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App 3/2/00
Senate App 5/2/00

CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

I. CONTACT

Contact Person Rita M. Johnson Phone x 3281
Department Food and Nutrition

II. PROPOSAL TYPE (Check All Appropriate Lines)

xxx **COURSE** Advanced Nutrition
Suggested 20 character title
 New Course * _____
Course Number and Full Title
xx **Course Revision** FN 458/558 Advanced Human Nutrition
Course Number and Full Title
 Liberal Studies Approval + _____
for new or existing course Course Number and Full Title
 Course Deletion _____
Course Number and Full Title
 Number and/or Title Change _____
Old Number and/or Full Old Title

New Number and/or Full New Title
 Course or Catalog Description Change _____
Course Number and Full Title

 PROGRAM: **Major** **Minor** **Track**
 New Program * _____
Program Name
 Program Revision * _____
Program Name
 Program Deletion * _____
Program Name
 Title Change _____
Old Program Name

New Program Name

III. Approvals (signatures and date)

Joanne B. Steiner *Joanne B. Steiner*
Department Curriculum Committee Department Chair
Mary E. Seunba 4/26/99 *Charles J. Foxi*
College Curriculum Committee College Dean

+ Director of Liberal Studies (where applicable)

* Provost (where applicable)

FN 458/558

Advanced Human Nutrition

(4c-0l-4sh)

Prerequisites: FN 355, CH 255 or CH 351, MA 217

In-depth study of the nutrients and their function within the cell. Incorporation of the principles of physiology and biochemistry in the study of nutrition. Emphasis placed on applying current research and evaluation of research methodology.

I. Catalog Description

FN 458/558	Advanced Human Nutrition	4 credits 4 lecture hours 0 lab hours (4c-0l-4sh)
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Prerequisites: FN 355, CH 255 or CH 351, MA 217

In-depth study of the nutrients and their function within the cell. Incorporation of the principles of physiology and biochemistry in the study of nutrition. Emphasis placed on current research and evaluation of research methodology.

II. Course Objectives

Upon completion of the course, the student enrolled in FN 458/558 will:

1. critically integrate previously learned principles of nutrition, anatomy, physiology, and biochemistry to metabolism.
2. state the detailed physiologic processes of digestion, absorption, and transport of the macro and micro-nutrients and ethanol.
3. explain the role of macro- and micronutrients in cellular metabolism.
4. describe selected biochemical pathways or mechanisms and apply these to overall nutrient requirements or nutritional status.
5. describe biochemical aspects of nutrition assessment for selected vitamins and minerals.
6. state the functions of nutrients on the synthesis of selected neurotransmitters.
7. differentiate among qualitative and quantitative types of nutrition research methodologies.
8. apply statistical knowledge to primary nutrition research literature.
9. apply selected research findings to practical nutrition applications.
10. communicate using scientifically appropriate language both verbally and in writing.

III. Course Outline

(56 hours - 4, one hour exams = 52 hours of class time in one semester)

- A. Introduction/Nutrition Research Methodologies (5 hours)
 - 1. Descriptive Studies
 - 2. Analytical Surveys
 - 3. Experimental Method
 - 4. Use of Statistics in Interpreting Research
(mean, median, mode, t-test, analysis of variance)
 - 5. Reading Scientific Tables in Nutrition Research
- B. The Recommended Dietary Allowances (2 hours)
 - 1. History and Purpose
 - 2. Scientific Basis for Recommendations
 - 3. Revisions of Recommendations
- C. The Gastrointestinal Tract (5 hours)
 - 1. Review of Anatomy and Physiology
 - 2. Specialized Cells of the Gastric and Intestinal Epithelium
 - 3. Enzymes of Digestion
 - 4. Digestion of Carbohydrate, Protein, Lipid, and Fiber
 - 5. Application to Gastrointestinal Diseases (e.g. Dysphagia, Gall Bladder, Constipation, Diverticulosis)
- D. The Fat Soluble Vitamins: Absorption/Function/Assessment of Nutritional Status/Application of Current Research (6 hours)
 - 1. Vitamin A
 - 2. Vitamin D
 - 3. Vitamin E
 - 4. Vitamin K
 - 5. Applications (e.g. β -carotene as an antioxidant, Vitamin D and latitude, Vitamin E and low density lipoprotein oxidation)
- E. The Water Soluble Vitamins: Absorption/Function/Assessment of Nutritional Status/Application of Current Research (9 hours)
 - 1. Thiamin
 - 2. Riboflavin
 - 3. Niacin

4. Vitamin B₆
 5. Folate
 6. Vitamin B₁₂
 7. Biotin
 8. Vitamin C
 9. Applications (e.g. B vitamin needs of athletes, Homocysteinemia and heart disease, Vitamin B₁₂ and senility)
- F. The Macrominerals: Absorption/Function/Assessment of Nutritional Status/Application of Current Research (4 hours)
1. Calcium
 2. Phosphorus
 3. Magnesium
 4. The Electrolytes: Sodium, Potassium, and Chloride
 5. Applications (e.g. measures of bone mass, magnesium needs of women, fluid balance and athletic performance)
- G. The Microminerals: Absorption/Function/Assessment of Nutritional Status/Application of Current Research (6 hours)
1. Iron
 2. Zinc
 3. Copper
 4. Chromium
 5. Iodine
 6. Selenium
 7. Applications (e.g. iron supplements in the elderly, zinc and the common cold, selenium and cancer, chromium and weight loss)
- H. Review of Enzyme Regulation (2 hours)
1. Allosteric Modification
 2. Covalent Modification
 3. Cyclic AMP modified reactions as applied to key enzymes in macronutrient metabolism
- I. Carbohydrate Metabolism (3 hours)
1. Review of Glycogenesis, Glycogenolysis, Glycolysis
 2. Gluconeogenesis
 3. Hormonal Regulation of Carbohydrate Metabolism
 4. Diabetes and The Exercising Diabetic
- J. Lipid Metabolism (6 hours)

1. Review of Triglyceride Metabolism
 2. Ketone Formation and Relationship to Carbohydrate Intake
 3. Alcohol Catabolism
 4. Hormonal Control of Triglyceride Metabolism
 5. Lipoprotein and Apolipoprotein Metabolism
 6. Eicosanoids and Heart Disease
 7. The Relationship of Individual Fatty Acids to Cardiovascular Disease Risk
 8. The Effect of Selected Drugs on Cholesterol Metabolism
- K. Protein Metabolism (4 hours)
1. Amino Acid Catabolism for Energy Yield
 2. The Importance of Glutamine, Glutamate, Alanine: Intra-organ exchange
 3. The Urea Cycle
 4. Neurotransmitter Synthesis: Serotonin, Dopamine, Norepinephrine, Epinephrine
 5. Application (e.g. glutamine as a gut fuel, carbohydrate intake on serotonin synthesis)

IV. Evaluation Methods

Undergraduate Students

4 exams @ 100 pts	400 pts
Final exam @ 100 pts	100 pts
2 homework questions @ 15 pts	30 pts
5 in-class quizzes @ 20 pts	100pts
	630 pts

90 - 100% = A, 80 - 90% = B, 70- 80% = C, 60-70% = D, <60% = F

V. Required Textbook and Readings

Groff, J.L., Gropper, S. S. & Hunt, S.M. (1995). Advanced Human Nutrition and Metabolism (2nd ed.). St. Paul, MN: West Publishing.

VII. Bibliography (used Spring, 1999)

In order of use:

1. International Food Information Council Foundation. (1997). How to understand and

interpret food and health-related scientific studies. Washington, DC.

2. Mortensen L. & Charles, P. (1996) Bioavailability of calcium supplements and the effect of vitamin D: comparisons between milk, calcium carbonate, and calcium carbonate plus vitamin D. American Journal of Clinical Nutrition, 63, 354-357.
3. Yates, A. A., Schlicker, S. A. & Suitor, C.W. (1998) Dietary reference intakes: the new basis for recommendations for calcium and related nutrients, B vitamins, and choline. Journal of the American Dietetic Association, 98, 699-706.
4. Institute of Medicine, Food and Nutrition Board. (1998) Dietary reference intakes for thiamin, riboflavin, niacin, vitamin B-6, folate, vitamin B-12, pantothenic acid, biotin, and choline. Washington DC: National Academy Press.
5. McBean, L.D. (1998, July/August). Special dietary needs of mature Americans. Dairy Council Digest, 69, 19-24.
6. Addis, P. B. (1990, March/April). Coronary heart disease: an update with emphasis on dietary lipid oxidation products. Food and Nutrition News, 62, 1-4.
7. Zock, P. L. & Katan, M. B. (1998). Diet, LDL oxidation, and coronary artery disease. American Journal of Clinical Nutrition, 68, 759-760.
8. McCully, K. S. (1998). Homocysteine, folate, vitamin B-6 and cardiovascular disease. Journal of the American Medical Association, 279, 392-393.
9. Malinow, M. R., Duell, P. B., Hess, D. L., Anderson, P. H. Kruger, W. D., Phillipson, B. E. & Gluckman R. A. (1998) Reduction of plasma homocyst(e)ine levels by breakfast cereal fortified with folic acid in patients with coronary heart disease. The New England Journal of Medicine, 338, 1009-1015.
10. Iron nutrition and cognitive development. (1998, Spring). Food and Nutrition News.
11. Havel, R. J. (1999) Dietary supplement or drug? The case of cholestin. American Journal of Clinical Nutrition, 69, 175-176.
12. Heber, D., Ian, Y., Ashely, J. M., Elashoff, D. A., Elashoff, R. M. & Vay Liang, W.G. (1999) Cholesterol-lowering effects of a proprietary Chinese red-yeast-rice dietary supplement. American Journal of Clinical Nutrition, 69, 231-236.

Proposal to Change FN 458, Advanced Human Nutrition, from a 3 credit to a 4 credit Course

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Summary of Proposed Revisions

The proposed revision for this course is to increase it from three to four credits with an accompanying increase in the amount of information to be discussed. This revision also adds MA 217, Probability and Statistics, and FN 355, Nutrition in Disease I as prerequisites. Currently, neither MA 217 or FN 355 are prerequisites. The current catalog states that CH 255 may be taken concurrently. This proposal deletes “may be taken concurrently” and adds that either CH 255 or CH 351 are prerequisites. This proposal more closely matches the current focus of this course and proposes to expand its content.

Justification/Rationale for the Revision: FN 458

This course has been offered by the Department of Food and Nutrition for many years. The most recent syllabus of record is dated November, 1983. Two reasons are summarized below to support the revision of this course. However, from a curriculum perspective, the addition of this one credit will not affect the overall 124 credit hours needed to graduate with a Bachelor's degree in Dietetics (or Nutrition, as proposed). In the fall of 1996, the Biology Department reduced the number of credits of BI 105, Cell Biology, from 4 credits to 3.

Students who take this course will benefit from an increase in credits because nutrition claims and research have greatly expanded in their scope since this course originated. These claims and research are often directly applied to the American population via the mass media, but as food and nutrition pre-professionals, dietetic majors must be able to fully understand and analyze them. While a prerequisite course, FN 212, Nutrition, discusses many of these as they relate to the macronutrients (carbohydrate, lipid, and protein), issues with the micronutrients (vitamins and minerals), and advanced application of biochemistry and nutrition (CH 255) is needed.

In addition to the increasing amount of nutrition research available, students are challenged in this capstone course to integrate knowledge learned in two (and in this proposal, five) previous courses (BI 155, FN 212, CH 255, MA 217, FN 355). Most students find this integration and application quite difficult and their questions, in class, often reflect this.

Students enrolled in FN 458 from both the Spring 1997 and Fall 1996 semesters were asked about increasing the credits to 4 and about a participatory experience that was recently added. A summary of their responses are in Part III of this proposal.

FN 458/558

Advanced Human Nutrition

3 s.h.

I. Catalog Description

Study in depth of the nutrients and their functions within the cell. Incorporation of the principles of physiology and biochemistry in the study of nutrition. Emphasis on current research and evaluation of research methodology. (3 hours lecture) Prerequisite: CH 351 or 355 or concurrently, FN 212

II. Competencies

The student will:

- A. describe cell organelles and functions.
- B. distinguish between the functioning of normal and malnourished cells.
- C. explain the role of each essential nutrient in cellular metabolism.
- D. explain the role of nutrition in maintaining immunity.
- E. describe and utilize criteria for evaluating research methodology.

III. Course Outline By Topic

- A. Research Methodology
- B. Evaluation of Professional Literature
- C. The Cell and Its Growth
- D. Specialized Cells
- E. Energy Yielding Nutrients
- F. B-Complex Vitamins
- G. Vitamin C
- H. Fat Soluble Vitamins
- I. Minerals
- J. Immunity
- K. Malnutrition and Deficiency Diseases

IV. Evaluation

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A. Midterm exam

B. Term project

V. Text

Goodhart and Shils. Modern Nutrition in Health and Disease, 6th edition.

VI. Supplementary Materials

Pike and Brown. Nutrition: An Integrated Approach.

Professional journals

VII. Special Provisions

A. Term project will be the development of a research design based on a review of current literature.

B. Midterm exam will test student's ability to integrate course material in problem solving.

VIII. Susan Shank Dahlheimer

November, 1983

Part III. Student Statements of Support

The following represent student responses to two questions that students were asked when the student evaluation instrument was distributed.

A. Four credit course

The question about this course becoming a 4 credit course was asked differently in the Fall 1996 and Spring 1997 semesters.

Fall, 1996

This semester two "sections" were added. This caused us to get behind. The two sections were (1) spending quite a bit of time on reading scientific tables, and (2) learning about the RDAs, USRDAs, and RDIs. What do you think? Choose as many as you like.

- A. You shouldn't include the part about the RDAs anymore; we learn that in other classes.
n = 3; 21%
- B. You shouldn't spend as much time on reading tables; we learn that in other classes.
n = 0; 0%
- C. You should make this a 4 credit class.
n = 11; 79%

Spring, 1997

Do you think that I should propose that this course be a 4 credit class?

- A. Yes, I would appreciate knowing your reason why on the back of this sheet. n=20; 91%
- B. No, I would appreciate knowing your reason why on the back of this sheet. n=2; 9%

20, 91% chose "A"

2, 9% chose "B"

Verbatim remarks:

1. "More homework would justify the 4 credit status; remember to cut quizzes."
2. "Yes, because it is one of the more difficult or most difficult classes we take. It requires a lot of time."
3. "If this course became worth 4 credits I would hope 4 hours of class would be held. An

extra hour of class would be beneficial in allowing you to cover more information."

4. "I feel it should be 4 credits because of the amount of work you do in the class and also, I feel it is taught @ a higher level."
5. "There is too much work for only 3 credits. The work helps students learn but it is overwhelming."
6. "I think this should be a 4 credit course, b/c of the amount of information we need to know for each test and the fact that there are a lot of assignments."
7. "Its a lot of work, which deserves 4 credits, but then if you do poorly, 4 credits would end up hurting your QPA more."
8. "The course should be 4 credits because of the amount of work and content of the class."
9. "The workload is much, much larger than a usual 3 credit course. If taping the course is a required task for the class, a student would need 4-5 hours a night going over the tape and studying the material. Isn't it 2 hours for every hour of in class time/night? Also, the material, is covered way too fast." (Note: This student refers to the preference of some students to audiotape this course.)
10. "I think this class should be 2 semesters long. There is so much information and we didn't get to cover it all."
11. "Because there is a lot of material covered."
12. "The work load is much more than some classes @ same credit. There is also a great deal of evaluating and critical thinking. Often not encountered in 3 cr courses."
13. "Simply b/c there is too much work to cram into the time frame, especially with students who must take other time-consuming classes such as experimental at the same time."
14. "Enormous amount of valuable material to be covered. Maybe even 2 semesters worth to do it completely right."

B. 5 Minute Summaries

In the fall of 1996, after the instructor attended the Summer Teaching Academy, she instituted a "5 minute summary" of the previous class session. Each student is responsible for organizing a

summary, once each semester, and presenting it to the class. These summaries may take 10 or 15 minutes, depending on an additional review/explanation of topics that were not well understood. Students state that they like this addition of "5 minute summaries".

Fall, 1996

This semester each student gave a "5 minute summary". What do you think? Choose one.

- A. Yes n = 14; 93%
- B. No n=1; 7%

Spring, 1997

This is the second semester that students have given a "5 minute summary". Did you, personally, benefit from these?

- A. Yes n = 17; 77%
- B. No n = 5; 23%

April 20, 1999

To: Mary Swinker
Chair, College Undergraduate Curriculum Committee

From: Rita Johnson
Department of Food and Nutrition

Subject: Revision of Course Proposal

Mary, please find attached the course proposal to increase the number of credits for Advanced Human Nutrition, FN 458, from 3 credits to 4 credits. The undergraduate curriculum committee made some minor recommendations last spring, which I have made. These changes include:

1. Omitting credit, lecture, and lab hours on the catalog description page.
2. Omitting attendance policy.
3. Omitting references to FN 558 since a change to this course must be approved by another committee.
4. Addition of a grading scale (e.g. 90 - 100% = A).
5. Using the APA style for the text and bibliography.
6. Emphasizing that the one credit increase in this course does not increase the number of credits needed to graduate - see justification section.
7. Updating the references to reflect those used this semester.

I hope that these revisions meet with your approval. My understanding was that the committee did not need to completely review this course again and that it only needed to come to you. Thank you for your consideration.

4CRDSYLL

Subject: Adding MA 217 as a prerequisite to FN 458

Date: Wed, 16 Feb 2000 22:49:26 -0500

From: Joanne Steiner <jsteiner@grove.iup.edu>

Organization: Chair, Food and Nutrition

To: JBuriok@grove.iup.edu

CC: Joanne Steiner <jsteiner@grove.iup.edu>

I have just come across another course that is the same as my previous memo. We would like to add MA 217 as a prerequisite to FN 458 Advanced Human Nutrition. Emphasis in this course is placed on applying current research and evaluation of research methodology.

Another email reply would be appreciated.

--

Joanne B. Steiner
Chair, Food and Nutrition

Subject: Adding MA217 as a prerequisite

Date: Thu, 17 Feb 2000 13:17:29 -0500

From: Jerry Buriok <jburiok@grove.iup.edu>

To: jsteiner@grove.iup.edu

CC: Jerry Buriok <jburiok@grove.iup.edu>

Dr. Steiner,

In response to your memos stating you wish to add MA217 Probability and Statistics to the prerequisites for FN362 Experimental Foods and FN458 Advanced Human Nutrition, I want to inform you the Mathematics Department is totally supportive of the proposal. As you pointed out in your memo, students in the Food and Nutrition department are required to complete MA217 anyway, so there should be no impact on total enrollment. Since we offer approximately ten sections of MA217 each semester and 4 sections in the summer, we should be able to accomodate changes in enrollment patterns within an academic year, should your students find it advantageous to take the course in a certain timeframe.

Thank you for informing me of your proposal. Rest assured we are anxious to accomodate your students and continue the excellent working relationship our departments have developed over the years.

Gerald Buriok, Chairman
Mathematics Department