physical Properties	2 Hours
Chapter 1: the basic theory of food physics	6 hours
Section 1: the main components, structural and physical properties of food	
Section 2: Food Adhesive	
Section 3: Food Rheology Foundation	
Chapter 2 Liquid Food Properties	4 hours
Section 1: liquid food's rheological properties	
Section 2: Foam Food Properties	
Chapter 3 Solid and semi-solid food properties	3 hours
Section 1: Gel food properties	
Section 2: powder food properties	
Chapter 4 Food texture	6 hours
Section 1: Determination of food texture	
Section 2: Relationship between sensory testing of food texture and instrumentation	
Section 3: Application of food quality evaluation	
Chapter 5 Food Thermophysics	3 hours
Section 1: Measurement and Data Processing of Heat Transfer Property of Food	
Section 2: Estimation of Thermophysical Properties of Food	
Chapter 6 Food Electrical Characteristics	3 hours
Section 1: Dielectric properties and determination	
Section 2: dielectric relaxation	
Section 3: Electromagnetic radiation	
Section 4: power saving application	
Chapter 7 Food Light Characteristics	3 hours
Section 1: the basic principles of optical determination of food	
Section 2: Determination and Application of Light Properties of Food	
Section 3: food's color detection	
Course paper information collection and writing	6 hours
Classroom discussion	4 hours
(Please add more pages if this page is insufficient)	

**The Catalog for main reference book (periodicals):**

序 S.N.	作者姓名 Author	书（刊）名 Books and Periodicals' name	出版社 Press
1	Li Lite	Physical Properties of Food	China Agricultural Publishing House
2	Li Yunfei	Physical Properties of Food	China Light Industry Press
3	Zhou Zue	Agricultural Material Science	China Agricultural Publishing House

4	Jin Wanhao	Agricultural Material Science	China Science and Technology Press
5	Brian M.	Texture in food	Woodhead Publishing Limited
6	Nuti N.	Physical Properties of Plant and Animal Materials	Gordon and Breach Science Publishing
7	Chen Kefu	Food rheology and its measurement	China Light Industry Press
8		Journal of Texture Studies	

Review Comments of School (Institute, Center):

Signature (Date)

Review Comments of Student Committee:

Signature (Date)

Review Comments of Graduate School

Signature (Date)