### Course Name:
KNPE 339/3.0
Advanced Exercise Metabolism

### Course Instructor:
Jacob Bonafiglia and Hashim Islam

### Learning Hours:
Lectures: 2 x 1.5 hrs/ 12 weeks

### Prerequisite:
Level 3 or above in a KINE or PHED Plan and KNPE 225/3.0 and KNPE 227/3.0

### Exclusion:
KNPE 427/3.0

### Course Description:
The focus of KNPE 339 is on aspects of skeletal muscle energy metabolism related to exercise and nutrition, with a particular emphasis on the regulation of carbohydrate and fat metabolism and the mechanisms regulating their use as substrates for muscle during rest and exercise. The use of nutrition and exercise in humans to assess the impact of these perturbations on whole body metabolism and related clinical disorders are also considered.

### Intended Student Learning Outcomes:
- Advanced understanding of mechanisms underling classic and current topics in exercise metabolism
- Gain a cursory knowledge of the methodology used in exercise metabolism
- Understand both results and methodologies presented in primary references from exercise metabolism:
  - Utilize primary articles as a reference material;
  - Efficiently extract study methodologies (subjects, experimental protocols, materials and methods);
  - Interpret results within the contexts of 339, exercise metabolism, and health.
- Develop problem statements that integrate physiological models and test speculative propositions using primary references from exercise metabolism
- Independently learn and integrate information on selected topics in exercise metabolism

### Course Evaluation:
- In-class reading quizzes 10%
- Multiple choice tests (3 x 10%) 30%
- Video Presentations (3 x 8%) 24%
- Assignments 6%
- Final exam 30%

### Course Outline

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<th>Topic</th>
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<tr>
<td>ATP production and carbohydrate metabolism</td>
<td>Impact of detraining/what exactly happens in sedentary muscle?</td>
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<td>Exercise intensity and substrate utilization (Fatty Acid)</td>
<td>Oxidative stress in health and disease</td>
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<td>Problem solving</td>
<td>Mitochondrial content and health</td>
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<td>Training and exercise substrate selection</td>
<td>Liver and adipose tissue in insulin resistance</td>
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<td>Mitochondrial respiration</td>
<td>Inflammation and T2D</td>
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<td>Mechanisms controlling mitochondrial content</td>
<td>Curing T2D</td>
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<td>Exercise intensity and mitochondrial biogenesis</td>
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