《食品化学》课程教学大纲

<table>
<tr><td colspan="6">课程基本信息（Course Information）</td></tr>
<tr><td>课程代码
（Course Code）</td><td>FS300</td><td>*学时
（Credit Hours）</td><td>32</td><td>*学分
（Credits）</td><td>2</td></tr>
<tr><td rowspan="2">*课程名称
（Course Name）</td><td colspan="5">（中文）食品化学</td></tr>
<tr><td colspan="5">（英文）FOOD CHEMISTRY</td></tr>
<tr><td>课程性质
(Course Type)</td><td colspan="5">Professional core course</td></tr>
<tr><td>授课对象
（Audience）</td><td colspan="5">Required for undergraduate major in Food science and engineering, and also open to students in other majors</td></tr>
<tr><td>授课语言
(Language of Instruction)</td><td colspan="5">English</td></tr>
<tr><td>*开课院系
（School）</td><td colspan="5">School of Agriculture and Biology</td></tr>
<tr><td>先修课程
（Prerequisite）</td><td colspan="5">Chemistry, Biochemistry, introduction to food science</td></tr>
<tr><td>授课教师
（Instructor）</td><td colspan="2">Jing, Pu</td><td>课程网址
(Course Webpage)</td><td colspan="2">http://ecc.sjtu.edu.cn/html/course_98.html</td></tr>
<tr><td>*课程简介
（Description）</td><td colspan="5">本课程适用于食品科学的基本科学原理以及实际应用。针对于食品的质量和安全性，学习、讨论食品组分如碳水化合物、脂质、蛋白质和其它成分在贮藏和加工中的化学/生物化学变化、反应。强调影响颜色、风味、质地、营养和食品安全性的因素和反应条件。学生通过学习典型案例，了解相关食品行业和食品消费相关的现实问题。</td></tr>
<tr><td>*课程简介
（Description）</td><td colspan="5">The course applies basic scientific principles to food systems and practical applications. Food constituents, and chemical/biochemical reactions of carbohydrates, lipids, proteins, and other constituents in fresh and processed foods are discussed with respect to food quality and safety. Reaction conditions and processes that affect color, flavor, texture, nutrition, and safety of food are emphasized. Students are given a role in the learning experience through independent projects related to real world problems associated with the food industry or food consumption.</td></tr>
<tr><td colspan="6">课程教学大纲（Course Syllabus）</td></tr>
<tr><td>*学习目标(Learning Outcomes)</td><td colspan="5">The course applies basic scientific principles to food systems and practical applications. Food constituents, and chemical/biochemical reactions of carbohydrates, lipids, proteins, and other constituents in fresh and processed foods are discussed with respect to food quality and safety. Reaction conditions and processes that affect color, flavor, texture, nutrition, and safety of food are emphasized. Students are given a role in the learning experience through independent projects related to real world problems</td></tr>
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<tr><td></td><td>associated with the food industry or food consumption (A5.2.1, B1, B2, B9).
This course is designed to evaluate the chemical, physical and functional properties of food constituents and the effects of processing on those constituents. The course objectives are shown as followings:
1. To learn the basic chemical structure, nomenclature, physiochemical properties of food components (A5.1.1, A5.2.1).
2. To understand the basic chemical reactions related to food processing, food formulation, food quality and stability, and food nutrition (A5.2.1).
3. To understand the interactions of food components in food formulation, food processing, food safety, and food nutrition (A5.2.1, C7).</td></tr>
<tr><td>*教学内容、进度安排及要求(Class Schedule&Requirements)</td><td>
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<tr><th>教学内容</th><th>学时</th><th>教学方式</th><th>作业及要求</th><th>基本要求</th><th>考查方式</th></tr>
<tr><td>Introduction</td><td>2</td><td>Lecture</td><td></td><td>Understanding generally the course of Food Chemistry</td><td></td></tr>
<tr><td>Water</td><td>2</td><td>Lecture</td><td></td><td>Water properties, water activity and food spoilage, water immigration, glass transition</td><td></td></tr>
<tr><td>carbohydrate</td><td>6</td><td>Lecture</td><td>Describe the mechanisms of Maillard reaction and find out where it happens in your daily life. The paper should be typed, with font type Times New Roman and size 12, and double spaced. The length should be 3 - 5 pages.</td><td>Sugar structure, Non-enzymatic reaction, reducing sugar, disaccharides, oligosaccharides, polysaccharides, starch, gelatinization, retrogradation.</td><td></td></tr>
<tr><td>Peptide and protein</td><td>8</td><td>Lecture</td><td></td><td>Properties and classification of amino acids, structural properties of peptides and</td><td></td></tr>
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					proteins, protein denaturation (foaming, dough development, etc.),	
	Lipids	4	Lecture		Fatty acids, lipid structure, lipid reaction, lipid oxidation, antioxidants	
	Food Enzyme	4	Lecture	*Write a report about mechanisms of enzymatic browning and how to protect from it with a daily example.* The paper should be typed, with font type Times New Roman and size 12, and double spaced. The length should be 3 - 5 pages.	Enzymatic reaction, enzymatic browning （polyphenoloxidase reaction）	
	Colors	2	Lecture		Color theory, color space, synthetic colorants, natural colorants	
	Vitamins and Minerals	2	Lecture		Classifications, loss in processing and storage, Vc browning reaction	
	Discussion	2	Oral presentation and discussion		Students will select a topic and give a scientific presentation based on understanding of the interactions of	

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<tr><td>Final</td><td></td><td></td><td></td><td></td><td></td></tr>
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<tr><td>*考核方式(Grading)</td><td>Class meetings are lectures, occasional discussions or oral presentations. Outside activities may include homework problems. The course grade is derived from attendance (10%), two reports and discussion (20%) and final exam (70%).</td></tr>
<tr><td>*教材或参考资料 (Textbooks & Other Materials)</td><td>Textbook: Fennema's Food Chemistry, Fourth Edition (Food Science and Technology), CRC Press; 4th Edition (September 13, 2007) ISBN-10: 0849392721; ISBN-13: 978-0849392726（使用 7 届,外文教材,高等院校教材）
Other material: Belitz, H. D. and Grosch, W. Food Chemistry. Second Edition （English Version）. New Yolk：Springer verlag, Berlin Heidelberg，1999 ISBN-10: 354069935X; ISBN-13: 978-3540699354</td></tr>
<tr><td>其它（More）</td><td>无</td></tr>
<tr><td>备注（Notes）</td><td>无</td></tr>
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备注说明：

1．带*内容为必填项。

2．课程简介字数为 300-500 字；课程大纲以表述清楚教学安排为宜，字数不限。