

KINE350
SCIENCE OF NUTRITION
Course Outline Fall 2011
TR 9:30-10:45
Small Hall 110

Instructor: Ken Kambis, Ph.D.
Adair Hall 109
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Office Hours: **TR:** 12:30 – 1:30 **W:** 11:00-12:00

Course Description

Nutrition is a science that studies the effect of foods we consume on our health, growth, and reproduction. Whitney and Rolfe's text *Understanding Nutrition* (10th, 11th or 12th editions as well as online purchase of individual chapters at cengage.com/highered) will be the source of a scientific basis of nutrition and metabolism which is essential for an understanding of healthy nutrition. Highlighted supplements provide readings that include research in nutrition. Selected "hot topics in nutrition" will be discussed in class periodically.

This introductory science of nutrition course, which carries GER2B credit, will range from discussion of methods of scientific inquiry used to determine needs for individual nutrients through in-depth treatment of life-cycle nutrition issues. Beginning with review of development of theories and how they are tested, basic biochemistry and physiology are discussed. The anatomy of the gastrointestinal system is introduced along with a history of experiments that resulted in our present level of understanding of the physiology of nutrition. The course will deal with assessment of nutritional status and how we know that nutrition is essential to health. Large nutrients necessary for energy production and raw materials as well as vitamins and minerals are reviewed from a biochemical transformation and interaction perspective. Eating disorders, weight loss and gain, body composition changes, and factors that influence food consumption are discussed. Changes in the food supply relative to food processing, additives, naturally occurring toxicants, and microorganisms in food are covered. Nutrition throughout life: The unique needs of older adults, exercising individuals, pregnant and lactating women, infants, adolescents, and nutrition for special populations are also discussed. Consumer concerns about foods and water are addressed throughout the course.

Grading: **Quiz I, Quiz II, and the Final Exam each count 1/3 of the final grade.**

GER 2B Criteria:

1. **Provide the student with a body of knowledge within a particular scientific discipline**

Gaining a scientific body of knowledge involves the mastery of concepts and the development of the viewpoint specific to a particular scientific discipline. It is more than simply learning a set of facts. Knowledge of a particular science and its paradigms allows understanding of:

- A. What types of questions should be posed and how one can go about answering them;
- B. How scientific theories are developed and tested; and,
- C. The nature of science and the limits of empirical knowledge.

2. **Provide the student with an appreciation of the broader context for that knowledge**

GER2 courses also address issues that go beyond the body of knowledge of a particular discipline, such as the concepts that unify the natural sciences or how science has related to the broader cultural context. All GER2 courses achieve an understanding of at least three of the following:

- A. The character of natural laws;
- B. The role of mathematics in science;
- C. The centrality of cause and effect reasoning to the scientific world view;
- D. The fundamental importance of change and evolution;
- E. The characteristic scales and proportions of natural phenomenon;
- F. The historical development of science and its cultural and intellectual context.

Required texts:

Whitney, E.N., and Rolfes, S.R. *Understanding Nutrition*. 12th Edition. Thompson Wadsworth, Belmont, CA. 2010 (see Course Outline for suitable alternatives)

Reference text for the advanced student:

Shils, M.E., e al., *Modern Nutrition in Health and Disease*, 10th Edition. Lippincott Williams & Wilkins, Baltimore, MD 2006.

SCIENCE OF NUTRITION SYLLABUS

Lecture Series:

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|---------------------------------------|--|-------------------|
| I | GER2B Criteria, Scientific method, overview, food choices, psychology of hunger and appetite. | Slides, Chap. 1-2 |
| II | Anatomy and physiology of nutrition. Digestion, absorption and transport. | Chap. 3 |
| III | Carbohydrates: Metabolism, hexoses, bonding requirements and condensation, sugar alcohols, starch, dietary fiber. | Chap. 4 |
| IV | Lipids: Acid and methyl groups, the carbon chain, triglycerides, saturation, adipogenesis and lipolysis. | Chap. 5 |
| Quiz I: Tuesday, October 18 | | |
| V | Protein: Amino acids and side groups, essential AA's, denaturation. Digestion, absorption, and transport. | Chap. 6 |
| VI | Metabolism: Enzymes and coenzymes, biochemical reactions, transfer of energy, catabolism, oxidation. | Chap. 7 |
| | Energy balance, BMR, fatness, adaptive thermogenesis, weight control | Chap. 8-9 |
| VII | The Vitamins: Water soluble, fat soluble, absorption, transport, storage, deficiency diseases, toxicities. | Chap. 10-11 |
| Quiz II: Thursday, November 17 | | |
| VIII | Water and Minerals: Homeostasis, dehydration, PCOP, NaK Pump, pH, electrolytes, inorganic elements. Deficiencies and toxicities. | Chap. 12-13 |

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| IX | Nutrition and physical activity:
Principles of conditioning, female athlete triad: Eating disorders, amenorrhea and osteoporosis. Energy systems. | Chap. 14 |
| X | Processing, toxicology, world hunger, environmental issues. | Chap. 19-20 |

EXAM

Graduated Comprehensive Final Exam
Wednesday, December 14th, 9:00AM