NUTR 202
PRINCIPLES OF NUTRITION SCIENCE
Tufts University, Friedman School of Nutrition Science and Policy
FALL 2016
(September 6, 2016 - December 16, 2016)

Students will be able to access the course website through TRUNK by 5pm (EDT) on Friday, September 2, 2016. An orientation to the course site will be provided under the "Announcements" section on the front page.

Instructor:
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Class meeting time: Tuesdays and Fridays, 1:30-3:00 pm

Location: Jaharis 156, Boston campus

Bring an electronic device (smartphone, laptop, or tablet) to each class*

Tufts Graduate Credit: 1.0

Prerequisite: One semester of college level biology, chemistry or human physiology (preferred).

Course Description and Goals:
This course presents the scientific principles of human nutrition. During the course of the semester students will learn the components of a healthy diet, and their health implications; understand the major nutritional problems that affect individuals and populations from conception and throughout the life cycle; and understand the scientific basis for nutritional recommendations brought before the scientific and lay communities.

Course Objectives/Outcomes:
By the end of this course, students will:

- Categorize the accepted name(s) of each macronutrient and micronutrient; their common food sources; recommended intake; major functions and biochemical role in the body
- For each nutrient, be able to explain their digestion, mode of absorption, transport, and excretion from the body.
- Explain the health effects associated with a deficiency or toxicity of each nutrient, and any potential major public health problems
- Be able to summarize the dietary recommendations of the major groups/organizations in the United States that recommend what to include in a healthy diet
- Be able to discriminate between sound and questionable nutrition information sources.
- Assess their own dietary habits and physical activity levels
- Compare and contrast their own dietary intake with nutritional recommendations
- Be able to identify sources of the nutrients in their own diet
- Know how to critically evaluate the quality of their own diet
- Evaluate the quality and health implications of the class’ average nutrient intake

Textbook and Software:

STUDENTS ARE STRONGLY ENCOURAGED TO PURCHASE THE REQUIRED TEXTBOOK AND SOFTWARE BEFORE THE CLASS STARTS.

The print, rental, and e-book versions of the text are available on many websites (new and used). The software is available for purchase directly from the publisher at www.cengagebrain.com.

**Required text** - Wardlaw’s Perspectives in Nutrition (McGraw-Hill, 10th edition, 2016), by Byrd-Bredbenner et al., ISBN 9780078021411 is the recently updated version of this text. The 9th edition of this text is also acceptable. When ordering the print version of the text, keep in mind that it may take up to 2 weeks for shipping. (In the event that your textbook does not arrive by the start of class, please note that Chapters 1-3 of the 9th edition may be available online via TRUNK with the instructor’s permission).

**Required software (2 programs)** -

1.) Diet and Wellness Plus (web-based software program from CengageBrain) will be used for analyzing your 3-day diet record. The program is available in an online version to which you will have instant access (do not purchased the printed card with access code). You may purchase either the 2-semester instant access (ISBN 9781285856209) or a 1-semester access for less money (ISBN 9781285856216). Earlier versions of this software are unacceptable for this course.
IMPORTANT NOTES ABOUT DIET AND WELLNESS PLUS:

● Please consider cost-sharing the access code for this software with your fellow students. Each access code allows up to 10 student profiles. Feel free to post your request to share on Cafe McKay, the general class discussion forum on the TRUNK course site.

● **DO NOT** purchase a used access code for this software unless you know when it expires.

● Students must have access to Diet and Wellness Plus in time to complete Part 1 of the Diet Record assignment, which is due at the end of Week 2.

2.) *Learning Catalytics (FREE to Tufts Friedman students!)- Complete the login steps below BEFORE the first day of class.* Please use your Tufts email address as your Learning Catalytics username and email address. Bring your web-enabled device (smartphone, tablet, or laptop) to every class for use with Learning Catalytics and connect your device to the "Tufts_Secure" wireless network for a fast and secure connection. If you have any issues contact edtech@tufts.edu.

**Student Learning Catalytics Login Instructions** (Single Sign-on)

● To access Learning Catalytics, follow this link and log in with your Tufts username and password: [http://go.tufts.edu/nutritionlc](http://go.tufts.edu/nutritionlc)

● The first time you log in you must click, “Accept” on the end user license agreement. After that and on subsequent logins you’ll be taken directly to the Learning Catalytics “Join Session” screen. That’s it! A session ID will be provided by your instructor in class.

● Link to student guide: [http://trunkuserguide.screenstepslive.com/s/8335/m/33860/l/611225](http://trunkuserguide.screenstepslive.com/s/8335/m/33860/l/611225)

**IMPORTANT NOTES ABOUT USING LEARNING CATALYTICS:**

● **Always use the custom link provided above**, as it ensures your accounts are licensed through Tufts. Do not login to learningcatalytics.com directly. You do not have proper access.

● **After each session, just close your browser** on your device. **Do not log out of the website** to avoid any potential browser issues. If you do click “Log out”, you will need to force quit the browser on your mobile device or clear the browser cache. Then, try accessing the link again.

● In the classroom, always connect your device to the "Tufts_Secure" wireless network for a fast and secure connection: [https://it.tufts.edu/securewireless](https://it.tufts.edu/securewireless).

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**Assignments, Exams and Grade Evaluation:**

**Grade Evaluation:**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Journal Entries (1 per chapter)</td>
<td>5%</td>
</tr>
<tr>
<td>Assignments</td>
<td>Weight (%)</td>
</tr>
<tr>
<td>--------------------------------------------</td>
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<tr>
<td>In-Class Questions</td>
<td>5%</td>
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<tr>
<td>Presentation</td>
<td>5%</td>
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<tr>
<td>Weekly Quizzes (15)</td>
<td>15%</td>
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<tr>
<td>Exam I</td>
<td>15%</td>
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<tr>
<td>Exams II, III, and IV (10% each)</td>
<td>30%</td>
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<tr>
<td>Diet Record Project (Parts 1-5)</td>
<td>25%</td>
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</tbody>
</table>

**Grading Scale:**
- A+ = 98.50 - 100
- A  = 92.50 - 98.49
- A- = 90.00 - 92.49
- B+ = 87.50 - 89.99
- B  = 82.50 - 87.49
- B- = 80.00 - 82.49

(No credit for course if grade is below a B-, per Friedman School policy)

**Assignments, Exams and Activities:**
Assignments for this course include required readings, in-class participation (via Learning Catalytics), quizzes and journal entries for each chapter, 1 presentation, 4 in-class exams, and a 5 part diet record project. Detailed instructions for each of these assignments are provided on the course website in TRUNK, the Tufts learning management system.

**There are NO opportunities for extra credit work in this course.**

**Assignment due dates/times**
Due dates for all assignments are listed in this syllabus under the section labeled Lecture & Assignment Schedule below, and in the [Google Calendar](#). Students are responsible for knowing these due dates, and adhering to them. All assignments, including quizzes, journal entries, and diet project parts, unless otherwise noted must be submitted on their specified due date no later than 11:59PM ET (Boston time). Points will be deducted from all late assignments unless prior arrangements have been made with the instructor. Assignments submitted after the posted due date/time will be assessed a 5 point per day penalty effective immediately after the deadline. *(You MUST email, text, or call the instructor at any time PRIOR to the posted due date/time to request an extension!)*

**Required readings, online lectures, and supplemental materials**
Students are required to complete all required readings (in textbook and online) and attend in-class lectures. Lecture outlines and lecture slides are provided for each chapter to enhance your learning experience. *(You will find the lecture outlines and the learning objectives particularly helpful when preparing for exams).* All readings, lectures, outlines, and supplemental materials can be found on the Trunk course site.

Students are required to complete all required readings (in textbook and online via Trunk). Supplemental readings, although not required, are highly recommended. Lecture outlines and
lecture slides are provided for each chapter to enhance your learning experience. *(You will find the lecture outlines and the learning objectives for each chapter particularly helpful when preparing for exams).*

Abbreviated, **online versions of each lecture** are provided for students who prefer to review the materials in this format, and for those who may be unable to attend a class.

All readings, lectures, outlines, and supplemental materials can be found under the **Weekly Overviews** link on the Trunk course site.

**Journal entries**

**After each chapter/lecture** students will be asked to reflect upon the information presented with a 3-2-1 **journal entry**. This 3-2-1 journal entry requires you to write out the following for each assigned chapter: **3 things you learned that you can use in the real world OR in your chosen/intended field of study, 2 questions you still have, and 1 thing you thought was most interesting (or challenged your previous beliefs).** In general, each entry will be due prior to the following lecture (see the course schedule for exact due dates). Each journal entry should be properly labeled by chapter and date. Each journal entry is worth ~0.6% of your course grade.

Your personal space for submitting all journal entries can be found under the **Journals** link on the TRUNK course site. Please note - your journal is continuous, and you may either write directly to your journal (beware the TRUNK 30 minute timeout) or copy/paste from a word doc (recommended). To maintain privacy, please click on “Only tutors and I can see this post” at the bottom of each entry you post.

**Quizzes**

Graded **chapter quizzes** are provided to enhance your learning experience, and assess your understanding of the materials presented by highlighting concepts/issues of importance. **After each chapter/lecture**, students must complete a quiz based on the materials presented in the assigned chapter/lecture. Each quiz will be open immediately following the lecture corresponding to the respective chapter, and may be completed anytime prior to the following lecture. Students can take each quiz up to 2 times during this period, and your final score will be the average of the 2 attempts. Students may opt to take the quiz only once if they are confident of their answers. Feedback on the quiz questions will not be provided until after the due date. That is, students will not know whether their answers were correct or incorrect until the quiz has closed. All quizzes are open-book and timed (20 minutes per quiz). Each quiz is worth 1% of your course grade.

All quizzes can be found under the **Tests & Quizzes** link on the Trunk course site.

**In-class questions**

We will be using Learning Catalytics ([http://go.tufts.edu/nutritionlc](http://go.tufts.edu/nutritionlc)), an automated classroom response system to provide an opportunity for you to answer questions in class using a web-enabled device. Questions will be presented during class, and each individual will be able to choose an answer that will be recorded by my computer. Your participation in these exercises
(whether or not you get the correct answer) will contribute towards your final grade. You are required to complete 80% of the questions asked in class from Sept 6 through Dec 16 to receive the full 5% credit. **Credit will not be given for absence due to illness or personal reasons, and you CANNOT make up missed questions.**

Learning Catalytics will be used during every class, and you are responsible for bringing your own device to each class. To use this system in class, students can use any modern web-enabled device, i.e., smartphone, tablet, or laptop (preferred). If you do not have one of these devices to use in class this semester, please email the instructor during the first week of class.

**Presentation**

To help students synthesize and extend their knowledge of the course materials, and become more familiar with the nutrition science research literature, you will be required to do a 5-10 minute in-class presentation summarizing the emerging evidence on a current controversy or “hot” topic in nutrition science. Students will be given the opportunity to select their topic or research article to be presented from a list provided by the instructor on a first come/first served basis. Presentations will be given throughout the semester and in conjunction with the appropriate lecture. Extra points (5) for this assignment will be awarded to the first 2 students to present. Please refer to the [Grading Rubric](#) for this assignment.

Specific instructions for this assignment can be found under the **Weekly Overviews** link on the Trunk course site.

**Diet record project**

For the **diet record project**, students will be asked to
a) observe and record their own dietary habits for 3 days, and
b) enter the data they have collected into the required software program, Diet and Wellness Plus, generate a 3-day average report, and
c) provide a multi-part written assessment of their diet based on the information generated in this report that addresses specific questions posed by the instructor. This assignment will divided into 5 parts, due at specified intervals corresponding with the materials presented throughout the course. **Part 1 is due at the end of week 2** and will require students to record their own dietary intake for 3 days, and generate a 3-day average intake report using Diet and Wellness Plus. Each part is worth 5% of your course grade. Please refer to the [Grading Rubric](#) for this assignment, and to the specific grading criteria provided in the instructions for each part.

Specific instructions for each part of this assignment can be found under the **Assignments** link on the Trunk course site.

**Exams**

Students must complete all 4 in-class exams. Each exam will be based on the materials presented in the required readings and lectures. Unlike the weekly quizzes, each exam will require you to write comprehensive answers demonstrating your knowledge of and ability to apply the materials presented in this course. All exams are closed-book/note, and your written answers must be in your own words. Please review the Tufts policies on plagiarism prior to taking each exam (links to these policies are provided under the **Academic Conduct** section.
Technical Support:
Online course support is provided by Friedman support staff and/or IT Support. Please do not contact faculty or TAs for technical support.

- **Telephone**: (617) 627-3376
- **Email**: trunk@tufts.edu
- **Hours**: 24 hours a day, seven days a week.

When reporting a problem, please include:

- The name and number of your course (e.g. "NUTR 202")
- Your operating system and browser
- A detailed description of the problem

This information will expedite the troubleshooting process. If you are sending a support request via email, please use your Tufts email address.

Many problems with Trunk are a result of using an unsupported browser. Please make sure you are using an up-to-date version of Firefox or Internet Explorer, especially when using communication and timed assessment tools (quizzes) within Trunk.

Class Policies and Expectations:
Students will have only one (1) opportunity to complete each assignment and exam.

Students who are unable to complete an assignment on time for any reason should notify the instructor by email (preferred), text message or phone call PRIOR to the deadline, with a brief explanation for why the extension is needed.

Instructors and other university personnel may request that students submit written assignments to plagiarism prevention resources, websites, or other authoritative databanks, such as (but not limited to) “turnitin.com,” or a similar site. These services compare student-produced documents with web content, newspapers, journals & magazines, books, student essays, and other data to determine the originality of student work.

Students are expected to complete all assignments on their own, i.e., without assistance from other students, faculty, etc., unless otherwise noted. All outside documents used in the preparation of students’ work must be properly referenced. (References to the textbook are not required).

Academic Conduct:
Each student is responsible for upholding the highest standards of academic integrity, as
specified in the Friedman School’s Policies and Procedures manual (http://nutrition.tufts.edu/student/documents) and Tufts University policies (http://uss.tufts.edu/studentaffairs/judicialaffairs/Academic_Integrity.pdf). It is the responsibility of each student to understand and comply with these standards, as violations will be sanctioned by penalties ranging from failure on an assignment and the course to dismissal from the school.

Communication Policy:
All communications will be sent to your Tufts email address - please check it at least once a day. Please use "Cafe McKay," the online class discussion forum on TRUNK, to post questions to your fellow students, or the instructor, about course-related issues that might also be of interest to your classmates. Students should check this discussion board frequently to seek out information for themselves before contacting the instructor. The answers to your questions may have already been posted by your peers, or the instructor. If you cannot find your answer on "Cafe McKay," or prefer privacy, feel free to contact the instructor or TAs via email. Please do not wait until the last minute if your question is urgent. Faculty will respond within 24 hours (please note my response time is often much sooner than this).

Accommodation of Disabilities:
Tufts University is committed to providing equal access and support to all students through the provision of reasonable accommodations so that each student may access their curricula and achieve their personal and academic potential. If you have a disability that requires reasonable accommodations, please contact the Friedman School Assistant Dean of Student Affairs at 617-636-6719 to make arrangements for determination of appropriate accommodations. Please be aware that accommodations cannot be enacted retroactively, making timeliness a critical aspect for their provision.

Course Calendar: Click here (then click to Sept-Dec 2015 to view full semester)

Lecture & Assignment Schedule:
*This schedule is subject to modification at the instructor’s discretion

<table>
<thead>
<tr>
<th>DATE</th>
<th>WEEK</th>
<th>TOPIC</th>
<th>ASSIGNMENT DUE DATES</th>
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<tbody>
<tr>
<td>Sept 6</td>
<td>1</td>
<td>Introduction to Course</td>
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<tr>
<td>Sept 9</td>
<td>2</td>
<td>Nutrition Overview</td>
<td>Ch 1 quiz, journal entry - Sept 13</td>
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<tr>
<td>Sept 13</td>
<td>2</td>
<td>Basis of a Healthy Diet</td>
<td>Diet project, part I - Sept 16</td>
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<tr>
<td>Sept 16</td>
<td>2</td>
<td>Basis of a Healthy Diet, con’t</td>
<td>Ch 2 quiz, journal entry - Sept 20</td>
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<tr>
<td>Sept 20</td>
<td>3</td>
<td>Digestion</td>
<td>Diet Project, part II - Sept 23</td>
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<tr>
<td>Sept 23</td>
<td>3</td>
<td>Carbohydrates</td>
<td>Ch 4 quiz, journal entry - Sept 23</td>
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<td>Sept 27</td>
<td>4</td>
<td>Lipids</td>
<td>Ch 5 quiz, journal entry - Sept 27</td>
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<td>Ch 6 quiz, journal entry - Sept 30</td>
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<td>Sept 29</td>
<td>Proteins</td>
<td>Diet Project, part III - Oct 4</td>
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<td>Ch 7 quiz, journal entry - Oct 4</td>
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<td>Oct 4</td>
<td>Exam I</td>
<td>In-class, 1.5 hours</td>
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<td>Oct 7</td>
<td>Energy Metabolism</td>
<td>Ch 9 quiz, journal entry - Oct 11</td>
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<td>Oct 11</td>
<td>Alcohol</td>
<td>Ch 8 quiz, journal entry - Oct 14</td>
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<td>Oct 14</td>
<td>Energy Balance/Weight Management</td>
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<td>Oct 18</td>
<td>Energy Balance/Wt Mgt, con’t</td>
<td>Ch 10 quiz, journal entry - Oct 21</td>
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<td>Oct 21</td>
<td>Exam II</td>
<td>In-class, 1.5 hours</td>
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<td>Oct 25</td>
<td>Fat-Soluble Vitamins</td>
<td>Ch 12 quiz, journal entry - Nov 1</td>
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<td>Oct 28</td>
<td>Water-Soluble Vitamins</td>
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<td>Nov 1</td>
<td>Water-Soluble Vitamins, con’t</td>
<td>Ch 13 quiz, journal entry - Nov 4</td>
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<td>Nov 4</td>
<td>Major Minerals</td>
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<td>Nov 8</td>
<td>Major Minerals, con’t</td>
<td>Ch 14 quiz, journal entry - Nov 15</td>
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<td>Nov 11</td>
<td>NO CLASS - Veteran’s Day</td>
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<td>Nov 15</td>
<td>Trace Minerals</td>
<td>Diet project, part IV - Nov 18</td>
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<td>Nov 18</td>
<td>Exam III</td>
<td>In-class, 1.5 hours</td>
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<td>Nov 22</td>
<td>Lifecycle Nutrition I</td>
<td>Ch 16 quiz, journal entry - Nov 29</td>
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<td>Nov 25</td>
<td>NO CLASS - Thanksgiving Break</td>
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<td>Nov 29</td>
<td>Lifecycle Nutrition II</td>
<td>Ch 17 quiz, journal entry - Dec 2</td>
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<td>Dec 2</td>
<td>Lifecycle Nutrition III</td>
<td>Ch 18 quiz, journal entry - Dec 6</td>
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<td>Dec 6</td>
<td>Diet, Health &amp; Disease</td>
<td>LAST quiz, journal entry - Dec 9</td>
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<td>Diet project, part V - Dec 12</td>
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<tr>
<td>Dec 9</td>
<td>Exam IV</td>
<td>In-class, 1.5 hours</td>
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**Readings, Learning Objectives, & Activities**

For the most up to date information regarding required readings, assignment instructions, and due dates please check the TRUNK course site. Click on the link labeled "Resources" to access the required readings and online lectures, or "Assignments" for instructions.

**IMPORTANT ASSIGNMENT NOTE: 3-Day Diet Record, Part 1 (Due end of Week 2)**

- You may begin collecting your own diet and activity data for the Diet Record Project as soon as you have access to the course site on Trunk. Instructions for Part 1, due at the end of Week 2, can be found under the Assignments link on the Trunk course site.
Students must have access to the required software, Diet and Wellness Plus in order to complete Part 1 of this assignment, due at the end of Week 2.

You may begin working on Parts 2-5 as soon as you have completed Part 1.

**Week 1 Lecture: Nutrition Overview**

**Lecture Learning Objectives:**
By the end of this lecture, students should be able to:
- Be able to define “nutrition” and “essential nutrients.”
- Describe the six major classes of nutrients and their basic chemical structures.
- Describe foods in terms of their energy values, including alcohol.
- Explain the role of national nutrition surveys (NHANES)
- Describe the typical American diet.
- Summarize the ABCDEFs of nutrition assessment, and their limitations.
- Explain the scientific method.
- Differentiate between the different types of study designs
- Be able to identify the red flags of poor nutrition advice.
- Identify reliable sources of nutrition information.

**Required readings and Assignments:**
- Please refer to the TRUNK course site for complete list and links

**Week 2 Lecture: Basis of a Healthy Diet**

**Lecture Learning Objectives:**
By the end of this lecture, students should be able to:
- Describe the characteristics of a healthy diet, i.e., the diet planning principles.
- Define nutrient density, and identify nutrient dense foods from each food group.
- Name and define the four sets of dietary standards of the DRIs.
- Describe how the DRIs are determined and how/when each is used.
- Compare the DV to DRI and explain how they are used Nutrition Facts Panels.
- Interpret the nutrition information provided on food packaging labels.
- Describe the different types of claims allowed on food labels.
- Summarize the purpose of the Dietary Guidelines for Americans.
- Describe the components of the current USDA Food Guide Graphic.

**Required readings and Assignments:**
- Please refer to the TRUNK course site for complete list and links

**Week 3 Lectures: Digestion and Absorption**

**Lecture Learning Objectives:**
By the end of this lecture, students should be able to:
- Describe the overall physiological processes of digestion and absorption, including the roles played by the organs of the gastrointestinal tract and the related accessory organs: liver, gallbladder, and pancreas.
- Describe, in detail, the digestion of a meal containing all 3 macronutrients.
- Describe the differences between the digestion and absorption of the fat- vs. water-soluble nutrients, and be able to outline each step in the process.
- Identify the enzymes and hormones that act in the digestion of the various nutrients, and indicate how they work.
- Summarize the major nutrition-related gastrointestinal health problems and typical approaches to treatment.

**Required readings and Assignments:**
- Please refer to the TRUNK course site for complete list and links

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**Lecture: Carbohydrates**

**Lecture Learning Objectives:**
By the end of this lecture, students should be able to:
- Describe the differences and similarities among mono-, di-, oligo-, and polysaccharides and identify food sources of each.
- Explain the functions of simple and complex carbohydrates.
- Describe the digestion and absorption of carbohydrates.
- Discuss the role of fiber in human nutrition.
- Discuss the problems that can occur with carbohydrate digestion and absorption.
- Know the recommended intake of dietary carbohydrate.
- Explain the role of insulin and glucagon in the regulation of blood glucose.

**Required readings and Assignments:**
- Please refer to the TRUNK course site for complete list and links

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**Week 4 Lectures: Lipids**

**Lecture Learning Objectives:**
By the end of this lecture, students should be able to:
- Describe the structure of saturated, monounsaturated, and polyunsaturated fatty acids and identify the fatty acids that are considered essential.
- Describe the structure of triglycerides and phospholipids and explain their biological significance.
- Summarize the role of cholesterol in human nutrition.
- Explain the effects of omega-3 and omega-6 fatty acids on cell function and health.
- Describe the functions of dietary fat and body fat.
- Explain the digestion and absorption of dietary fat, including the role of bile.
Describe the transport of lipids in the blood and throughout the body, and the role of each lipoprotein.
Identify food sources of dietary cholesterol, saturated fat, mono- and polyunsaturated fats.
Discuss the origin and food sources of trans fatty acids and their effect on health.

Required readings and Assignments:
- Please refer to the TRUNK course site for complete list and links

Lecture: Proteins

Lecture Learning Objectives:
By the end of this lecture, students should be able to:
- Describe the chemical structure of amino acids and proteins.
- Identify the amino acids that are essential in the diet.
- Describe the special category of conditionally essential, or indispensable, amino acids.
- Summarize the process of protein synthesis.
- Describe deamination and transamination.
- Explain the difference between high-quality and lower-quality proteins, their specific food sources, and the concept of a limiting amino acid.
- Summarize protein digestion and absorption.
- Specify the physiological functions of protein.

Required readings:
- Please refer to the TRUNK course site for complete list and links

EXAM I

Week 5 Lecture: Energy Metabolism

Lecture Learning Objectives:
By the end of this lecture, students should be able to:
- Define *anabolic* and *catabolic reactions*, and give an example of each
- Define ATP, and describe its 3 major functions in the body.
- Besides ATP, list the other 2 compounds produced in cells after food is completely metabolized.
- Identify where energy metabolism occurs in the cell.
- Identify the 3 major metabolic pathways through which the macronutrients are converted into energy.
- Examine the general differences in the breakdown of carbohydrates, fats, and proteins to usable energy components (ATP).
- Define *ketosis* and describe the conditions in which it occurs.
- Outline the metabolic consequences of consuming an excessive amount of any
macronutrient (in excess of the body's energy/calorie needs)

- Describe the fate of each macronutrient during short-term and prolonged fasting (starvation).

**Required readings and Assignments:**
- Please refer to the TRUNK course site for complete list and links

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**Week 6 Lectures: Alcohol**

**Lecture Learning Objectives:**

By the end of this lecture, students should be able to:

- Define *moderate alcohol consumption* for both men and women
- Define *one drink* when referring to an alcoholic beverage
- Briefly describe the process of alcohol absorption and metabolism, including the role of the enzyme alcohol dehydrogenase and the microsomal ethanol oxidizing system (MEOS).
- List the potential health benefits associated with moderate alcohol consumption
- List the nutrients that are most likely to be deficient in a diet of a person who abuses alcohol.
- Define *Wernicke-Korsakoff Syndrome*
- Summarize the negative health effects of alcohol abuse, i.e., how alcohol damages body organs, such as the liver, heart, and brain.
- Define *fatty liver disease, cirrhosis*
- Describe the impact of alcohol consumption during pregnancy.

**Required readings and Assignments:**
- Please refer to the TRUNK course site for complete list and links

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**Week 6 & 7 Lecture: Energy Balance and Weight Control**

**Lecture Learning Objectives:**

By the end of this lecture, students should be able to:

- Define energy balance, and discuss how changes in energy balance affect body weight
- Describe the major components of "energy in" vs. "energy out"
- Define & state the relative contributions of the 3 major components of energy expenditure (basal metabolism, physical activity, thermic effect of food)
- List several factors that can affect BMR.
- List the variables required to calculate your estimated energy requirements (EER).
- Define BMI, describe its limitations, and summarize how BMI is used to define underweight, healthy weight, overweight, and obesity.
- Describe the common methods used to assess body composition, i.e., proportion of fat mass to lean mass (muscle), and their limitations.
● Explain the health risks of too little and too much body fat, with an emphasis on central obesity and its associated health risks.
● Discuss the prevalence of overweight and obesity among American adults.
● Describe how fat cells develop, and the role of LPL in fat storage.
● Discuss how genetics, environment, and the regulation of hunger and satiety contribute to the development of overweight and obesity.
● List the health risks associated with fad diets, weight loss products, prescription drugs and surgical interventions in treating obesity.
● Discuss the role of diet, physical activity, and behavior change as keys to managing body weight.
● Summarize the characteristics of a sound eating plan for weight management.

**Required readings and Assignments:**
- Please refer to the TRUNK course site for complete list and links

**EXAM II**

**Week 8 Lecture: Fat-Soluble Vitamins**

**Lecture Learning Objectives:**
By the end of this lecture, students should be able to:
● Summarize the general differences between macronutrients (carbohydrates, lipids, proteins) and micronutrients (vitamins and minerals)
● List the fat-soluble and water-soluble vitamins, and describe how solubility affects the absorption, transport, storage, and excretion of each type of vitamin.
● Identify the roles of vitamin A in the body, and describe the effects of vitamin A deficiency and toxicity.
● List the major food sources of vitamin A (preformed) and beta-carotene.
● Describe the uses of vitamin D in the body, and the effects of deficiency and toxicity of this vitamin.
● Identify the major food and non-food sources of vitamin D.
● Identify the role of vitamin E in the body and the effects of vitamin E deficiency and toxicity.
● List the major food sources of vitamin E.
● Identify the major role of vitamin K in the body, and the effects of vitamin K deficiency and toxicity.
● List food and non-food sources of vitamin K.
● Define the term antioxidant, and name the vitamins that act as antioxidants in the body.
● Identify the population group or groups at risk for fat-soluble vitamin deficiencies.

**Required readings and Assignments:**
- Please refer to the TRUNK course site for complete list and links
**Weeks 8 & 9 Lecture: Water-Soluble Vitamins**

**Lecture Learning Objectives:**

By the end of this lecture, students should be able to:
- List the B vitamins, and identify the major functions of each vitamin in the body.
- List the major food sources of each of the B vitamins.
- Identify the major deficiency disease(s) associated with each B vitamin.
- Describe the digestion and absorption of vitamin B12 from food.
- List the major uses of vitamin C in the body.
- Identify the signs and symptoms of vitamin C deficiency and toxicity.
- List the major food sources of vitamin C.
- Describe the population group or groups at risk for water-soluble vitamin deficiencies.

**Required readings:**
- Please refer to the TRUNK course site for complete list and links

**Weeks 9 & 10 Lecture: Major Minerals and Water**

**Lecture Learning Objectives:**

By the end of this lecture, students should be able to:
- Describe the absorption, storage, and risks of toxicity of the major minerals.
- List the functions of each major mineral.
- Identify food sources and state the recommended intake of each of the major minerals.
- Describe the major mineral deficiency and toxicity conditions.
- Identify the population group or groups at risk for major mineral deficiencies.
- Describe the general difference between minerals and vitamins.
- Describe the general difference between the major minerals and trace minerals.
- Describe the role of calcium in the body and the factors that enhance or limit its absorption in the intestines.
- List the hormones needed to maintain blood calcium levels, and describe how calcium homeostasis is maintained.
- Identify food sources of calcium, and describe the effects of calcium deficiency.
- Identify the risk factors for the development of osteoporosis and the roles of physical activity and calcium intake.
- Identify the major roles of phosphorus in the body, and food sources in the diet.
- Identify the role of magnesium in the body, and major food sources.
- Define electrolyte, list the 3 major electrolyte minerals, and describe their common functions.
- Identify the role of sodium in the body, the effects of excessive intake, and major food sources.
- Identify the role of potassium in the body, the effects of inadequate intake, and major food sources.
● Describe the food components of the DASH diet, the minerals provided by each food component, and specify who might benefit from such a diet.
● Identify the major role of chloride during digestion.
● Discuss the reasons why a protein-adequate diet can meet the body's need for sulfur.
● Describe the population group or groups at risk for major mineral deficiencies.

● Summarize the key roles of water in the body.
● Discuss the daily water needs of humans.
● Define water balance and its components.

**Required readings and Assignments:**
- Please refer to the TRUNK course site for complete list and links

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**Week 11 Lecture: Trace Minerals**

**Lecture Learning Objectives:**

By the end of this lecture, students should be able to:

- Define trace mineral.
- List the primary functions and deficiency/toxicity issues for each trace mineral.
- Describe, in general, how trace minerals are absorbed, transported, and excreted.
- Identify foods that are concentrated sources of each trace mineral.
- Identify the population group or groups at risk for trace mineral deficiencies.
- Identify the major functions of iron in the body.
- Compare the availability of iron from plant vs. animal sources.
- Describe the role of zinc in the body, major food sources, and consequences of a zinc deficiency.
- Discuss the mucosal block theory.
- Describe the role of copper in the body.
- Identify and describe the potential consequences of trace mineral interactions (i.e., iron, zinc, copper).
- Describe the effects of insufficient and excess iodine intake.
- Describe the use of chromium in the body and its relationship to diabetes.
- Describe the use of selenium in the body and the role of selenium in cancer protection and as an antioxidant.
- Explain the use of fluoride in the body and its role in dental caries prevention.

**Required readings and Assignments:**
- Please refer to the TRUNK course site for complete list and links

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**EXAM III**

**Week 12 Lecture: Lifecycle Nutrition I**
Lecture Learning Objectives:
By the end of this lecture, students should be able to:
● Explain why a nutritionally adequate diet is important long before a pregnancy is established.
● Describe prenatal growth and development.
● Define placenta, critical period, NTD, and spina bifida.
● Explain the role of folate during the early stages of fetal development
● Describe the relationship between maternal weight gain during pregnancy and infant birthweight
● Discuss the increased nutrient needs of the mother during pregnancy including total calories and specific micronutrients required for blood production, cell growth, and bone development.
● Discuss the effect of nutrition on pregnancy and its outcome.
● Summarize the nutrient needs of the mother during lactation
● Summarize the physiology of the letdown reflex.
● Outline the benefits of breastfeeding for both the infant and mother
● Discuss the need for additional calories and fluids during lactation, and list the habits that are incompatible with lactation.
● Define fetal alcohol syndrome.

Required readings and Assignments:
● Please refer to the TRUNK course site for complete list and links

Week 13 Lectures: Lifecycle Nutrition II

Lecture Learning Objectives:
By the end of this lecture, students should be able to:
● Discuss how an infant’s calorie needs differ from an adult’s needs.
● Explain the consequences of under-nutrition or over-nutrition at different stages of growth and development.
● Describe how to assess the growth and nutritional status of infants and children
● Discuss the 2 dietary practices that have the most significant effect on an infant's nutritional health, i.e., the milk an infant receives, and the age at which solid foods are introduced
● Describe and compare the nutrient needs of infants, children, and adolescents
● Describe the nutritional problems that may occur during the growing years (obesity in particular) and their potential impact on future health

Required readings and Assignments:
● Please refer to the TRUNK course site for complete list and links

Lecture: Lifecycle Nutrition III
Lecture Learning Objectives:
By the end of this lecture, students should be able to:
● Discuss the physical changes of the aging process and nutritional implications.
● Describe the role of physical activity during aging.
● Summarize the nutrients of concern for aging adults, i.e., identify the nutrients for which there are different requirements in older adults.
● Outline food-related factors that can predict malnutrition in older adults.
● Identify the commonly used drugs that adversely react with nutrients, and explain the potential consequences of these interactions.

Required readings and Assignments:
● Please refer to the TRUNK course site for complete list and links

Week 14 Lecture: Diet, Health, & Disease

Lecture Learning Objectives:
By the end of this lecture, students should be able to:
● Identify the important lifestyle factors (modifiable and non-modifiable) that promote health and disease.
● Describe the development, risk factors, and specific nutrition recommendations for each of the major chronic diseases discussed (CVD, hypertension, diabetes, and cancer).
● Compare the two major forms of diabetes mellitus.
● Define the role of nutrition in the metabolic syndrome.
● Describe how nutrition impacts the immune system.
● Discuss the potential impact of adhering to the Dietary Guidelines for Americans and the food guide graphics, MyPyramid/MyPlate, on chronic disease risk.

Required readings and Assignments:
● Please refer to the TRUNK course site for complete list and links

EXAM IV