SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number: BIO- 107 Class/Lect. Hours: 3 Lab Hours: 0 Credits: 3 Dept.: Biology

Course Title: World Food Habits and Sustainability Semester: Fall Year: 2016

Course Description, Prerequisite, Corequisite:
This course reviews the evolution of world food habits from their earliest beginnings to the present. It will present the biological and environmental perspectives to global food systems. World dietary patterns will be examined with respect to human evolution and the influence of socialization and acculturation. The course will discuss the world revolutions that shaped current landscapes in food production and food science. Understanding the environmental sustainability of agricultural production and processing will be a vital component of this course. Special emphasis will be made on current trends in food biotechnology, fermented foods, functional foods and the effect of climate change on food production and world food habits. By the end of the course you should also have a better understanding of your own food choices.
Prerequisites, Corequisites- none.
Textbooks- none. Research papers and links for web based reading will be provided in class and blackboard.

Course Objectives	Competencies
Primary learning goals addressed: 1. Quantitative literacy 2. Critical and Ethical thinking 3. Computer literacy 4. Written and oral communication 5. Information literacy	Students completing this course will be able to:
I. Understand the basics of food science.	1. Know that food science is the application of basic sciences and engineering to study foods. 2. Describe basic human nutrition in terms of Macronutrients and Micronutrients. 3. Understand the nature of food, chemical composition, effect of storage, processing and preservation. 4. Describe the pros and cons of global food trends. 5. Aware of the current crisis of over-nutrition in developed countries and malnutrition in developing. 6. Explain the importance of food sustainability.
II. Understand that evolution of humans and food are related.	1. Understand human evolution (out of Africa story). 2. Illustrate how human brilliantly adapted to the Environment. 3. Interpret the findings of Charles Darwin and evolution due to selective pressure, natural selection and survival of the fittest. 4. Describe evolution of food from Pliocene period to current. 5. Annotate that humans need to double the global food supply to meet the demands of population explosion.
III. Understand the greenhouse effect and its effect on global food production.	1. Understand the role of atmospheric gases. 2. Illustrate the greenhouse effects, global warming and its consequences. 3. Explain why global carbon levels are increasing and its economic and global effects.

	4. State the importance of sustainability principles to counteract global warming. 5. Construe the potential of biofuels.
IV. Explain early dietary patterns of humans in different parts of the world.	1. Disclose the early civilizations of the eastern hemisphere, like that of Mesopotamia, Egypt, Indus and Huanh Ho and their food habits. 2. Describe Greek and Rome food culture. 3. Describe the food culture of early Mayan civilization. 4. State the origin of some common food sources. 5. Mention some unusual food sources in the world.
V. Describe current pollution and its effect on food production. Describe basics of bio-remediation.	1. Explain Ozone, CFC and other point source or nonpoint sources. 2. Describe the effects of pollution on human health with common examples. 3. Able to describe the devastating effects of deforestation and acid rain on productivity and speciation. 4. Disclose current practices in managing pollution. 5. Explain the role of clean water, soil and air for environment and human health. 6. State the current advances in bioremediation.
VI. Explain the challenge of current world hunger and the role of global organizations.	1. Describe the challenges in meeting the world food requirements. 2. Aware of extends of poverty and hunger in the world today and appreciate conditions in the USA. 3. Define the effects of malnutrition on cognitive development and disposition to diseases. 4. State possible solutions for world food security and global initiative to end world hunger. 5. Aware that food safety and food security are monitored by agencies like the International Association for Food Protection.

	6. Be able to address issues such as sustainability, biological diversity, climate change, nutritional economics, population growth, water supply, and access to food.
VII. Disclose the Old world and New world crops and their significance.	1. Describe the crops of the Americas and their origins. 2. Know the crops of the Eastern world and their origins. 3. Understand modern genetic improvements and hybrids of crops. 4. Illustrate the Columbian exchange that lead to the widespread transfer of animals, plants, culture, human populations, technology, and ideas between the two worlds.
VIII. Describe the significance of food safety and the environmental impact.	1. State the importance of food safety on health. 2. Name the common culprits of biological, chemical and microbial food poisoning and effects on the human body. 3. Describe the major food borne parasites and fool spoilage. 4. Examine food related health risks. 5. Describe the rules of hygiene in food preparation. 6. Name the important government agencies are involved in regulating foods in the US.
IX. Understand the concepts of food processing.	1. Describe the objectives of food processing. 2. Understand the principle and common practices in food preservation. 3. Disclose common techniques in food preservation such as low temperature, canning, dehydration etc. 4. State the fermentation process, significance and examples from around the world. 5. Construe the pros and cons of processed versus unprocessed foods.
X. Describe the important role food additives in food industry.	1. Learn the common natural and synthetic food additives that are used globally. 2. Understand the role of additives in improving nutritional value, food processing and to improve appeal.

	3. Construe the categories of additives and understand the regulation of food additives (Food and Drug Act-GRAS). 4. Describe the role of FDA, WHO and FAO in monitoring additives.
XI. Explain the production of Carbohydrates globally and role in nutrition.	1. Describe basic carbohydrate chemistry and sources. 2. Understand the role of carbohydrates in the diet as the major energy source. 3. Describe the basics of cellular respiration. 4. Understand the role of Insulin and Glucagon in the human body homeostasis. 5. Construe the role of fiber in diet. 6. Explain Green revolution and how it improved cereal production the world over. 7. Express the contributions of Dr. Norman Borlaug.
XII. Understand sources of protein for food globally and its role in nutrition.	1. Expound basic protein chemistry and significance in diet. 2. Describe the role of proteins in the body. 3. Explain the sources of protein from plant, animal, fungal and algae. 4. Future challenges and technology to meet growing protein needs. 5. Illustrate the pros and cons of high protein diet trends.
XIII. Describe the process of fermentation and name some common fermented foods of the world.	1. Understand the process of fermentation and its nutritional benefits. 2. State the different types of food fermentation. 3. State the steps in the process of beer and wine making. Describe fermented drinks from around the world. 4. Describe the role of salt in certain fermentations for preservation. 5. Describe the process of fish sauce and soy sauce production. 6. Understand acid milks, yogurt, cheeses and fermented cereals. 7. Describe the production of meat like flavors by fermentation in Asia.
XIV. Understand the global significance of coffee and tea consumption.	1. Narrate the hot spots of coffee and tea cultivation and history in the world.

	2. Understand the basics of coffee and tea processing. 3. Comment on the health benefits of tea. 4. Types of tea and its phytochemical components and effects in the human body. 5. Explain the active ingredient in coffee and how it works in the human body. 6. Explain how the social movement of fair trade helps producers in developing countries achieve better trading conditions and promotes sustainability.
XV. Understand and appreciate the traditional food habits around the world.	1. Appreciate the ancient knowledge in traditional food of different civilizations through generations. 2. Understand that global food choices are dictated by religion and culture. 3. Discuss the vegetarian diet. 4. Decipher the pros and cons of the American diet. 5. Discuss food traditions of popular holidays and celebrations the world over.
XVI. Understand the concept of functional foods, food and health. Describe the pros and cons of current sugar substitutes available.	1. Describe the scientific reasoning behind functional foods. 2. Know the biologically-active compounds that has a clinically proven and documented health benefit. 3. Discuss role of functional foods in the prevention, management and treatment of chronic diseases of the modern age. 4. Understand the obesity epidemic around the world. 5. Describe the concept of genetic predisposition to certain metabolic diseases and nutrition modification to manage them. 6. Describe some common herbal remedies and science behind its effectiveness. 7. Understand what it means to eat mindfully. 8. Disclose the list of sugar substitutes in the market today and discuss its potential.
XVII. Understand the Organic food culture.	1. Understand the history behind the organic food movement.

	2. Know agricultural practice methods that comply with the standards of organic farming. 3. Understand that these standards differ worldwide and that organic farming in general features practices that foster cycling of resources, promote ecological balance, and conserve biodiversity. 4. Describe what the organic standards are and how they are enforced. 5. Construe the advantages of National Organic Standards and the Organic Foods Production Act of 1990 (OFPA). 6. Discuss if organic is a good alternative to industrialized agriculture food.
XVIII. Describe the basic concepts in modern food biotechnology.	1. Describe the central dogma of molecular biology which is the flow of genetic information within a biological system, proposed by Crick, 1956. 2. Construe the historical milestones that lead to the modern biotechnology revolution. 3. Understand the molecular process of gene expression. 4. Exemplify recombinant DNA technology and gene cloning. How is it different from earlier practices of breeding? 5. Explain how GMOs revolutionized the world food scene and contributes to alleviating world hunger.
XIX. Understand the significance of sustainable food production systems.	1. Explain how sustainability is the capacity to endure; it is how biological food systems remain diverse and productive indefinitely. 2. Learn the three pillars of sustainability and factors that contribute to sustainable food systems. 3. Know historical events that caused famine and food shortages. 4. Evaluate specific methods to improve sustainable agricultural practices. 5. Understand how societal and economic factors influence food production sustainability. 6. Express how moving towards sustainability is the current social challenge that entails ethical consumerism. 7. Describe the Sustainable Development Goals (SDGs).

XX. Understand the effect of climate change on world food systems.	1. Understand climate change and its overall consequences. 2. Understand the role of droughts and floods on food systems. 3. Evaluate impact of natural disasters on food production and distribution. 4. Learn about the role of precipitation on agricultural yield and food availability. 5. Relation between changing climate and agricultural pests and diseases. 6. Adaptation options in agriculture under climate change.
XXI Understand the future of food and sustainability	1. Discuss how we can create a sustainable food future to feed 9 billion people by 2050 in an ecofriendly manner accompanied by economic development. 2. Describe the challenges in meeting the world food requirements. 3. Aware of extends of poverty and hunger in the world today. 4. State possible solutions for world food security. 5. Develop possible combination of solutions to alleviate poverty, gender equity, ecosystem conservation, greenhouse gas emission reductions, and sustainable freshwater management to emerging food challenges.