NSC 475/575: Nutrigenomics for the Study of Disease Prevention and Intervention

INSTRUCTOR:
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SUGGESTED PREREQUISITES:
MCB 181R and L General Biology and lab
BIOC 460, 462A, or 364
MATH 110 or Higher
NSC 308: Nutrition and Metabolism

COURSE DESCRIPTION:
The elucidation of the human genome has created a unique opportunity to utilize nutrients and bioactive food components to improve the quality of life of people through the use of diet in the prevention and intervention of human disease. Nutrigenomics is the application of genomics to the study human nutrition and is useful in determining the role or relationship between nutrition and health. The focus of this class is the application of Nutrigenomics as it relates to the prevention or intervention of disease by providing or restricting the proper nutrients and food compounds to maintain homeostasis in the body from the biochemical level to organ systems. The ability for nutritionists and healthcare professionals to create an optimal diet requires an understanding of how innumerous interactions between nutrients and genes, proteins and metabolic pathways regulate disease pathways. The graduate version of the class contains an extra Unit of models and advanced online laboratory. A written research paper is also required.

The Professional Programs Committee has set guidelines for course workload requirements and expects 45 hours of time spent on classes for each 1 credit hour. Given that this is a 3-credit class taught over 7.5 weeks, the expected workload for this course is a minimum of 18 hours of time spent on readings, course activities and assignments per week.

COURSE DESIGN:
This course is a traditional college course with a midterm and final. Lectures are short, online primers to guide the week’s lesson. At the beginning of every week reading assignments, lecture materials and quizzes will be posted. A discussion board post with questions and a Voice Thread assignment will also be required after each Unit. Reading questions via online assessments (quizzes) will be due weekly. Midterm and final are written.

SPECIAL NOTES:
• You are required to read the Announcements Section to stay updated. News additions may supersede what is written on the syllabus.
• If there is a grade mistake, you have 1 week following the assignment return date to adjust the grade.

TEXTBOOK REQUIREMENTS:

COURSE OBJECTIVES:
Students will develop an understanding of nutritional genomics and its individual components. They will develop an up-to-date knowledge of the role of nutrition and gene interactions as they relate to disease prevention and intervention. Students will develop the ability to understand bioinformatics and genetic data pertaining to gene-nutrient interaction. Additionally, students will be able to identify the appropriateness of studies and techniques in this field by understanding methodologies and scientific inquiry.
COURSE OUTCOMES:
Students will be able to:
- Identify nutrients and their function in normal health and potential genetic interaction
- Define and describe bioinformatics as it relates to other course material
- Complete experimental online exercises examining Nutrigenomic-based approaches to disease prevention and intervention.
- Determine nutrient/drug and target validation

COURSE POLICY:
Participation is necessary to be successful in this course. We will have on-line discussions and cover topics that will appear on quizzes and tests. Students will be responsible for knowing assignment and test dates and making arrangements to complete or hand-in work BEFORE if there is a conflict, unless a valid physician or administrator note is provided. There will be no “make-ups”.
If you believe an assignment, quiz or test was graded or recorded incorrectly, you will have 7 days from the time the grade is posted to notify me of the error. Otherwise, the grade will remain unchanged.

INCOMPLETES:
Incompletes will be issued on an individual basis and only if the first ¾ of the course has been completed.

UNDERGRADUATE GRADING:
Letter grades will be given according to the University Grading System and will be determined by your final numeric score:

1. Quizzes will be worth 10 points each, for a total of 90 points
2. Exams (midterm and final) will be worth 50 points each, for a total of 100 points
3. Unit Discussions (3 total) will consist of 30 points.
4. Journal article evaluations (1 total Voice Thread Assignments) will consist of 10 points

For NSC 475 the final course grade will be based upon your percentage of possible points. All points are weighted equally. All quizzes and exams must be taken and Quizzes or exams that are missed have to be taken as soon as possible. There will be no curving of scores or extra credit work.

GRADUATE GRADING:
Letter grades will be given according to the University Grading System and will be determined by your final numeric score:

1. Quizzes (9 total) will consist of 90 points
2. Exams (midterm and final) will be worth 50 points each, for a total of 100 points
3. Unit Discussions (3 total) will consist of 30 points.
4. Journal article evaluation (1 total Voice Thread Assignments) will consist of 10 points
5. Advanced Laboratory Discussion/Term Paper 40 points

For NSC 575 the final course grade will be based upon your percentage of possible points. All points are weighted equally. All quizzes and exams must be taken and Quizzes or exams that are missed have to be taken as soon as possible. There will be no curving of scores or extra credit work.

Both Graduate & Undergraduate letter grades will be determined by the following percentages of coursework:

A = 90% and above
B = 80% and above
C = 70% and above
D = 60% and above
E = less than 60%

SCHEDULE OVERVIEW
Unit 1 Introduction to Nutrigenomics
i. Overview of Nutrigenomics
ii. Bioactive Food Components
iii. Bioactives and their function
iv. Interaction of Molecules with Genes

Unit 2. Nutrition, Disease, and Associated Target Genes
i. Overview of Disease and Nutrition
ii. Inflammation and Associated Target Genes
iii. Obesity and Associated Target Genes
iv. Cancer and Associated Target Genes

Written Midterm-Covering Units 1 and 2

Unit 3. Screening for Bioactive Nutrients and Compounds
i. Introduction to Control of Gene Expression
ii. Introduction to DNA Microarrays

Unit 4. Methods for Target Validation
i. Methods for Target Validation
ii. Mouse Models

Lab Assignment/Paper Due (Graduate course only)
Written Final Exam-Covering Units 3 and 4

CLASSROOM BEHAVIOR:
The Arizona Board of Regents’ Student Code of Conduct http://dos.web.arizona.edu/uapolicies/scc5308abcd.html#sccphilosophy, ABOR Policy 5-308, prohibits threats of physical harm to any member of the University community, including to one’s self. See: http://policy.arizona.edu/threatening-behavior-students

SPECIAL NEEDS & ACCOMMODATIONS STATEMENT
Students who need special accommodation or services should contact the Disability Resources Center, 1224 East Lowell Street, Tucson, AZ 85721, (520) 621-3268, FAX (520) 621-9423, email: uadrc@email.arizona.edu, http://drc.arizona.edu/. You must register and request that the Center or DRC send me official notification of your accommodations needs as soon as possible. Please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate. The need for accommodations must be documented by the appropriate office.

STUDENT CODE OF ACADEMIC INTEGRITY:
Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: http://deanofstudents.arizona.edu/codeofacademicintegrity

CONFIDENTIALITY OF STUDENT RECORDS:
http://www.registrar.arizona.edu/ferpa/default.htm

SUBJECT TO CHANGE STATEMENT:
Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.