

# Physiology of Sport and Physical Activity ESS 375

## Course Syllabus

This course is an introductory course in exercise physiology. It will introduce certain concepts of the “how and why” the body responds to both acute and chronic exercise stress. It is **required** that the student already passed an introductory course in physiology prior to taking this class. It is **recommended** that the student passed an anatomy course. If you **do not** have the proper prerequisites, you will be dropped from the course (unless special written permission is obtained by the instructor ahead of time).

**Text: Exercise Physiology: Theory and Application to Fitness Performance 5th Edition by S.K. Powers & E. T. Howley, Publishers, McGraw Hill 2001, N.Y.,NY.**

Office hours.

This is by appointment and arranged ahead of time. You can stop by and ask me questions but I cannot assure you a time. Please e-mail ([ahgoldfa@uncg.edu](mailto:ahgoldfa@uncg.edu)) or call me (334-3029) to leave a message to arrange a meeting or if you have a question or concern.

**Credit:** 4 credits for Entire course. 0 credits for laboratory section.

Prerequisites: Physiology class: Biology 277 or equivalent, Biology 271 recommended, or permission of the instructor.

The class meets from 9:30 - 10:45 Tuesday, Thursday in room 340 HHP Building.

**Instructor: Dr. Allan H. Goldfarb Tel: 334-3029 e-mail: [ahgoldfa@uncg.edu](mailto:ahgoldfa@uncg.edu)  
Office 260 HHP Bldg.**

Office hours Monday 9:00-10:00 A.M.

Tuesday 8:00-9:00 A.M.

Thursday 8:00-9:00 A.M.

This is by appointment or arranged ahead of time. You can stop by and ask me questions but I cannot assure you time at that moment. Please e-mail me or call me to leave me a message to arrange a meeting or if you have a question or concern. Please leave your e-mail or telephone number and a good time to speak with you. Please e-mail me if you can to leave time or message at [ahgoldfa@uncg.edu](mailto:ahgoldfa@uncg.edu). Leave a time that is good to call or contact you so we do not play phone tag.

Lab. Instructors: **Tel: 334-4062 Labs will meet in 353 HHP Building**

Tentative Instructors are Mike McKenzie, Jason Waggoner, Milind Chaudhari and Jessica Witherspoon

Monday section L-04 2:00-3:50

Tuesday section L-03 11:00-12:50

Wednesday section L-01 2:00-3:50

Thursday section L-02 11:00-12:50  
Friday section L-05 1:00-2:50

**CLASS STARTS ON TIME, ATTENDANCE WILL BE TAKEN, COMING IN LATE DISRUPTS CLASS.** 3 times late = 1 absence. **More than 3 absences that are not excused = -3 points on your average.** More than 6 absences will result in your dismissal from the class with a failing grade.

**If you bring in cell phones or beepers into class turn them to silent mode or vibrate or turn them off.\*\*\*\*\*If you are talking when class starts and do not stop I will ask you to leave. There is no food or drink allowed in the classroom or lab.\*\*\*\*\***  
**You may record the lecture if you so desire. Please let me know if you do this.**

**BE PREPARED. READ CHAPTERS PRIOR TO CLASS MEETING**  
**HAVE ALL ASSIGNMENTS READ AHEAD OF TIME AND QUESTIONS**  
**TYPED OUT.**

**\*\*\*\*\* You must be enrolled in one section of the laboratory section and must pass the laboratory section to pass the course\*\*\*\*\*.**

The lab materials are available in the bookstore.  
If you are registered for one lab section please make sure you attend that section.

It is expected and required that you **read the assigned chapters prior to the class meeting**. The format of the class will start with your questions of material already covered. I will then present the important concepts within the text. **It is assumed that you have read the material** and that I will help clarify concepts. **You have the obligation to come prepared to discuss the material.** You will be called on occasionally. If you do not understand the text material please have questions prepared. If after the class you still do not understand the material, please make an appointment to see me so I can clarify the material. Since you are required to have read the material ahead of time, I will **occasionally give quizzes to see your progress**. The intent of the quizzes are three fold: 1) to stimulate you to read and keep up; 2) to have you experience some of my questions prior to the tests; 3) to help evaluate your progress. Hopefully this will help you prepare better for the tests.

Missing a quiz or a test will count as a zero. If you know there will be a conflict you may arrange **ahead of time** to take the test or scheduled quiz **early**. There will be **no** adjustments to quiz or tests missed if notified after the fact. Being on a team, band, in a play, visiting someone, etc. for personnel or University purposes does not excuse you from class, tests, or assignments. If there was a medical reason a doctor's note must be submitted. If this is the case you can have a make up for the exam or the quiz. If you have car problems etc. call my office and let me know. This is not an excused absence.

**I will take attendance.** It is required that you attend on time and participate (ask questions or give your opinion). I encourage questions, comments and your perspective to help the class understand or obtain a different view. If you just sit there and do not contribute to the discussion you will not get

your full participation points.

**I require all students to arrange a 10 minute meeting** with me to determine your progress and work out problems if they occur. Sometimes my teaching style may not be suitable for your learning style. Please make an appointment with me to discuss this. I am willing to meet with students on topics in the class. You should arrange a time with me preferably during my office hours ahead of time (call or e-mail). If this is not suitable to you, we can arrange other times. Please schedule a time with me early in the semester (**first three weeks**). My e-mail is [ahgoldfa@uncg.edu](mailto:ahgoldfa@uncg.edu).

**Tentative Schedule for topics this semester:**

<u>Meeting</u>	<u>Topic</u>	<u>Chapters to be Read before lecture</u>
1	Introduction, Requirements, Physiology, Past and Future, Control of the Internal Environment, Homeostasis	1&2
2	Bioenergetics	3
3	Bioenergetics {anaerobic and aerobic} (Glycolysis, beta-oxidation)	3
4	Exercise Metabolism	4
5	Exercise Metabolism (Oxygen debt, O <sub>2</sub> deficit)	4
6	Hormonal Responses to Exercise	5
7	Hormonal Responses to Exercise	5
8	Measurement, Work, Power, & Energy Expenditure	6*
9	<b>TEST 1 covers chapters 1-6</b>	
10	Nervous System	7
11	Nervous System	7
12	Skeletal Muscle	8
13	Skeletal muscle	8
14	Circulatory adaptations to Exercise	9
15	Circulatory adaptations to Exercise	9*
16	<b>TEST 2 covers chapters 7-9</b>	
17	Ventilation During Exercise	10
18	Ventilation During Exercise	10
19	Physiology of Training	13
20	Physiology of Training	13
21	Body composition and Nutrition	18
22	Body composition and Nutrition, Body Composition and Performance	18,23
23	Nutrition, Body Composition and Performance	23
24	Ergogenic Aids	25*

25	<b>TEST 3</b> covers <b>Chapters 10,13,18,23,25</b>	
26	Factors Affecting Performance	19
27	Training for Performance	21
28	Temperature Regulation	12
29	Exercise and the Environment	24
30	Special Populations, and Exercise Prescription for Health and Fitness	22,16
31	<b>TEST 4</b> covers 19,21, 12, 24, 22, 16	

\* **(Review for test if time permits). You must have at least 5 typed** questions submitted relevant to chapters that you want answered (not questions you know). Questions only, do not ask me to explain or discuss etc. 1) These are not questions: and 2) Do not ask me questions that are not relevant to the class material. If you have questions not relevant please see me and I will try to help with them.

Final Exam during finals week will be during **Finals week** as indicated in the schedule for December 8 from 9:00 -11:00 a.m. in room 340 (do not be late). It is only a two hour exam.

Anyone whom needs special assistance with tests or learning needs must demonstrate with documentation that this need has been verified from student services. I encourage you to go to student services for testing if you think you have a special need.

### **Grading.**

There will be 4 exams each will be 100 points (400 pts). The laboratory section will have a separate grade that will be factored into your average (100 pts). Quizzes, oxygen debt cost and nutritional assignments (2-4) will be given and will be considered part of your grade. The total of all the quizzes and assignments will be averaged and count 40 points toward your final grade. Participation in class will be factored as 20 points. If you do not ask questions and just sit there you will not get the full twenty points. The laboratory grade is calculated from a possible 100 points (no matter how many points are accumulated). The total of the 4 exams, quizzes, assignments and participation will equal 460 points. Your final grade will be the sum total of your four exams, quizzes, assignments, participation and points earned in the laboratory **You must have a passing grade in the laboratory to pass this course** If you miss more than one laboratory meeting your grade will be reduced by one letter grade. All laboratory write-ups will be typed and no longer than 2 pages excluding the data. All lab reports are due the next meeting of the laboratory except the last laboratory meeting. In that case they will be due one week after the last meeting. There are no make-ups for the write-ups. If they are not handed in on time they will get a zero

Reviews are for your benefit. Submit at least 5 questions typed by e-mail at least one day ahead of class. Handing them in at class will not be acceptable. These are questions that you want clarified not answers you know and must be relevant to the topics in the class. **These questions will be factored towards your participation. If there are not at least 5 questions and if not typed then you will not get the full points.** Do not ask me to explain something as this is not a question. Make

sure it is a question on the topics we covered. Do not ask me to go over a topic again.

There will be two nutrition and activity assignments that will be submitted for a grade. These assignments will take time and you will need to be careful in recording your information. You need to record all of the food and liquids you take for one week as well as your activity. **Put the information in column form and this must be typed (preferably on computer) in the form below. You may not use information already obtained from another class for this.**

Date	Item	Total Calories	Carbs(%)	Prot(%)	Fat(%)
2-10-04	pizza	590	250 (42)	150(25)	190(32)
2-10-04	coke (32 oz)	324	324(100)		
2-10-04	brownie	290	215(74)	15(5)	60(21)
Total for day		1204	789(65)	165(13.7)	190(21)

**Note:** That the calories and the % in ( ) are listed for each item. The % should total 100% for each item across. The total across on the carbs, proteins and fat should equal the total calories of that particular item and should add up to 100%. Sometimes the program or package label does not add up. Check this and make it work. The total across the bottom should be equal to the total calories. The % calories from carbs, proteins and fats should equal 100% at the bottom. **All items are in calories (not grams).** Also for total % at the bottom should be 100%. Thus,  $789/1204 = 65\%$  not  $(42 + 100 + 74) / 3 = 72$ .

**Make sure your numbers add up correctly** (both across and down).

**Use calories not grams.** Conversion of grams to calories is the following:

Carbohydrates and proteins = 4 cal/gm. Fats = 9/gm. Thus, if 2 grams of fat = 18 calories.

Each day total the columns and figure % of calories for each of the major nutrients.

**Put in calories not grams.**

Each day will get a separate sheet for diet and activity. Diet on top and activity on bottom of page. You will add up the totals for each day and average for the week on a separate sheet of paper. **You will also record you weight at the beginning and end of the week.** Put starting weight on first page at top. Put ending weight on last page at top.

Include amount of activity you do each day on same sheet as food and determine the calories expended per day. This will help you understand if you are in caloric balance for the day and the week. Do not do times of day but categories. I do not want to know if you sit from 8-10 a.m. I want to know the total time you sit for the day.

For calories expended make a sheet that includes 24 hours. Example

Activity	Time	cal/min/lb	calories
Sleeping	8 hours	0.007 cal/min/lb =	
Sitting	8 hours	0.008 cal/min/lb =	
Standing	4 hours	0.009	
Walking	2 hours	0.020 = slow	fast= 0.022

Aerobics	30 min.	0.040	only time moving not stretching.
Basketball	30 min.	0.050	full court half court 0.040 Only time on court.
Baseball	30 min	0.028	only time on field not on bench. Softball similar.
Weights	30 min	0.028	only time doing lifts (each lift takes about 2-3 sec).

**Note if you do 10 lifts and 3 sets =10 x 3 x 3 =90 seconds of activity.**

Other activities

Cycling 0.045-.100 depending on speed and grade, Football 0.050,

Running 0.070-.121 depending on speed, (0.070 is about 8-9 minute miles. If you go slower than adjust the number downward. If you go faster 6-7 minute miles be about .1 00 and faster go towards the higher number. Climbing hills 0.055, golf (walking) 0.027, soccer =0.059, Swimming 0.060-0.070, (this is free style and again depends on pace and if against a current.

Tennis (singles) 0.050, doubles 0.038, volleyball 0.023.

Cleaning house is similar to standing (latest reports). Do not put brushing teeth, and other daily grooming activities.

Do not put 8 min walked, 6 min sitting etc. Add all for the day and group category.

Please remember only time doing activity not waiting around on sidelines, on deck or in the weight room as activity. These are times sitting or standing. If you are in the field and not moving this is standing (softball, baseball, soccer, etc). Same is true for weight lifting. How many lifts time number of sets is time lifted. Thus, 10 lifts of three sets = 30 lifts each taking 2-3 seconds = 60-90 seconds of work. If you did 8 types of muscle activities then times the 60 or 90 times 8.

Determine if your average calories taken in are approximately = to the average calories expended for the day and for the week.

Answer the following questions:

What percentage of your diet is in Carbohydrates, Proteins and Fats per day and for the week?  
Is this normal for you and for what is recommended for the U.S. population?

Was this a typical week? If this was not a typical week explain why it was not. Were you sick? Did you eat more or less than normal? Did you eat your typical foods? Were you stressed out? (Exams, papers, work, relationships). Did you get your typical sleep and/or exercise? Was there anything that affected you this week that was abnormal? Examples (allergies, weather conditions, etc).

Make sure you get your weight at the beginning and end of the week. Same time of day without any clothes (same scale).

Try to maintain your normal eating and activity habits for the week.

The second assignment will be based on this first assessment. Do not discard this. Keep a record of this before you hand it in on your computer and back it up. I may make some suggestions. It will then be up to you to make recommendations on your diet and exercise records in the second assignment based on the guidelines for the food pyramid and ACSM activity guidelines. Come up

with your own strategies how to improve your diet and energy balance based on your goals. The first diet assignment will be due. September 22<sup>nd</sup> in class.

## GRADING SCALE

A = 92 + average	A <sup>-</sup> = 90 >
B <sup>+</sup> = 87 >	
B = 82 >	B <sup>-</sup> = 80 +
C <sup>+</sup> = 77	
C = 72 +	C <sup>-</sup> = 70 +
D <sup>+</sup> = 68 +	
D = 66 +	D <sup>-</sup> = 65
F = below 65	

4 exams each 100 points	= 400 points
1 laboratory grade	= 100 points
Quizzes, assignments, etc	= 40 points
Participation in class	= 20 points
Includes papers + assignments	
Total	= 560 points

Thus, 80% of 560 = 448 points gives a B<sup>-</sup> grade.  
Or 90% of 560 = 504 points gives an A<sup>-</sup> grade.

- Test 1. Student Learning Objectives 1-4
- Test 2. Student Learning Objectives 10-13, 16
- Test 3 Student Learning Objectives 5,8,9
- Test 4 Student Learning Objectives 14,15

Laboratory Student Learning Objectives 7,8  
Diet and exercise assignments Student Learning Objectives 5,8

There may be times when you may earn extra credit. This is by volunteering as a subject in an experiment or helping in the laboratory with research. The amount of time you spend and your contribution will determine your extra credit points. These are up to a maximum of 15 points of your total points. You may not get dual credit. Thus, if you are a subject in a study and ask for points in my class you may not obtain extra points in another class and visa versa or get paid for being a subject. These volunteer points must be verified by the research and sent to me prior to finals week. Do not ask me for extra credit at the end of the semester. Do not ask me to do a paper at the end of the semester. You must have the researcher write me that you successfully participated as a subject and what you did. If you get paid for being a research subject you will not get extra credit points. The points for volunteering are for the semester you take this class and do not pertain to previous volunteer efforts.

**You will be required to set up an appointment with me in my office within the first three**

**weeks.** This is to let you get to know me, let me to get to know you and to help you with the course. It is your obligation to schedule this. Do not let this go to the third week if possible (e-mail me for appointment time).

### **Course Objectives for ESS 375**

Upon completion of the course the student will be able to.

1. To express the basic terminology utilized in exercise physiology. Test 1
2. To integrate homeostatic mechanisms and feedback regulation process that occurs during exercise. Test 1
3. To understand the structure of muscle and the fiber types and how this is related to contractile function in response to acute and chronic exercise. Test 1
4. To integrate energy metabolism that can produce energy with the needs for energy during exercise and how this is altered with chronic exercise training. Test 1
5. To understand how alterations in diet may influence exercise performance. Test 3 + Diet assignments.
6. To demonstrate proficiency with equipment that assesses aerobic and anaerobic capacities. Lab
7. To demonstrate competency in the measurement of oxygen consumption, ventilation measures, muscle strength and body composition. Lab
8. To identify the principles for regulating body composition and weight control through diet and exercise. Test 3 + Diet and exercise assignment.
9. To demonstrate an understanding of the principles for determining the correct intensity, duration and frequency for exercise training in normal and special populations. Test 3
10. To be able to monitor adaptations as a result of training on the cardiovascular system. Test 2
11. To integrate the cardiovascular adjustment to exercise with those of the muscular system. Test 2
12. To understand the alterations that occur in the blood as a result of acute and chronic exercise. Test 2
13. To understand the pulmonary alterations with exercise and its role in cardiovascular requirements. Test 2
14. To understand and apply the principles of exercising in different temperatures and environments

and populations. Test 4

15. To synthesize the principles of muscular fatigue in response to exercise.  
Test 4

16. To synthesize the alterations that occur within the body that enable proper function by both the neural and endocrine systems. Test 1 and Test 2

**Teaching Strategies:** The course is primarily a lecture format but has opportunities for class questions and discussion each time we meet. The laboratory aspect is primarily group work and class discussion format. There are hands on learning skills needed for assessments and measurement.