

NSD 456 Nutritional Biochemistry
Syracuse University
Department of Public Health, Food Studies, and Nutrition
Summer 2018

Course Description: Review of structure and function of atoms and molecules of biological importance, principles governing chemical reactions, and characteristics of the cellular environment necessary for normal function of the human body. Structure and function of proteins, carbohydrates and lipids in the complex biological environment. Introduction to digestion and absorption and key metabolic pathways involved in utilization of energy nutrients.

Prerequisites: Introductory courses in biology and general chemistry and human physiology

Course Credits: 4

Faculty Information:

Margaret Voss, PhD

561 White Hall

mavoss@syr.edu

Emails will be answered within 24 hours, except on weekends.

Office Hours: I will be online Monday and Wednesday from 10:00-11:00 AM. These sessions will be live through BlackBoard Collaborate (under the course tools tab), but they will also be recorded for later viewing.

Course Objectives:

Upon completion of the course, students will be able to:

- Communicate basic knowledge of organic chemistry
- Recognize, understand and explain how characteristics of organic molecules (functional groups, structure, bonding and other interactions) influence their function
- Understand and describe the structure and functions of major organelles
- Understand and explain the structure of carbohydrates, lipids and proteins and amino acids as well as properties of carbohydrates, lipids and proteins that influence nutritional function
- Describe, discuss, and recognize roles and processes of major metabolic pathways by which carbohydrates, proteins, and lipids are utilized by the body
- Understand and describe the significance of oxidation-reduction reactions in the major metabolic pathways
- Understand and describe the role of hormones such as insulin in regulation of metabolism
- Understand, describe, and discuss the basic mechanisms of enzyme action
- Understand, describe, and discuss the impacts of feeding and fasting on metabolism
- Understand, describe, and discuss the impacts of alcohol on metabolism
- Understand, describe, and discuss how the human body provides energy to support different types of exercise

NSD 456 fulfills the following knowledge requirements by the Academy of Nutrition and Dietetics:

| Knowledge Requirements | Activities | Assessments |
|---|---|-----------------------------|
| Domain 1. Scientific and Evidence Base of Practice: Integration of scientific information and translation of research into practice. | | |
| KRDN 1.1 Demonstrate how to locate, interpret, evaluate and use professional literature to make ethical, evidence-based practice decisions. | Lecture notes | Assignments, Quizzes, Exams |
| KRDN 1.2 Use current information technologies to locate and apply evidence-based guidelines and protocols. | Lecture notes Homework Assignment | Assignments, Quizzes, Exams |
| KRDN 1.3 Apply critical thinking skills. | Homework Assignment | Assignment, Quizzes, Exams |

Course Materials:

- Required Materials: Cengage MindTap
 - Open BlackBoard and click on the MindTap link in the content folder
 - Follow the prompts to register for MindTap.
 - The course will be named NSD 456 Summer 2018
 - To check whether your computer meets the requirements for using MindTap, go to <http://ng.cengage.com/static/browsercheck/index.html>
- Optional – If you already own these books, they may be helpful:
 - *Advanced Nutrition and Human Metabolism* by Gropper SS, Smith JL, Groff JL., ANY EDITION by Wadsworth, ISBN#9781133104056
 - *Biochemistry of Human Nutrition: Desk Reference* by Gropper, 2nd Edition, 2000 by Wadsworth, ISBN#9780534515430
- Supplemental lecture materials provided by the instructor.
- Textbooks and class notes of general chemistry, biology, anatomy and physiology and basic nutrition. Students are expected to review the contents covered in those courses as necessary in their own time.

Minimum Technical Requirements:

| | |
|------------------|--|
| Operating System | Windows 7 or higher; Macintosh OSX 10 or higher |
| Browser Windows: | Please refer to this link for supported browsers |
| Sound Card | Required |
| Microphone | Required |
| Camera | Optional, but may be desirable some activities |

You will also need certain software installed and cookie settings configured correctly. [Click here to test your current configurations](#). The minimum requirements for this course are:

1. Flash Player (required for viewing video clips)
2. Adobe Acrobat Reader (required, some course materials are in PDF format)
3. JavaScript (required for interactive features)

Method of Instruction:

All course instruction and communications will be conducted online. Videos, slide presentations, and *Cengage Mind Tap* assignments will be used throughout the course to explain chapter content. *Blackboard*, the Syracuse University Course Management System and *Cengage Mind Tap* will be used to house the course links and to administer on-line quizzes, exercises, assignments, and exams. A discussion tab has been set up in *Blackboard* to be used for peer discussions. I will also use the *Blackboard Collaborate Ultra* link under the *Course Tools* link to hold and to record weekly office hour sessions as listed in the Course Schedule. All assignments will be submitted to *Blackboard* – no hard copy assignments will be handed to the instructor. In addition, *Blackboard* will provide the communication needed between student and instructor (all email and discussion forums). It will be important for students to pay attention to assignment deadlines. They are posted in each *Blackboard* folder and the complete list of deadlines for the course can be found the *Cengage Mind Tap* schedule and in the

course schedule below. Students are responsible for meeting assignment deadlines. Late assignments will not be accepted and the schedule will not be altered after the course has begun. Special circumstances (emergencies, illness, etc.) that prevent a student from meeting a deadline must be discussed with the instructor as soon as possible.

Student / Instructor Communication:

All course questions of a general nature (i.e., those appropriate for the entire group) will be posted to the “Ask the Instructor” Discussion Forum under the Discussions tab on the left-hand side of the BlackBoard course page. If you send me an assignment question via email, I will likely ask you to submit it to the discussion forum. Submitting all course questions to the discussion forum eliminates multiple responses to students. In addition, other students can respond to the question as well. If a question is posted to the discussion forum, I will respond within 24 hours. My goal is to be as responsive and accessible as possible, but do not expect to receive a response to assignment questions just a few hours before the assignment is due. Twenty-four (24) hours is the normal response time.

*Students are expected to review their **Blackboard** course Email at least once a day. Schedule changes and assignment notes will be communicated electronically. It is the student’s responsibility to monitor Emails and discussion forums.*

Expectations

Before entering this upper-level undergraduate science class in nutrition:

- Students will have completed all prerequisite courses.
- Students fully understand that learning must be done by individual students through continuous participation and effort.
- Students fully understand the university’s policy on academic integrity and what constitutes academic dishonesty and other violations of the policy.
- Students will have basic computer and writing skills.

In this class:

- Students will hold themselves to the highest integrity, academic, and professional standards.
- Students will behave in a mature, responsible, and professional way throughout the semester in all course-related activities, including all communications.
- Students will utilize all available resources to achieve success.
- Students will not underestimate the amount of work needed to succeed in this course

Note that this is a 4-credit course that normally runs for 14 weeks during the fall semester.

This means about 7 hours of study and class work per weekday will be required to successfully complete the 6-week summer session

- Students will communicate with the instructor in a timely manner regarding their progress, questions, problems, help needed, and suggestions.

Course Policies

Registration:

The university prohibits students from attending, being evaluated, auditing, or otherwise participating in courses without being officially enrolled. The only exception is for students making up *Incomplete* grades with faculty approval. Faculty may not allow students to attend classes and/or submit work unless students (1) appear on the official class list of (2) present a copy of their class schedule showing the course to have been added. (Academic Rules and Regulations, 8.0.1).

Academic Integrity:

Syracuse University’s Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. Syracuse University students are required to

read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term checkin on MySlice. For more information and the complete policy, see <http://academicintegrity.syr.edu>.

It is expected that all assignments will be completed by the students with the use of appropriate sources (class notes, textbooks, additional reading materials) and written in the student's OWN words. Assignments and exam answers may not be copied from another student. References should be listed following the format of the Journal of Nutrition. Under any circumstances, copy-and-paste verbatim from any source is NOT allowed. Plagiarism or cheating is not tolerated. Students should ask the instructor directly for advice and clarification if they have any questions or doubts. Note that the Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in course failure regardless of violation level.

Student Works Policy

In compliance with the federal Family Educational Rights and Privacy Act, works in all media produced by you as part of your participation in this course may be used for educational purposes. Your continued enrollment of the course constitutes understanding of this policy and permission by you. At the completion of the course, any further use of your work will meet one of the following conditions: A. The work is rendered anonymous through the removal of all personal identification of the work's creator/originator(s) or B. the creator/originator's written permission is secured.

Disability-Related Accommodations

Our community values diversity and seeks to promote meaningful access to educational opportunities for all students. Syracuse University and I are committed to your success and to supporting Section 504 of the Rehabilitation Act of 1973 as amended and the Americans with Disabilities Act (1990). This means that in general no individual who is otherwise qualified shall be excluded from participation in, be denied benefits of, or be subjected to discrimination under any program or activity, solely by reason of having a disability. If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), <http://disabilityservices.syr.edu>, located at 804 University Avenue, room 309, or call 315-443-4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue "Accommodation Authorization Letters" to students with documented disabilities as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible. You are also welcome to contact me privately to discuss your academic needs although I cannot arrange for disability-related accommodations.

Blackboard and Email Correspondence

Syracuse University has established email as a primary vehicle for official communication with students, faculty, and staff. This course is supported by **Blackboard**. The course syllabus, all assignments, announcements, and other documents can be found there. The web address is <http://blackboard.syr.edu>. You will need to use your syr.edu account name and your ID number to enter the system. It is students' responsibility to check **Blackboard** for information and announcements.

Use of the **Blackboard** program enables the instructor to email every enrolled student in the class, but it will arrive at your assigned syr.edu email account. If you usually use another email service provider (such Gmail, Hotmail, or AOL, etc), it is your responsibility to check your syr.edu email every day. All email correspondence directed to the instructor should come from your syr.edu email account. Emails from other email service providers will not be read; the instructor is not responsible for any important communication lost for this reason.

Faith Tradition Observances

Syracuse University does not have non-instructional days for any religious holiday and students **must notify instructors by the end of the second week of classes when they will be observing their religious holiday(s)**. SU's religious observances policy, found at http://supolicies.syr.edu/emp_ben/religious_observance.htm, recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their tradition. Under

the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors no later than the end of the second week of classes. Student deadlines are posted in My Slice under Student Services/Enrollment/My Religious Observances/Add a Notification. The religious observances policy requires accommodation for the religious holiday itself, not for travel days if a student will be observing the holiday elsewhere.

Assessments

Submission of Assignments:

Blackboard assessments (Quizzes): Each week there will be several *MindTap* and *Blackboard* based quizzes. Quizzes in Blackboard will cover the previous three (3) lectures. The MindTap **Unit Quizzes** will be inclusive end of chapter assessments. The quizzes will be clearly labeled as graded individual assignments. Links to the assignments can be found in two places: 1) the weekly content folders and 2) the assignment folder in BlackBoard. You should read the chapter, study the slides, and do any practice assignments, including non-graded pre-tests before taking each quiz. Quizzes will be open book and untimed, but you will only have one day to complete them. Quizzes will open at 1:00 AM on the day they are due and will close at 11:59 that night. *Given that time constraint, you will need to have exceptional familiarity with the material and the text to do well.* Other assignments and discussions will be used to reinforce key concepts and introduce supplemental material. Although I will not and cannot review all text material during online office hours, you will still be responsible for knowing the material included in every chapter and in any posted lecture slides. All quizzes must be completed by the assigned due date. Each quiz will be disabled on after the posted due date and time. There will be no opportunity to take a quiz after the posted date and time. No exceptions will be made to this approach.

Homework Assignments: Deadlines are not negotiable. All homework assignments are due on the days announced in the calendar. Late submission will result in a 30% deduction for every 24 hours after the deadline, including weekends and holidays. No assignment will be accepted beyond 72 hours after the deadline. No make-up opportunity will be given. The instructor will only grade the final version of assigned homework. The instructor will not provide feedback to any draft submitted without specific questions relevant to the assignments. The instructor will provide detailed instructions for each assignment.

Extra Credit Activities

The activities specified in this syllabus provide ample opportunities to succeed. Students should neither expect nor ask for extra credit activities.

Assessment and Grades

Grades are not open for negotiation or discussion. Students have five business days to raise questions regarding grading after grades are posted. Grading errors, if any, will be corrected. Students can request their exams, quizzes, and assignments be graded for a second time with the understanding that grades as the result of a second-time grading will be final and may be lower than the original. Posted grades become final after five business days.

Grades

A 93~100%; A- 90~92%; B+ 87~89%; B 83~86%; B- 80~82%;
 C+ 77~79%; C 73~76%; C- 70~72%; D 60~69%; F <60%

| Assessment | Points |
|--|---------------|
| Chapter Quizzes (14 @ 45 pts each; include syllabus quiz and post-tests) | 630 |
| Assignments (7 @ 30 pts each) | 210 |
| <hr/> | |
| | 840 |

Course Calendar

| Week | Monday | Tuesday | Wednesday | Thursday | Friday |
|---|--|---|--|--|--|
| Week 1 5/21/18 Topics | Cells Office Hours | Biological Energy | The Digestive System Office Hours | Functional Groups | Functional Groups |
| Assessment Due | Quiz 1 – The Syllabus | | Quiz 2 – Unit 1 <i>Cells & biological energy</i> | Assignment 1: <i>Tumor Suppressors</i> | Quiz 3 – Unit 2 <i>The digestive system</i> |
| Week 2 5/28/18 Topics | Carbohydrate Structure Office Hours | Carbohydrate Digestion & Absorption | Glycogenesis & Glycogenolysis Office Hours | Glycolysis TCA cycle | Formation of ATP PPP |
| Assessment Due | Quiz 4 – Unit 3 <i>Functional groups</i> | | Quiz 5 – Carb <i>structure, digestion & absorption</i> | | Assignment 2: <i>Post-SX Nutrition</i> |
| Week 3 6/4/18 Topics | Gluconeogenesis Office Hours | Regulation of Metabolism | Regulation of Metabolism Office Hours | Fiber | Fiber |
| Assessment Due | Quiz 6 – <i>Glycogenesis to Gluconeogenesis</i> | | Quiz 7 – Unit 4 <i>End of Chapter Quiz Carbohydrates</i> | Assignment 3 <i>Controlling Diabetes</i> | Quiz 8 – Unit 5 <i>End of Chapter Quiz Fiber</i> |
| Week 4 6/11/18 Topics | Lipid Structure, Digestion, & Absorption Office Hours | Lipoproteins and Cholesterol | Fatty Acid and TAG Synthesis Office Hours | Beta Oxidation of Fatty Acids | Regulation of Lipid Metabolism |
| Assessment Due | Assignment 4: <i>Prebiotics</i> | | Quiz 9 -Lipid <i>structure, digestion, absorption, cholesterol</i> | | Assignment 5: <i>Ketogenic Diets</i> |
| Week 5 6/18/18 Topics | Alcohol Metabolism Office Hours | Protein & Amino Acids: Structure, Digestion, Absorption | Transamination and Deamination Office Hours | Transamination and Deamination | Protein synthesis |
| Assessment Due | Quiz 10 – Unit 6 <i>End of chapter Quiz Lipids</i> | | Quiz 11 - Protein & Amino Acids: <i>Structure, Digestion, Absorption</i> | | Quiz 12 – Unit 7 <i>End of Chapter Quiz Protein</i> |
| Week 6 6/25/18 Topics | Fed State vs Fasting States Office Hours | Fed State vs Fasting States | Exercise Metabolism Office Hours | Exercise Metabolism | |
| Assessment Due | Assignment 6: <i>Urine Testing</i> | | Quiz 13 - Fed State vs Fasting States | | Quiz 14 – Unit 8 <i>Chapter Quiz</i> Assignment 7: <i>Dieting</i> |