



## COURSE OUTLINE

Fundamental aspects of fitness and sport nutrition are presented. Topics include: balanced roles of proteins, carbohydrates, lipids, vitamins, minerals and water; supplements; dietary intake and energy usage; dietary programs and myths; practical nutrition for exercise and sports performance, cardiovascular health, diabetes, osteoporosis, obesity and aging.

The Approved Course Description is available at <http://camosun.ca/learn/calendar/current/web/chem.html>

### Instructor Information

Instructor: Noa Deutsch, BSpC, IOC PGdip

Office hours:

- Monday, 10:30 am to 11:30 am
- Wednesday, 10:30 am to 11:30 am
- Thursday, 11:30 am to 12:30 pm

Students are welcome whenever my office door is open. Appointments can be made for other times and locations. Email messages are encouraged and always promptly responded to.

- Location: CBA 147, Interurban Campus
- Phone: 250-686-8827 (outside of office hours) / TBA (during office hours)
- E-mail: [deutschn@camosun.bc.ca](mailto:deutschn@camosun.bc.ca)

**Intended Learning Outcomes** (At the end of the course students will be able to):

1. Explain the fundamental roles and importance of dietary proteins, lipids (fats and oils), carbohydrates, vitamins, minerals and water, and the need for balanced intakes for optimal wellness.
2. Relate various recommended daily intakes of proteins, lipids, carbohydrates, vitamins, and minerals to appropriate dietary and, possibly, supplement sources with regard to exercise type and intensity, optimal recovery, and optimal wellness.
3. Describe the importance of appropriate hydration before, during, and after exercise, and explain the general importance of water consumption and electrolyte balance to optimal wellness.

4. Relate muscle function and energy expenditure to biochemical fuel sources required by the body during various types and durations of exercise.
5. Relate the basic functioning of the gastrointestinal tract, the liver and the kidneys to the uptake and subsequent utilization or elimination of nutrients or their metabolic products before, during and after exercise.
6. Outline the effectiveness or potential efficacy, and/or the potential concerns, of current nutritional supplements.
7. Describe important considerations when comparing various diets recommended for general wellness, or diets designed for people interested in achieving greater wellness through exercise targeting weight loss, or the general effects of aging.
8. Describe the rationale of diets designed for the management of diabetes, food intolerance, osteoporosis, poor cardiovascular health, or hypokinetic diseases as they relate to the preventive and/or rehabilitative effects of exercise.
9. Obtain refereed scientific and medical reports on-line or in print form for the purpose of accessing new information on diets and nutritional supplements related to exercise and wellness.

### **Required Materials**

**Text:** Manore, M, Meyer, N & Thompson, J (2009). Sports Nutrition for Health & Performance (2nd Edition). Human Kinetics: Champaign, IL.

- Textbooks are available from the Interurban Campus Book Store. A copy will be made available in the reserve library at the Interurban Campus
- This is a great text to use as a reference in the future
- An e-book version is available directly from the Human Kinetics website.

**Journals:** Recently published and/or relevant peer reviewed articles in the area of nutrition for fitness and sports and additional relevant fields are considered required reading as part of the course.

- Some articles will be required reading (marked as R), while others will be optional reading (marked as O). A list of articles will be provided as part of the lecture notes.
- A list of recommended journals, websites and other resources will be provided at the start of the semester in a separate handout.

**Laboratory Experiments:** Experimental procedures will be provided on D2L

## General Materials and Supplies

- **Calculator:** A non-programmable, non-cell phone-based, calculator will be required at times in the lab, in lecture, and during exams. Students are required to provide their own calculator.
- **Latex gloves** (or 'non-allergenic' gloves): Will be available in the lab for several purposes including:
  - Handling any human sample, such as urine or blood.
  - If a person with an allergy, such as a skin contact-based food allergy, requires their use. People with food allergies should not risk inappropriate contact with allergens.

## Course Content and Schedule

**Credits:** 3 credits

**In-class workload:** 3 x 50 minute lectures per week + 1 x 1:50 hour lab period in alternating weeks

**Out of class workload:** Approximately 4.5 hours per week. Please use this time wisely. If you require assistance, please do not hesitate to ask.

**Number of weeks:** 14 weeks

**Pre-requisites** (courses):

- BIO 141 - Anatomy for Sport Education
- BIO 142 - Physiology for Sport Education
- HLTH 110 - Health in Today's World
- SPEX 210 - Exercise Physiology

## Lecture Outline

An outline of the topics to be covered in the course is provided below, broken into sections. At the start of each section, an assigned reading list and relevant outside sources will be provided. Note: The order of the lectures may be subject to change. Some of the lecture topics are not available in the text, the appropriate resources will be provided.

Supplementary materials, including scientific reports, review articles, and opinion papers will be provided throughout the course to enhance the curriculum and promote critical thinking, which is key in the field of exercise in wellness in general and fitness nutrition in particular.

## Lecture Topics

### 1. Introduction to the Science of Nutrition

- History of sports & fitness nutrition science & practice
- Introduction to fitness & nutrition myths, fads, supplements, etc
- Role of nutrition in exercise, sport and health & key terminology

### 2. Carbohydrates

- Biochemistry & general nature of carbohydrates

- Function, classification and sources
- Carbohydrate metabolism & hormonal regulation
- Dietary carbohydrate needs, reserves & recommendations

### **3. Fat**

- Biochemistry & general nature of types of lipids (fats & oils)
- Function, classification and sources
- Fat metabolism during exercise
- Dietary fat needs, reserves and recommendations

### **4. Protein**

- Biochemistry & general nature of protein and amino acids
- Function, classification and sources
- Assessing protein status
- Protein metabolism during and after exercise
- Dietary protein needs and recommendations

### **5. Nutrient Digestion, Absorption and Elimination**

- Biochemistry and chemistry of gastrointestinal function
- Digestion & absorption

### **6. Energy & Nutrient Balance**

- Macronutrient balance
- Energy expenditure
- Energy intake

### **7. Body Weight**

- Role of diet and exercise
- Weight loss interventions
- Maintaining or gaining weight
- Weight & the athlete

### **8. Body Composition**

- Body composition for health
- Body composition for athletic performance
- Assessment methods

### **9. Exercise fueling - carbohydrate**

- Pre and post carbohydrate needs
- During exercise carbohydrate needs

## **10. Fluid and electrolyte balance**

- Water and electrolyte balance
- Fluid and electrolyte needs for exercise
- Sports drinks and hydration drinks
- Fluid needs in hot environments
- Fluid and electrolyte needs for children & adolescents

## **11. Micronutrients – general overview**

- Vitamins
- Minerals

## **12. B Vitamins & energy metabolism**

- Exercise related functions
- Requirements
- Assessment

## **13. Antioxidants**

- Actions & definitions
- Enzymes & nutrients involved
- Assessment of oxidative damage
- Requirements
- Antioxidants and chronic disease

## **14. Minerals & Exercise (Iron, copper, zinc, magnesium, chromium)**

- Exercise related functions
- Requirements & food sources
- Assessment & status of active people

## **15. Blood forming nutrients (Iron, copper, folate, B12)**

- Exercise related functions
- Requirements & food sources
- Assessment & status of active people

## **16. Nutrients in bone health (Calcium, phosphorus, magnesium, vitamin D)**

- Bone metabolism
- Requirements and sources
- Assessment
- Additional nutrients involved in bone metabolism
- Exercise and bone health

## 17. Ergogenic Aids

- Ergogenic substances in sport and exercise
- Evaluating & choosing quality supplements
- Review of various substances

## 18. Various diet types

- Evaluation and analysis of various popular diets

## 19. Supplement material

- Student selected topics & questions as time permits

## Laboratory Experiments

### Week 1: Lab Orientation, Safety & Organization, and Experiment Planning

- Safety outline
- Lab organization
  - Students 'pair-up'
  - Dry-lab protocols and requirements are reviewed

### Experiment Set I: Carbohydrates

Blood Glucose: The 'first choice' in energy: Students will drink a solution rich in glucose or will select to eat a particular carbohydrate rich food at the start of the lab. Drinks and or particular foods will be provided by each student and should be approved prior to the lab. During the lab, pin-prick dip stick tests will be conducted on droplets of blood at selected intervals. A 'PA' hand-held analyzer will be used to provide results. The test will be repeated every 20 minutes. The data will be graphed to allow students to appreciate how rapidly insulin production rises to return blood glucose levels to normal. Students with diabetes, or pre-diabetic conditions, or glucose-intolerance will not participate directly but will work with a partner.

Dry lab #1: A comparison of sports drinks & gels: Students will be assigned particular sports drinks and sports gels and will provide a breakdown of the carbohydrate amount, type & percentage of solution along side a summary, based on the literature, of what individuals should be looking for in a sports drink or gel. These must be supplied a week prior to the lab period. Follow-up during the lab: A comparison of the results will be discussed.

A Taste-Test of natural and artificial sweeteners: In this lab period, students will examine the taste perception of the sweetness of natural and artificial sweeteners at a constant concentration and correlate them with 'real world' dietary needs. This lab report is due a week after the lab period.

## **Experiment Set II: Lipids**

'Good Cholesterol' - 'Bad Cholesterol': Simple, pin-prick, dipstick-based analyses of total blood cholesterol levels, and LDL & HDL levels, will be used. The data will be compared with optimal levels and ratios of cholesterol, LDL ('bad' cholesterol) and HDL ('good' cholesterol) in association with wellness.

## **Experiment Set III: Protein**

Dry Lab #2 Are all protein supplements made equal?: Student will be assigned a particular supplement and will provide an analysis of the supplement, due a week prior to the lab period. Follow-up during the lab: A comparison of the results will be discussed.

## **Experiment Set IV: Hydration, Fluid & Electrolyte Balance**

A Look at Water Balance: Students will engage in their normal exercise pattern outside of lab time and will weigh themselves before and after exercise to estimate water loss during exercise. Body weight changes will be recorded. A report is due a week prior to the lab period. Discussion will follow during the lab period.

Dry-Lab #3: Students analyze their urine for specific parameters and provide a summary regarding the importance of several of these parameters for hydration.

## **Basis of Student Assessment (Weighting)**

### **I. Project and Assignments**

(combined value 50% of final grade)

1. Seven-day, detailed food journal & analysis - 10%
2. Critical analysis of a popular dietary plan - 15%
3. Blog posts related to sport & fitness nutrition and presentation - 25%

The seven-day food journal is a two part project: the journal must be completed during the first 21 days of the semester, while the analysis itself is due during the second part of the semester. Similar to the food journal, the blog assignment is a 2 part project requiring the students to post throughout the semester (part 1) and to prepare a presentations about their experience & learning (part 2).

Other assignments and dates for submission will be provided at appropriate times spread across the semester.

### **II. Laboratory Experiment Reports**

The lab reports total grade contributes a value of 15% to the final grade. Attendance in the lab periods is mandatory. No laboratory experiment can be missed without an acceptable reason submitted in writing such as a proper letter from Medical Doctor.

### III. Midterm Exam

The midterm exam grade contributes a value of 10% to the final grade. This exam covers relevant material from approximately the first half of the course. The delineation of material that students will be responsible for will be provided about one week before the date of the exam. The exam is a 50 minute exam and will be held during regular class hours.

### IV. Final Exam

The final exam grade contributes a value of 20% to the final grade. The format is an open book exam and the emphasis is on material covering the entire semester. Assistance on how to prepare for such an exam will be provided throughout the semester.

Attendance at the final exam is mandatory. Appropriate documentation must accompany any explanation for absence. The College will publish the time and location of this 3 h final exam during the semester as indicated in the College Calendar.

### V. Attendance & Participation

5% of the final grade is allocated to attendance (3%) and participation (2%). Attendance in both classes and labs is mandatory. If students must miss a class or lab, please email or call in advance, providing a reason. Participation in class discussion is needed to enhance the learning process.

## Grading System

### Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved	0



## Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at [camosun.ca](http://camosun.ca) or information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<u>Incomplete</u> : A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	<u>In progress</u> : A temporary grade assigned for courses that are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
CW	<u>Compulsory Withdrawal</u> : A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.

## Recommended Materials or Services to Assist Students to Succeed Throughout the Course

After every section, appropriate resources will be posted on D2L. The corresponding text website provides learning resources that will further enhance the understanding and appreciation of the curriculum of this course. Additional resources and readings will be provided throughout the course as needed.

## Learning support and services for students

There are a variety of services available for students to assist them throughout their learning. This information is available in the college calendar, registrar's office or the college website at <http://www.camosun.bc.ca>.

## Academic conduct policy

There is an academic conduct policy. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each school administration office, registration and on the college website policy section. [www.camosun.bc.ca/divisions/pres/policy/2-education/2-5.html](http://www.camosun.bc.ca/divisions/pres/policy/2-education/2-5.html)

