

George Mason University
College of Education and Human Development
PhD in Education – Exercise, Fitness and Health Promotion Specialization
EFHP 815 (001) – Measurement Techniques and Instrumentation (3)
3 Credits, Fall 2019
Fridays: 9 – 11:40AM, KJ Hall 212 – Science & Technology Campus

Faculty

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Prerequisites/Corequisites

Graduate Standing or Permission of Instructor

University Catalog Course Description

Explores the application and implementation of conventional measurement techniques and instrumentation to collect data in Exercise, Fitness, and Health Promotion.

Course Overview

Not Applicable

Course Delivery Method

This course is delivered using classroom instruction (face-to-face) and laboratory experiences.

Learner Outcomes or Objectives

This course is designed to enable students to do the following:

1. Discuss measurement techniques and instrumentation using field specific terminology.
2. Determine the appropriate measurement equipment based on research design.
3. Modify data acquisition procedures using an evidence-based approach.
4. Develop protocols for collecting and assessing data in Exercise, Fitness, and Health Promotion.

Suggested Texts

Beam W, Adams G. *Exercise physiology laboratory manual*. McGraw-Hill Higher Education; 2013.

Winter DA. *Biomechanics and motor control of human movement*. 4th ed. Hoboken, N.J.: Wiley; 2009.

Course Performance Evaluation

Students are expected to submit all assignments on time in the manner outlined by the instructor (e.g., Blackboard, Tk20, hard copy).

Assignments and Examinations

Examinations and Final Examination – Each student will be required to complete two exams and a final exam. The final exam will be cumulative. The format for all exams will be multiple choice, true/false, short essays, and problem-solving questions. Examinations represent inquiries regarding student knowledge of fact regarding course content. Examinations demonstrate that the student can remember and apply facts as well as demonstrate a hierarchy of knowledge information.

Final Presentation – Students will give an oral presentation associated with the laboratory experiences and their line of research. The focus will be on their measurement protocol, instrumentation and data collection. The presentation will be graded based on the content and of the presentation itself (see rubric below).

Laboratories and Laboratory Reports – The intent of the laboratories is to show how theory can be applied to a variety of common activities. The labs will require students to work in small groups. During the lab sessions data will be collected and a simple analysis will be performed. The labs will include questions regarding the results and several discussion questions. Each group must hand in 1 formal lab report, which will be due in class exactly 1 week after the lab is performed. Lab reports must be typed and include a cover sheet. Calculations may be hand written. Overall the laboratories will provide guided experiential learning that requires students to:

- Discuss measurement techniques and instrumentation using field specific terminology.
- Determine the appropriate measurement equipment based on research design.
- Modify data acquisition procedures using an evidence-based approach.
- Develop protocols for collecting and assessing data in Exercise, Fitness, and Health Promotion.

Course Performance Evaluation Weighting

This course will be graded on a point system, with a total of 100 possible points.

Item	Assessment Method	Number	Points Each	Total Points
#1	Examinations	2	15	30
#2	Final Exam	1	20	20
#3	Final Presentation	1	10	10
#4	Laboratory Reports	5	8	40
TOTAL				100

Grading Policies

The student's final letter grade will be earned based on the following scale:

Grade	Percentage
A	94 – 100%
A-	90 – 93%
B+	88 – 89%
B	84 – 87%
B-	80 – 83%
C	70 – 79%
F	0 – 69%

Note: Although a B- is a satisfactory grade for a course, students must maintain a 3.00 average in their degree program.

Professional Dispositions

See <https://cehd.gmu.edu/students/polices-procedures/>

Class Schedule

Week	Topic	Chapter/Assignment Due Date
1 – 8/30	Concepts in Tests and Measurements	Winter Chapter 1 Articles on Blackboard
2 – 9/6	Demographics: Body Composition and Anthropometry Lab 1	Winter Chapter 4 Articles on Blackboard
3 – 9/13	Metabolic Functioning Measurement Lab 2	Beam & Adams Chapter 15-21 Articles on Blackboard Lab Report 1 Due
4 – 9/20	Isokinetic Measurement and Testing	Articles on Blackboard Lab Report 2 Due
5 – 9/27	No Class: Dr. Mrs. Caswell Conference	Exam 1
6 – 10/4	Force Measurement (e.g., force plates, dynamometers, etc.) Lab 3	Winter Chapter 3, 5 & 6 Articles on Blackboard
7 – 10/11	Motion Analysis Theory	Winter Chapter 7 Lab Report 3 Due
8 – 10/18	Motion Analysis Lab 4	Winter Chapter 9
9 – 10/25	Kinematic & Kinetic Instrumentation in the field Data Synchronization & Management	Lab Report 4 Due
10 – 11/1	Exam 2	Exam 2
11 – 11/8	Guest Speaker: Dr. Eric Greska Wearable devices	
12 – 11/15	Electromyography	Winter Chapter 10 Articles on Blackboard
13 – 11/22	Electromyography Lab 5	Winter Chapter 8 Articles on Blackboard
14 – 11/29	<i>No Class – Thanksgiving Break</i>	
14 – 12/6	Student Presentations	Lab Report 5 Due Final Presentation
15 – 12/13	Final Exam	Final Exam

Note: Faculty reserves the right to alter the schedule as necessary, with notification to students.

Core Values Commitment

The College of Education and Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles: <http://cehd.gmu.edu/values/>.

GMU Policies and Resources for Students

Policies

- Students must adhere to the guidelines of the Mason Honor Code (see <https://catalog.gmu.edu/policies/honor-code-system/>).
- Students must follow the university policy for Responsible Use of Computing (see <http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>).
- Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students **solely** through their Mason email account.
- Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see <https://ds.gmu.edu/>).
- Students must silence all sound emitting devices during class unless otherwise authorized by the instructor.

Campus Resources

- Support for submission of assignments to Tk20 should be directed to tk20help@gmu.edu or <https://cehd.gmu.edu/aero/tk20>. Questions or concerns regarding use of Blackboard should be directed to <http://coursesupport.gmu.edu/>.
- For information on student support resources on campus, see <https://ctfe.gmu.edu/teaching/student-support-resources-on-campus>

For additional information on the College of Education and Human Development, please visit our website <https://cehd.gmu.edu/students/> .

Assessment Rubrics

Final Presentation (10% of Grade)

Standard	Accomplished: Strongly Meets Expectations (4)	Developing: Meets Expectations Adequately (3)	Beginning: Does not Adequately Meet Expectations (2)	Little or No Evidence (1)	Score
Content					
Introduction / Background - Discuss measurement techniques and instrumentation using field specific terminology. <i>(Course Objective)</i>	The introduction thoroughly describes the purpose of the data collection and reviews relevant literature related to the particular field of study. Additionally, student discusses measurement techniques and instrumentation using field specific terminology.	The introduction describes the purpose of the data collection and reviews relevant literature related to the particular field of study but is not thorough enough for doctoral level work. Additionally, student discusses measurement techniques and instrumentation using field specific terminology.	The introduction describes the purpose of the data collection but does not meet expectations in terms of the literature review relevant literature related to the particular field of study. Student discusses measurement techniques and instrumentation using inappropriate field specific terminology.	The introduction does not describe the purpose of the data collection, does not meet expectations in terms of the literature review relevant literature related to the particular field of study.	
Measurement Protocol - Develop a protocol for collecting and assessing data in Exercise, Fitness, and Health Promotion <i>(Course Objective).</i>	Develops a protocol for collecting and assessing data in Exercise, Fitness, and Health Promotion. The protocol utilizes appropriate measurement techniques to achieve purpose of data collection. Student demonstrates a thoughtful, evidence-based reasoning for protocol design.	Develops a protocol for collecting and assessing data in Exercise, Fitness, and Health Promotion. The protocol utilizes appropriate measurement techniques to achieve purpose of data collection. However, student does not demonstrate an evidence-based reasoning for protocol design.	The protocol developed would not be appropriate for collecting and assessing data in Exercise, Fitness, and Health Promotion. Protocol needs revisions to be acceptable.	The protocol developed would not be appropriate for collecting and assessing data in Exercise, Fitness, and Health Promotion.	

Instrumentation - Determine the appropriate measurement equipment based on research design (<i>course objective</i>).	Determine the appropriate measurement equipment based on research design. Instrumentation is appropriate for the purpose of data collection. Student demonstrates mastery of understanding and application of instrumentation.	Determine the appropriate measurement equipment based on research design. Instrumentation is appropriate for the purpose of data collection. Student does not fully demonstrate an understanding and application of instrumentation.	The instrumentation used needs further thought in the selection process. Student needs to improve understanding of instrumentation.	The instrumentation is inappropriate for the desired measurement(s)	
Data Collection - Modify data acquisition procedures using an evidence-based approach (<i>Course Objective</i>).	Data collection is appropriate and utilizes current best practices in the field given available resources to student. Student demonstrates an advanced understanding of the application of theory to a real-world situation by modifying data acquisition procedures using an evidence-based approach.	Data collection is appropriate and utilizes current best practices in the field given available resources to student. Student does not fully demonstrate and advanced understanding of the application of theory to a real-world situation by modifying data acquisition procedures using an evidence-based approach.	Data collection is not appropriate and/or does not utilize current best practices in the field given available resources to student. Revisions are needed to the data acquisition procedures.	Data collection is not appropriate and/or does not utilize current best practices in the field given available resources to student. A new data acquisition procedure is needed.	
Presentation					
Appeared well prepared	Student was very well prepared	There were a few minor instances in which student could have been better prepared but overall they appeared prepared	There were numerous instances in which it was apparent that student was not prepared	Student was clearly not prepared for presentation	

Demonstrated good use of voice, speaking clearly and using voice inflection, maintained eye contact with audience and did not read verbatim off slides or notes	Student demonstrated good use of voice, spoke clearly w/ voice inflection, maintained eye contact with audience and did not read verbatim off slides or notes	With a few minor exceptions student demonstrated good use of voice, spoke clearly w/ voice inflection, maintained eye contact with audience and did not read verbatim off slides or notes	Numerous times student did not demonstrate good use of voice, spoke clearly w/ voice inflection, maintained eye contact with audience and did not read verbatim off slides or notes	Student did not demonstrate good use of voice, spoke clearly w/ voice inflection, maintained eye contact with audience and did not read verbatim off slides or notes throughout the presentation	
Utilized visual aides and/or multimedia effectively	Student utilized visual aids and/or multimedia effectively	With a few minor exceptions student utilized visual aids and/or multimedia effectively	Numerous times student did not utilize visual aids and/or multimedia effectively	Student did not use visual aides and/or multimedia	
Presented content in a logical and organized manner	Student presented content in a logical and organized manner	Minor improvements are needed in terms of presenting material in a logical and organized manner	Major improvements are needed in terms of presenting material in a logical and organized manner	The presentation content was not presented in a logical and organized manner	
Demonstrated ability to respond effectively to audience questions	Student effectively and appropriately responded to audience questions	Minor improvements in responses to audience questions are needed	Major improvements in responses to audience questions are needed	Student did not respond effectively to audience questions	
Total Score					/ 41

Laboratory Reports (40% of Grade)

Standard	Accomplished: Strongly Meets Expectations (4)	Developing: Meets Expectations Adequately (3)	Beginning: Does not Adequately Meet Expectations (2)	Little or No Evidence (1)	Score
Methods / Protocol - Determine the appropriate measurement equipment based on research design (<i>course objective</i>). & Develop a protocol for collecting and assessing data in Exercise, Fitness, and Health Promotion (<i>Course Objective</i>).	Student demonstrates an understanding of appropriate measurement equipment and protocol based on research design prescribed in the laboratory. Description of methods is thorough, accurately describes all steps undertaken during the laboratory, and uses appropriate terminology.	Student demonstrates an understanding of appropriate measurement equipment and protocol based on research design prescribed in the laboratory. Description of methods requires minor revisions.	Student demonstrates some understanding of appropriate measurement equipment and protocol based on research design prescribed in the laboratory. Description of methods requires minor revisions.	Student demonstrates little understanding of appropriate measurement equipment and protocol based on research design prescribed in the laboratory. Description of methods requires major revisions.	
Data Collection - Modify data acquisition procedures using an evidence-based approach (<i>Course Objective</i>).	Data collection procedures were correctly followed, necessary data was obtained and presented in the laboratory report. If/when appropriate student is able to modify data acquisition procedures using an evidence-based approach.	Data collection procedures were correctly followed, necessary data was obtained and presented in the laboratory report. Student needs to further demonstrate an evidence-based approach to the data collection.	Data collection procedures were correctly followed; however, not all the necessary data was obtained and presented in the laboratory report. Student needs to further demonstrate an evidence-based approach to the data collection.	Data collection procedures were not correctly followed.	
Tables / Figures	Tables and figures clearly presented the data but revisions would improve the clarity. Tables and figures were properly labeled and of the quality expected of doctoral level work.	Tables and figures presented the data but revisions would improve the clarity. Tables and figures were properly labeled and of the quality expected of doctoral level work.	Tables and figures presented the data but revisions would improve the clarity. Tables and figures were not properly labeled.	Tables and figures need major revisions	

Discussion Questions - Discuss measurement techniques and instrumentation using field specific terminology. <i>(Course Objective)</i>	Student discusses measurement techniques and instrumentation using field specific terminology. Responses were well written and justified based on current knowledge in the field. Appropriate references were included to support answers.	Student discusses measurement techniques and instrumentation using field specific terminology. Responses were well written. However, more references were needed support answers.	Student discusses measurement techniques and instrumentation using field specific terminology. However, responses were not well written and references were not provided to support answers.	Student did not discuss measurement techniques and instrumentation using field specific terminology. Responses were not well written and references were not provided to support answers.	
Formatting / Neatness	Laboratory was properly formatted throughout. No edits were required in terms of spelling or grammar. AMA referencing was used where appropriate.	Laboratory was properly formatted throughout. Several edits were required in terms of spelling or grammar. AMA referencing was used where appropriate.	Formatting errors were noted and in multiple instances edits were required.	Formatting errors, spelling/grammar edits and improper referencing were noted.	
Total Score					/ 25