

Southwest University

Graduate Course Syllabus

Course Unit: School of Food Science

Course No.	1108320026			Course name	Cereal science and technology						
Course category (√)	Compulsory courses (√) Elective courses ()	Credit hour	2	Total class hours	40	Lectures hours	36	Discussion hours	4	Experiment hours	0
Lecturer	Geng Zhong	Job title Degree	Professor Doctor degree		Specialties			Food, oil and vegetable protein			
Range of application by majors: Food science and engineering, storage and processing of agricultural products, grain, oil and vegetable protein, etc.											
Prerequisite courses: Grain and oil storage and processing technology, food chemistry, food machinery, food engineering											
Teaching objectives and requirements: Through this course, let the students master the basic grain structure, physicochemical properties, processing technology and equipment, as well as composition changes during processing and storage, research overview, and let the students master the grain science and technology and the latest development trend. Students can be able to engage in the development and utilization of food, food and other scientific research with the deeper understanding of basic knowledge											

Teaching and testing methods (it's need to be conducive to cultivating the innovative thinking and ability of graduate students):

Course teaching is the main method, develop discussions in class combining the students' learning of the course knowledge and the fusion of related contents.

The examination is mainly composed of papers, according to the requirements of the semester, there are two times. The writing of the essay should strictly follow the relevant regulations of the school, and the form, the word number, the content are strictly requested.

Course contents and course hours allocation

Chapter I Introduction (2 class hours)

- 1.1 Cereal science and technology research contents
- 1.2 The significance of cereal science and technology research and application in the present time
- 1.3 Development direction of cereal science and technology

Chapter II Grain tissue structure (2 class hours)

- 2.1 The components of the seed and the basic structure of the cell
- 2.2 Grain tissue structure
 - 2.2.1 Wheat
 - 2.2.2 Unhusked rice
 - 2.2.3 Maize
 - 2.2.4 Sorghum
 - 2.2.5 Rape seed
 - 2.2.6 Soybean
- 2.3 Weight proportion and chemical composition of each part of grain

Chapter III Starch and polysaccharides in cereals (8 class hours)

- 3.1 Introduction
- 3.2 Starch
 - 3.2.1 Composition and classification of starch
 - 3.2.2 Structure of starch
 - 3.2.3 Properties of starch
 - 3.2.4 Starch modification
 - 3.2.5 Physical and chemical changes of starch during grain processing
 - 3.2.6 Industrial utilization of starch
- 3.3 Dietary fiber in cereals
- 3.4 Soybean polysaccharide
- 3.5 Others

Chapter IV Proteins in cereals (8 class hours)

- 4.1 Introduction
- 4.2 Wheat protein
 - 4.2.1 Type
 - 4.2.2 Functional properties
 - 4.2.3 Composition and gluten properties
- 4.3 Soybean protein
 - 4.3.1 Composition and structure
 - 4.3.2 Functional properties
 - 4.3.3 Processing characteristics of soybean protein
- 4.4 Maize and sorghum protein
 - 4.4.1 Composition and structure
 - 4.4.2 Processing characteristics of protein
- 4.3 Other cereal proteins

Chapter V Lipids in proteins (6 class hours)

- 5.1 Introduction
- 5.2 The structure of lipids in cereals
- 5.3 Separation and determination of lipids in cereals
- 5.4 Lipids in starch granules

5.5 Lipids in cereal processing

Chapter VI Enzymes in cereals (6 class hours)

6.1 Introduction

6.2 Protease

6.3 Lipase

6.3.1 Lipolytic enzyme

6.3.2 Lipoxygenase

6.4 Amylase

6.5 Enzyme inhibitor

Chapter VII Functional active ingredients in cereals (4 class hours)

7.1 Introduction

7.2 Vitamin E

7.2 Phytosterol

7.3 Oryzanol

7.4 Octacosanol

7.5 Glutathione

7.6 Soybean isoflavone

7.7 Rutin

Chapter VIII High technology in cereal processing (4 class hours)

8.1 Introduction

8.2 Hydrocyclone separation technology

8.3 Twin screw extrusion cooking technology

8.4 Molecular distillation technology

8.5 Air flotation separation technology

The Catalog for main reference book (periodicals):

No.	Author	Books and Periodicals' name	Press
1	Shiyong Zhou, etc.	Food science and grain chemistry	China Commercial Publishing House, 1986
2	Yimin Wei	Grain quality and food processing	China Agricultural Science and Technology Press, 2005
3		Principle of Cereal Science and Technology	
4	Fucheng Gao	High technology of modern food engineering	
5		CerealChemistry[J]	
6		Advances in Cereal chemistry[J]	
7		Journal of Agricultural and Food Chemistry[J]	
8		Journal of The Chinese Cereals and Oils Association [J]	

Review Comments of School (Institute, Center):

Signature (Date)

Review Comments of Student Committee:

Signature (Date)

Review Comments of Graduate School

Signature (Date)