

CEP605 Exercise Biochemistry and Metabolism

(3 credit hours)

Course Syllabus

Course Description

Students will actively engage in the detailed study of the role and regulation of oxidative and non-oxidative energy pathways during acute exercise and how these pathways adapt to exercise training. Additionally, this course will discuss fuel utilization during exercise of varying intensity and duration and lactic acid production and utilization. Lastly, this course will discuss exercise metabolism concepts and their relationship to clinical conditions such as dyslipidemia, obesity, and diabetes mellitus.

Course Learning Outcomes

By the end of this course, you will be able to:

1. Understand the integrated nature of lipid, carbohydrate, and protein catabolism in homeostatic response to exercise.
2. Explain the roles of different dietary fuel types, and demonstrate the chemical roles of coenzymes and vitamins for common metabolic reactions.
3. Diagram oxidative and non-oxidative metabolic pathways and have knowledge of key structures, chemistry, and metabolite regulation of the reactions in these pathways.
4. Analyze the hormonal regulation of metabolism and how hormones affect nutrient utilization in health and disease.
5. Evaluate the role of lactic acid in exercise metabolism.
6. Describe how metabolic pathways are altered during varying exercise training 8. Demonstrate critical thinking in the regulation of metabolism during varying exercise intensity.

Required Textbook(s) and Resources

For this course, you will need to obtain the following materials:

- McConnell, G. (2022). *Exercise Metabolism: Psychology in health and disease (1st ed.)*. Springer.

Recommended Text:

- Berg, J. M., Gatto, G. J., Hines, J., Tymoczko, J. L., & Stryer, L. (2023). *Biochemistry* (10th ed.). W.H. Freeman & Company.

Be sure to also review the weekly **Explore** sections for additional library or web resources. For access to databases, research help, and writing tips, visit the [Tiffin University Library](#).

Time Commitment

Effective time management is possibly the single most critical element to your academic success. To do well in this online class you should plan your time wisely to maximize your learning through the completion of readings, discussions, and assignments. Because of our accelerated, seven-week term, TU online courses are designed with the expectation that you dedicate a little over **six (6)** hours per credit hour to course activities and preparation **each week**. For example, for successful completion of a three-credit, seven-week online course you should reserve roughly **twenty (20) hours per week**.

To help plan your time and keep on track toward successful course completion, note the distinctive rhythm of assignment due dates:

1. All times assume Eastern Time (GMT-4).
2. Weeks begin at 12:00 a.m. ET on Monday and end at 11:55 p.m. ET on Sunday.
3. Unless otherwise noted, initial assignments or discussion posts are due by **11:55 p.m. ET on Wednesdays**.
4. Additional assignments or follow-up discussion posts are due by **11:55 p.m. ET on Saturdays, and**
5. Major assignments and reflections are typically due by **11:55 p.m. ET on Sundays**.

Learning Activities

For Weeks 2-6, you will answer a series of application questions as well as provide responses to a weekly case study. Additionally, you will be required to research a peer-reviewed journal article related to the material discussed the corresponding week and provide a 2-page summary of the article selected. Assignments provided in weeks 2-6 will be given full credit only after responses to follow-up questions (given by the professor) are provided. Week 1 will have you provide an introduction of yourself and provide feedback to the introduction of your peers, utilize AI (ChatGPT) as a work tool, complete a partially filled-out concept map to provide a foundation for how metabolism works and complete an introductory quiz to assess your prior knowledge. Week 7 will have you conclude the course with a video presentation related to the topic of Exercise Metabolism and its application clinically, in research, or both.

Grading

The chart below identifies the individual contributions from each type of activity, per week.

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Total
Discussions Activity 1.1 (n/a) Activity 1.2 (25)	(n/a)	(n/a)	(n/a)	(n/a)	(n/a)	(n/a)	25
Assignments Activity 1.3 (50)	Assignments Activity 2.1 (30) Activity 2.2 (50) Activity 2.3 (75)	Assignments Activity 3.1 (30) Activity 3.2 (50) Activity 3.3 (75)	Assignments Activity 4.1 (30) Activity 4.2 (50) Activity 4.3 (75)	Assignments Activity 5.1 (30) Activity 5.2 (50) Activity 5.3 (75)	Assignments Activity 6.1 (30) Activity 6.2 (50) Activity 6.3 (75) Activity 6.4 (50)	Assignments Activity 7.1 (50) Activity 7.2 (0)	
Quiz Activity 1.4 (50)	(n/a)	(n/a)	(n/a)	(n/a)	(n/a)	(n/a)	50
125	155	155	155	155	205	50	1000

Grading Scale

A: 90-100% | B: 80-89% | C: 70-79% | F: <69%

Course Schedule and Weekly Checklist

Topic	Learning Activities (Due by 11:55 P.M. ET on the Day Designated)
Start Here	<ul style="list-style-type: none"> Activity 1.1: Activity 1.1: START HERE – Meet Your Peers
Week 1: Overview of Exercise Metabolism	<ul style="list-style-type: none"> WED: Activity 1.1: START HERE – Meet Your Peers WED: Activity 1.2: Key Milestones in the History of Metabolism SUN: Activity 1.3: Overview of Metabolism SUN: Activity 1.4: Quiz

Need Help? Get Help!
 See [Where and How to Get Technical Support at Tiffin University](#).

General Questions/Comments/Feedback:
online@tiffin.edu

Week 2: Glycogen Metabolism	<ul style="list-style-type: none"> ● WED: Activity 2.1: Journal Article Research ● SAT: Activity 2.2: End-of-Week Application Questions ● SUN: Activity 2.3: Case Study
Week 3: Fatty-Acid Metabolism	<ul style="list-style-type: none"> ● WED: Activity 3.1: Journal Article Research ● SAT: Activity 3.2: End-of-Week Application Questions ● SUN: Activity 3.3: Case Study
Week 4: Protein Metabolism	<ul style="list-style-type: none"> ● WED: Activity 4.1: Journal Article Research ● SAT: Activity 4.2: End-of-Week Application Questions ● SUN: Activity 4.3: Case Study
Week 5: Exercise Metabolism and the Body Systems	<ul style="list-style-type: none"> ● WED: Activity 5.1: Journal Article Research ● SAT: Activity 5.2: End-of-Week Application Questions ● SUN: Activity 5.3: Case Study
Week 6: Metabolic Disease	<ul style="list-style-type: none"> ● WED: Activity 6.1: Journal Article Research ● SAT: Activity 6.2: End-of-Week Application Questions ● SUN: Activity 6.3: Case Study ● SUN: Activity 6.4: Final Presentation Outline
Week 7: Final Presentation	<ul style="list-style-type: none"> ● SAT: Activity 7.1: Final Presentation ● SUN: Activity 7.2: Your Thoughts

Tips for Success

Online learning requires self-discipline and self-direction. As seekers of the truth, we should be willing to challenge one another's academic work in a spirit of respectful comradery. Your course is a place for you to grow as you benefit from the expertise, experience, and diverse perspectives of your instructor and peers. Constructive feedback will challenge you to stretch your own thinking, thereby expanding your knowledge and understanding.

To get the most out of your learning experience, you should actively engage (participate) in **ALL** course activities. Course elements are arranged chronologically. To complete a week, simply work your way "down the page" through all of the course materials and activities.

For More Information:

Be sure to review the [Support, Policies, and Procedures](#) addendum.