

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



**SAULT  
COLLEGE**

**COURSE OUTLINE**

<b>COURSE TITLE:</b>	APPLIED EXERCISE SCIENCE I		
<b>CODE NO. :</b>	FIT150	<b>SEMESTER:</b>	Winter
<b>PROGRAM:</b>	FITNESS AND HEALTH PROMOTION		
<b>AUTHOR:</b>	Steve McLeod		
<b>DATE:</b>	Jan. 2012	<b>PREVIOUS OUTLINE DATED:</b>	Jan. 2011
<b>APPROVED:</b>	"Marilyn King"		Dec. 2011
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	<b>CHAIR</b>		<b>DATE</b>
<b>TOTAL CREDITS:</b>	6		
<b>PREREQUISITE(S):</b>	OPA104, PNG111		
<b>HOURS/WEEK:</b>	6 (3 Theory and 3 Lab)		

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*For additional information, please contact the Chair, Health Programs  
School of Health, Wellness and Continuing Education  
(705) 759-2554, Ext. 2689*



**I. COURSE DESCRIPTION:**

This course is the first in a two part series (Applied Exercise Science I and Applied Exercise Science II). The course will be equally divided between theory and practical laboratory time.

**Theory:** This course examines the physiological adaptations that take place within the human body during exercise and work including the muscular system and energy usage via aerobic and anaerobic systems, the skeletal system and bone development, and the respiratory system and oxygen utilization, so that accurate assessments of fitness and well-being can be performed and monitored. Assessment of physical fitness and interpretation of laboratory results will provide the basis for developing and evaluating safe and goal oriented strategies tailored to maximize the benefits of health, fitness and well-being. Identification of clients who should seek medical clearance prior to performing a fitness appraisal or to becoming physically active and utilizing current theories to discuss weaknesses and strengths of performance protocols will enhance placements in a variety of worksites.

**Laboratory:** This course introduces health and fitness field and laboratory instruments, techniques and procedures for basic fitness evaluations including pulse and blood pressure readings, body mass and skin girth measurements, and several aerobic and anaerobic sub  $\text{VO}_2$  max tests. Fitness evaluations are used to establish starting points and used to evaluate a participant's competency in performing physical fitness tests and exercise.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

Upon successful completion of this course, the student will demonstrate the ability to:

1.

Apply knowledge of aerobic and anaerobic energy systems, the muscular system, the skeletal and respiratory systems to physical assessments, wellness and maintaining a healthy lifestyle.

- Energies capacity to work
- Inter-conversions of energy
- Biological work in Humans
- Measurement of work on a treadmill, cycle, ergometer, and step bench
- ATP
- Phosphocreatine
- Cellular Oxidation
- Oxidative Phosphorylation
- Oxygen's role in energy metabolism
- Glycolysis

- Lactate formation
  - Citric acid cycle
  - Energy release from fat
  - Energy release from protein
  - Interrelationships among carbohydrate, fat, and protein metabolism
  - Immediate, short term, and long term energy
  - Measuring human energy expenditure during rest and exercise
  - Muscle structure and function
  - Training muscles
  - Cardiovascular system, regulation, control and integration
  - Functional capacities of the cardiovascular system
2. Assess levels of physical fitness to develop and evaluate safe and goal orientated strategies tailored to maximize the benefits of health, fitness and well-being.
- Physiques and physical activity
  - Overweight, obesity and weight control
  - Principles of weight control
  - Diet and exercise
3. Identify clients who should seek medical clearance prior to performing a fitness appraisal or to becoming physically active.
- Par-Q to assess readiness for physical activity
  - Patient history
  - Physical examination
  - Informed consent
4. Utilize current theories to discuss weaknesses and strengths of performance protocols.
5. Use health and fitness field and laboratory instruments, techniques and procedures for basic fitness evaluations including pulse and blood pressure readings, body mass and skin girth measurements, and several aerobic and anaerobic sub  $\text{VO}_2$  max tests.
- Components of fitness
  - Collection of data
  - Body mass Index
  - Girth Measurements
  - Skinfolds
  - Resting blood pressure
  - Exercise blood pressure
  - Sprinting
  - Jumping
  - Anaerobic cycling, stepping
  - Aerobic stepping, cycling, running, jogging, and walking

6. Evaluate a participants competency in performing physical fitness tests and exercise.

### III. TOPICS:

1. Structure and Function of Exercising Muscle
2. Fuel for Exercising Muscle: Bioenergetics and Muscle Metabolism
3. Neural Control of Exercising Muscle
4. Hormonal Control During Exercise
5. Energy Expenditure and Fatigue
6. Cardiovascular System and Its Control
7. Respiratory System and Its Regulation
8. Cardiorespiratory Responses to Acute Exercise
9. Principles of Exercise Training
10. Adaptations to Resistance Training
11. Adaptations to Aerobic and Anaerobic Training

### IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Physiology of Sport and Exercise 5<sup>th</sup> ed. By Wilmore, Costill and Kenney.

Exercise Testing and Prescription Lab Manual, 2<sup>nd</sup> ed. By Acevedo and Starks

### V. EVALUATION PROCESS/GRADING SYSTEM:

Tests (4 @ 15% each) –	60%
Lab Assignments –	30%
Lab Final –	<u>10 %</u>
	100%

The following semester grades will be assigned to students in post-secondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 – 100%	
A	80 – 89%	4.00
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	

X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

**Note:** For such reasons as program certification or program articulation, certain courses require minimums of greater than 50% and/or have mandatory components to achieve a passing grade.

It is also important to note, that the minimum overall GPA required in order to graduate from a Sault College program remains 2.0.

#### VI. SPECIAL NOTES:

Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

#### VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.