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### HHP 531.01: Laboratory Procedures in Exercise Science

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**The University of Montana**  
**Department of Health and Human Performance**  
**Dr. Brent Ruby, Dr. Steven Gaskill**

**HHP 531 Laboratory Procedures in Exercise Science**  
**Tuesday 2:10-4:00 PM**  
**Fall 2001**

**Course Description:**

Exercise physiology can be defined as using exercise to better understand physiology or using physiology to better understand the adaptations that accompany acute and/or chronic exercise. This course has been developed to compliment the Graduate Physiology of Exercise Courses and to give you a practical understanding of laboratory measures commonly used in Exercise Science.

Throughout the course you will participate as subjects and testers using a variety of testing procedures. Although this course does include a diverse number of testing procedures, not all areas can be discussed. Therefore, the testing procedures discussed in this course represent those methods most commonly used by our laboratory.

**Course Objectives :**

**To acquire,**

1. a basic understanding of data analyses (statistical) and representation (graphical)
2. an understanding of indirect calorimetry measures (field and laboratory)
3. laboratory skills in expired gas collection and blood sampling
4. basic understanding of enzymatic, spectrophotometric analyses

and to establish an understanding of the following techniques...

1. body composition methodologies
2. microsoft excel spreadsheet applications
3. computer integrated measurements
4. substrate utilization

**Instructional Format :**

One 110 minute lecture/lab each week. Class will be held in the Human Performance Laboratory (unless otherwise indicated) and will consist of a practical laboratory experience, lecture material, data analysis and lab write-up preparation.

**Course Expectations:**

It is assumed that all students have had or are currently taking HHP 529 (Advanced Physiology of Exercise I). Although attendance will not be taken, all assignments are due on the dates we discuss in class.

**Grading:**

Letter grades will be established as follows...

<b>A</b>	<b>90 - 100 % (450-500 pts)</b>
<b>B</b>	<b>80 - 90 % (400-449 pts)</b>
<b>C</b>	<b>70 - 80 % (350-399 pts)</b>

The percentage grade will be calculated from the total points earned from three examinations, two laboratory write-ups, and a research presentation/paper.

**Lab Write-ups** (8 x 50 points each) = 400

**Take Home Exam** = 100

**Text:**

There is no required text for this course at the present times. Labs and supplemental information will be distributed throughout the course.

**Course Evaluation :**

Students will be advised to critically evaluate the course content, requirements, course format, and instructor to ensure future improvements. An official University student evaluation form will be provided during the last full week of instruction.

## COURSE OUTLINE

<b>September</b>	<b>Scheduled Lab</b>	<b>Instructor</b>
4	Introduction, laboratory procedures, regulations, etc.	Ruby
12	<b>Lab #1</b> - Indirect Calorimetry <u>Methods</u>	Gaskill
18	<b>Lab #2</b> - Linearity of VO <sub>2</sub> , Ventilatory Threshold <u>Discussion</u>	Gaskill
	<b>Lab #1 due</b>	
25	<b>Faculty Retreat - no lab this week</b>	
<b>October</b>		
2	<b>Lab #3</b> - Effects of Elevated Core Temperature on Energy Expenditure	Ruby
	<b>Lab #2 due</b>	
9	<b>Lab #4</b> - *Glucose Tolerance Test: Resting (Part I) <u>Introduction</u>	Ruby
	<b>Lab #3 due</b>	
16	<b>Lab #4 cont</b> - *Glucose Tolerance Test: Post Exercise (Part II)	Ruby
23	<b>Lab #4 cont</b> - *Glucose Tolerance Test Post resistance Exercise (Part III)	Ruby
30	<b>Lab #5</b> - *Substrate Utilization During Exercise (Part I) <u>Methodology</u>	Ruby
	<b>Lab #4 due</b>	
<b>November</b>		
6	<b>Lab #5, cont</b> - *Substrate Utilization During Exercise (Part II)	Ruby
13	<b>Lab #6</b> - Body Composition Measurement Techniques <u>Methodology</u>	Ruby
	<b>Lab #5 due</b>	
20	<b>Lab #7</b> - Strength/Power Measurements <u>Results</u>	Gaskill
27	Measurements of lung volume - No write up for this lab	Gaskill
	<b>Lab #6 due</b>	
<b>December</b>		
5	<b>Lab #8</b> - Energy Expenditure: Laboratory (Part I) <u>Discussion</u>	Ruby
12	<b>Lab #8 cont</b> - Energy Expenditure: Field (Part II)	Ruby
	<b>Lab #7 due</b>	
18	<b>Lab #8 due</b>	

\* Indicates a need to begin early due to catheter placement.

## Example of lab write-up

Each of the following are required for each lab write up.

**1 Questions/Analyses**      **10 points**

**2 Title:**                      Description of the current lab (develop an appropriate title - 15 words max).

**3 Abstract**                      **20 points**  
Concise paragraph that describes study, results, conclusions (approx. 250-300 words) – see examples in MSSE.

**One of the following (depending on the lab) – 20 points**

**Introduction**                      Include an intro to past research (rationale) and your purpose for the investigation (**you must include references**).

**Methodology**                      Describe the way the data was collected, the general protocol, the instrumentation used and the general descriptive information of the subjects (i.e. college aged males (n=15) and college aged females (n=17) were used in the present investigation). (**you must include references as needed**).

**Results**                              Report the values obtained on the main variables of interest (i.e. means, statistical results). Include figures and tables as needed.

**Discussion/Conclusion**              Discuss potential reasons for the obtained values/ results. Incorporate past research to better explain your results. You must include references to justify your results. (**you must include references**).

Statement of closing remarks, provide direction for further research based on your results. Again – references please.

**The University of Montana**  
**Human Performance Laboratory - Dr. Brent Ruby, Director**

**Lab Rules and Regulations**

**The Human Performance Laboratory is used as a research and teaching facility. Therefore, a high level of organization and cleanliness are necessary. The lab will be open for class time only and will remain closed for research during other times.**

1. Because you are in a research/clinical environment, you are expected to demonstrate professionalism at all times.
2. No food or drink of any kind will be allowed in the main laboratory area.
3. No book bags, backpacks, jackets, sweatshirts will be allowed in the laboratory area. These items must remain in the front door area. Benchtops are to be used for equipment and lab manuals only.
4. Do not sit on the lab benchtops as you may scratch them or disturb equipment. Use one of the wooden benches or the floor. Do not remove chairs from the computer area.
5. Come prepared to participate in lab. This includes wearing the right kind of clothes for that days work. There are locker rooms in the building so you can change prior to lab. Part of your lab grade is based on participation.
6. Bring a change of shoes to wear during lab time. Snow boots are not acceptable! If you create a mess on the floor with your shoes, you will be asked to clean it up. Your best option is to change into clean shoes before coming in the door.

7. Do not disturb any equipment.