



Department of Sociology, Social Work and Family Sciences

NUT 3065 – Advanced Nutrition

3 units

Fall 2022

<b>Meeting days:</b> Mon/Wed	<b>Instructor title and name:</b> Prof Cindy Swann, MS, RD, CDCES
<b>Meeting times:</b> 8:15-9:30	<b>Phone:</b> 619-849-2351
<b>Meeting location:</b> Evans 122	<b>E-mail:</b> cindyswann@pointloma.edu
<b>Final Exam:</b> Mon. 12/12 7:30-10:00 am	<b>Office location and hours:</b> Evans 134 Mon/ Wed 9:45-10:45; Tues/Thurs 9-9:45 am, 1:00-1:25 pm or by appt.

PLNU Mission:

To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

GOALS AND OUTCOMES:

Course Description:

Theories are integrated from physiology, biochemistry and nutrition to provide an in-depth study of nutrients and their role in human metabolism. Current research on human metabolic processes is analyzed. Laboratory applications. Three (3) semester unit credits.

Dietetic Learning Outcomes:

1. Demonstrate content knowledge of food and nutrition as well as concepts and theories of nutrition across a broad range including: lifecycle stages, cellular nutrition, disease prevention and medical therapy; food and food systems; development, modification, and evaluation of recipes, menus and food products.
2. Identify and assess scientific literature to evaluate current evidence-based research related to dietetic topics.
3. Evaluate the effects of societal, cultural, ethical and financial dynamics upon diet trends, dietary choices, and food preparation methods among families and societies.

NUT 3065 Course Student Learning Outcomes:

1. Define in-depth nutrient roles.
2. Describe how macronutrients are digested and absorbed.
3. Outline major biochemical pathways.
4. Explain specific reactions for vitamins and minerals as cofactors.
5. Draw the nutrient chemical structures.
6. Distinguish the relative importance of various foods as sources of nutrients.
7. Examine recent scientific literature in referred journals.

8. Analyze reports concerning research findings on various nutrients.
9. Practice spectrophotometric procedures on measurement of various blood nutrient levels.
10. Interpret and report data in a research paper.

**AND's KRDN Didactic Course Core Knowledge for the RDN in DPD Programs based on 2022 Standards:**

KRDN 1.1: Demonstrate how to locate, interpret, evaluate and use professional literature to make ethical, evidence-based practice decisions.

KRDN 1.2: Select and use appropriate current information technologies to locate and apply evidence-based guidelines and protocols.

KRDN 1.3: Apply critical thinking skills.

KRDN 2.1: Demonstrate effective and professional oral and written communication and documentation.

KRDN 2.9: Defend a position on issues impacting the nutrition and dietetics profession.

KRDN 3.4: Practice routine health screening assessments, including measuring blood pressure and conducting waived point-of-care laboratory testing (such as glucose or cholesterol).

COURSE CREDIT HOUR INFORMATION. In the interest of providing sufficient time to accomplish the stated Course Learning Outcomes, this class meets the PLNU credit hour policy for a 3 unit class delivered over 17 weeks. Specific details about how the class meets the credit hour requirement can be provided upon request.

**ESSENTIAL INFORMATION:**

**Required Text:**

Gropper, S.S., Smith, J.L. and Groff J.L. Advanced Nutrition and Human Metabolism, 8<sup>th</sup> ed. Cengage Learning, 2022.

**Lecture Notes:**

Available on Canvas. Print out and bring to lecture class or follow along on personal computers.

**Canvas Learning Management System:**

All lecture notes, chapter quizzes and most assignments are located here.

1. Please use **Chrome** as your browser.
2. Go to [canvas.pointloma.edu](https://canvas.pointloma.edu).
3. Create a shortcut or bookmark to this site.
4. Log in with your PLNU username and password.

**COURSE REQUIREMENTS AND STANDARDS:**

**Course Grading Criteria:**

13 Chapter quizzes @ varying pts.	~150 (LO# 1)
4 Term Exams @ 100 pts. each	400 (LO# 1)
Written Research Study	100 (LO# 1,2,3)
1 Oral Presentation @ 50 pts. each	50 (LO# 1,2,3)
4 Laboratory Reports @ 15 pts. each	60 (LO# 1)
Diet and Activity Study	100 (LO# 1,2,3)
Blood Glucose Journal	30 (LO# 1)
Debate	25 (LO# 1,2,3)
Final Exam	100 (LO# 1)
Review Questions/Discussions on Canvas	<u>varying points</u>
<b>TOTAL POINTS</b>	<b>~ 1000 points</b>

**Attention NUT students: You are required to turn in a portfolio project as a senior. Keep any and all graded work you want to showcase.**

**Grade Distribution:**

<b>GRADE</b>	<b>PERCENTAGE RANGE</b>	<b>GRADE</b>	<b>PERCENTAGE RANGE</b>
A	≥ 93%	C	73-76%
A-	90-92%	C-	70-72%
B+	87-89%	D+	67-69%
B	83-86%	D	63-66%
B-	80-82%	D-	60-62%
C+	77-79%	F	≤ 59%

**Projects:**

**Diet Activity Report**

See Canvas for full directions on this project. This project involves recording your dietary intake, and every minute of activity for three consecutive days. You will analyze your dietary intake by hand and compare it to three sets of recommendations: the DRIs, MyPlate guidelines, and US Dietary Guidelines. You will calculate your 24-hour activities using the appropriate METs. A summary report will be written for each method used, and then energy intake vs output will be compared. Lastly, a conclusion summarizing goals on how your daily diet and activities could be adapted to better meet the guidelines will be crafted.

**Laboratory Experiment Report Format**

A written report will be required to turn in following each lab experiment performed. The report will consist of the following six parts:

1. Objective: what did you measure? What was the point of the experiment?
2. Principle: how did the experiment happen? What reacted to produce a compound that could be measured?
3. Procedure: Step by step directions in how to measure the compound.
4. Raw Data: all readings from the spectrophotometer and all calculations must be shown here.
5. Final Data: What results did you obtain? What was the standard (known value) you were to obtain?
6. Discussion/Conclusion: Were your results accurate? If not, what were some potential sources of errors? Were your results precise? If not, what sources of error may have altered your results? What do the results mean to your patient? Are they in the normal range or not? If not, what could the results indicate? Remember to provide references for your “facts”.
7. We will do five (5) lab experiments during class. A lab report will be due the next class period after the lab. Each report is worth 15 pts.

**Debate**

Topic = Low Carb/Keto/Atkins diets. Research the pros and cons of low carb diets. This debate will be a “tag” format. When you are called on, you must state a fact about low carb diets that is the opposite side of the argument than your classmate. For instance, if the student before you stated a “con”, you must summarize their statement, then state a “pro”.

## Oral Presentations

Each student will choose one vitamin or one mineral to teach to the class. A 10 minute presentation will be prepared and presented that will include the nutrient's functions, active form, food sources, RDA values, deficiency/toxicity symptoms, and method of assessment. Additionally, a journal article on this nutrient will be presented. A variety of presentation methods may be utilized, but should include a visual presentation, as well as a handout to be used as a study guide.

## Research Report Guidelines

The purpose of this assignment is to conduct a research project in its entirety. Each student will be responsible for collecting data, and writing their own paper. The project will consist of several parts.

1. In class, we will practice conducting laboratory experiments on test "blood" reagents. Then you will choose one test kit to use for your research report (ex. cholesterol, triglycerides, glucose, albumin, iron)
2. Sign up with me for an appointment with the Wellness Center for a blood draw. This will be your "pre-diet" test vial. (I will bring in a sign-up sheet to the class for appointments.)
3. Change your diet to attempt to result in a change in this blood value. Write out how your diet will change, and give a sample. For example, add an egg to your diet every day to see if your blood cholesterol level changes; or eliminate red meat in your diet for two weeks to see if it affects your iron status. Follow your diet for two weeks. Keep a journal of what you ate.
4. After at least two weeks, sign up with me for a second appointment with the Wellness Center for a blood draw. This will be your "post-diet" test vial.
5. Run the lab experiment on your pre- and post-diet blood vials (see syllabus for assigned date).
6. Write a research paper. A research report consists of 6 parts:

A. Introduction: Students decide their own hypothesis. For instance, you may want to report on the assumption that increasing your saturated fat levels will raise your blood cholesterol values. The introduction generally has a few paragraphs describing the basic components of the nutrients. For example, what are saturated fats and where are they found, how do they affect blood cholesterol, etc. Next, conduct a literature review and outline what studies have been done on this topic in the past, summarizing what has been found. A literature review/introduction section should be ~5 pages (double spaced). Finish the section by stating the hypothesis of this research project.

B. Methods and Materials: in this section, report exactly how the research was conducted and the materials used. The methods section should be so clear, and complete, that I could repeat your exact study. Examples are a description of the subject(s), the environment, the diet followed, how the blood was drawn and prepared, and the laboratory equipment used. Think of this section as a recipe, **except the text is written in paragraph form** (do not list materials).

C. Results: generally, this is a summary of the data shown in concise graphs or tables with verbal text describing in paragraph form the contents of each graph or table. The raw data and any calculations done will be housed in the appendices. In this section, just report the facts. Write in the third person, past tense, with no opinion given, or discussion made. This will be a very brief section since you are just reporting the pre and post blood values, and the statistics of how compliant you were with your diet changes.

D. Discussion: this section should complete a full circle from your hypothesis and introduction material. Here you will compare or contrast your results to the literature reported, evaluate your procedures and techniques used, and summarize your findings. Finish with a brief conclusion.

E. Reference page: Follow the *Journal of Nutrition* format for referencing all articles used in your paper. Within the body of the paper, you may use the number system, or author/year system when referencing.

F. Appendices: all raw data used, such as diet log, raw data from the lab experiments, etc.

## DAILY SCHEDULE:

<u>Tentative Lecture Schedule</u>			
<u>Date</u>	<u>Lecture Topic</u>	<u>Chp Readings</u>	<u>Assignment Due</u>
Week 1 Tues, 8/30 Wed, 8/31	Course Intro; Cell Review Digestive System <b>(Start 3-day diet record on Thurs or Sun)</b>	1,2	Quiz 1/ <b>Introduce Self</b>
Week 2 Mon, 9/05 Wed, 9/07	<b>HOLIDAY</b> Energy/Start Carbohydrates	2,3	Quiz 2
Week 3 Mon, 9/12 Wed, 9/14	Carbohydrates Finish Carbs / Glucose Lab (Sator Hall, rm 120)	3	Quiz 3 <b>Glycolysis overview</b>
Week 4 Mon, 9/19 <b>Wed, 9/21</b>	Fiber <b>Exam 1</b>	4	Quiz 4
Week 5 Mon, 9/26 Wed, 9/28	Lipids Lipids	5 5	<b>Glucose lab report</b> Quiz 5
Week 6 Mon, 10/03 Wed, 10/05	Triglyceride / Cholesterol Lab (Sator Hall, rm 120) Lipids / Protein	6	<b>Chol lab report</b>
Week 7 Mon, 10/10 Wed, 10/12	Protein Protein/Body Composition	6 6,8	Quiz 6/ <b>Trig lab report</b>
Week 8 <b>Mon, 10/17</b> <b>Wed, 10/19</b>	Albumin (Sator Hall, rm 120) <b>EXAM 2 (Start 2 week diet change)</b>		<b>Diet/Activity report</b>
Week 9 Mon, 10/24 Wed, 10/26	Energy Balance Metabolism	8 7	Quiz 8/ <b>Albumin lab report</b> Quiz 7
Week 10 Mon, 10/31 <b>Wed, 11/02</b>	<b>Debate / Metabolism</b> <b>Oral Reports on Vitamins</b>	7 9	Quiz 9
Week 11 <b>Mon, 11/07</b> Wed, 11/09	<b>Oral Reports on Vitamins</b> Pre- and Post-diet labs (Sator Hall, rm 120)	10	Quiz 10
Week 12 Mon, 11/14 <b>Wed, 11/16</b>	Finish Vitamins/Review <b>EXAM 3</b>		

Week 13	Mon, 11/21	Macrominerals	11	Quiz 11
	<b>Wed, 11/23</b>	<b>Holiday</b>		
Week 14	<b>Mon, 11/28</b>	Fluid & Electrolyte Balance	14	Quiz 12/ <b>Blood Glucose Journal</b>
	Wed, 11/30	Microminerals	12	Quiz 13
Week 15	<b>Mon, 12/05</b>	<b>EXAM 4</b>		
	<b>Wed, 12/07</b>	Final Review		<b>Research Paper due</b>
Week 16	<b>Mon, 12/12</b>	<b>Final Exam</b>	<b>7:30-10:00 am</b>	

## POLICIES AND PROCEDURES:

### Department Policies And Procedures:

*Note: Failure to abide by the rules will negatively affect your grade.*

1. **CLASS ATTENDANCE:** Class will begin promptly. *Class attendance is essential for success in this class.* Students are expected to work efficiently and respectfully.
2. **ELECTRONICS IN CLASSROOM:** IPADS and laptops are fine for viewing and taking notes, however, there is much research proving writing notes BY HAND creates synthesis, thereby increasing your learning and promoting long-term retention. I highly recommend you try it!
3. **EMAIL:** Check PLNU email regularly for any new postings or communications from the instructor.
4. **LATE POLICY:** Due dates are enforced rigorously. 25% deducted for each day late.
5. **EXAMS:** No makeup exams or quizzes given. Emergencies processed on an individual basis.
6. **EMERGENCIES:** Everyone has them. Be responsible, communicate promptly and privately, tell the truth, don't take advantage of the instructor's goodwill. Each will be evaluated on its merits. Documentation may be requested.

### SPIRITUAL CARE

PLNU strives to be a place where students grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith.

If you have questions, a desire to meet with the chaplain, or if you have prayer requests, you can contact the [Office of Student Life and Formation](#).

### STATE AUTHORIZATIONⓈ

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on [State Authorization](#) to view which states allow online (distance education) outside of California.

### INCOMPLETES AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned in extremely unusual circumstances.

### **PLNU COPYRIGHT POLICY** ☒

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

### **PLNU ACADEMIC HONESTY POLICY** ☒

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See [Academic Policies](#) for definitions of kinds of academic dishonesty and for further policy information.

### **PLNU ACADEMIC ACCOMMODATIONS POLICY** ☒

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center ([EAC@pointloma.edu](mailto:EAC@pointloma.edu) or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

### **SEXUAL MISCONDUCT AND DISCRIMINATION**

Point Loma Nazarene University faculty are committed to helping create a safe learning environment for all students. If you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that help and support are available through the Title IX Office at [pointloma.edu/Title-IX](http://pointloma.edu/Title-IX). Please be aware that under Title IX of the Education Amendments of 1972, it is required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at [counselingservices@pointloma.edu](mailto:counselingservices@pointloma.edu) or find a list of campus pastors at [pointloma.edu/title-ix](http://pointloma.edu/title-ix)

## PLNU ATTENDANCE AND PARTICIPATION POLICY⊗

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation.

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### Course Outline NUT 3065 Advanced Nutrition

#### Section 1

##### I. Cell Review

- A. Typical Cell Components
- B. Cellular Proteins

##### II. Digestive System

- A. Structural Overview
- B. Coordination and Regulation
- C. The Process of Digestion

##### III. Energy Transformation

- A. High Energy Phosphate Bonds
- B. ATP Formation
- C. Electron Transport Chain

#### Section 2

##### I. Carbohydrates

- A. Structures
- B. Digestion
- C. Absorption, Transport, Distribution
- D. Integrated Metabolism
- E. Regulation of Metabolism

##### II. Dietary Fiber

- A. Definition
- B. Components
- C. Physiological and Metabolic Effects
- D. Recommended Intake

##### III. Lipids

- A. Structure and Function
- B. Digestion, Absorption, Transport
- C. Lipoproteins and Cardiovascular Risk
- D. Integrated Metabolism

##### IV. Proteins

- A. Functions
- B. Structure and Organization
- C. Amino Acid Classification



- D. Sources
- E. Digestion, Absorption
- F. Amino Acid Metabolism
- G. Organ-Specific Metabolism
- H. Protein Turnover
- I. Protein Quality/Intake
- V. Interrelationship of CHO, Lipid and Protein Metabolism
  - A. Central Role of Liver
  - B. Feed-Fast Cycle
  - C. System Integration and Homeostasis

### Section 3

- I. Water-Soluble Vitamins (C and all B)
  - A. Sources
  - B. Digestion, Absorption, Transport, Storage
  - C. Functions and Mechanisms of Action
  - D. Interactions with other Nutrients
  - E. Metabolism and Excretion
  - F. Recommended Amounts
  - G. Deficiency and Toxicity
  - H. Assessment of Nutriture
- II. Fat-Soluble Vitamins (A,D,E,K)
  - A. Sources
  - B. Digestion, Abs'n, Transport, Storage
  - C. Functions and Mechanisms of Action
  - D. Interactions with other Nutrients
  - E. Metabolism and Excretion
  - F. Recommended Amounts
  - G. Deficiency and Toxicity
  - H. Assessment of Nutriture
- III. Macrominerals
  - A. Sources
  - B. Digestion, Abs'n, Transport, Storage
  - C. Functions and Mechanisms of Action
  - D. Interactions with other Nutrients
  - E. Excretion
  - F. Recommended Amounts
  - G. Deficiency and Toxicity
  - H. Assessment of Nutriture
- IV. Microminerals
  - A. Sources
  - B. Digestion, Abs'n, Transport, Storage
  - C. Functions and Mechanisms of Action
  - D. Interactions with other Nutrients
  - E. Excretion
  - F. Recommended Amounts

- G. Deficiency and Toxicity
- H. Assessment of Nutriture

#### Section 4

- I. Body Fluid and Electrolyte Balance
  - A. Water Distribution in Body
  - B. Maintenance of Fluid Balance
  - C. Maintenance of Electrolyte Balance
  - D. Acid-Base Balance and Buffers
  - E. Respiratory Regulation of pH
  - F. Renal Regulation of pH