## EXS 489 - Exercise Science Research Methods
### SUNY Cortland
### Exercise Science and Sport Studies Department

<table>
<thead>
<tr>
<th>Instructors</th>
<th>e-mail</th>
<th>Office, Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Joy L. Hendrick, Ph.D.</td>
<td><a href="mailto:Hendrick@cortland.edu">Hendrick@cortland.edu</a></td>
<td>SW 138, x5707</td>
</tr>
<tr>
<td>Jim Hokanson, Ph.D.</td>
<td><a href="mailto:hokansj@cortland.edu">hokansj@cortland.edu</a></td>
<td>SW 150, x4964</td>
</tr>
<tr>
<td>Peter McGinnis, Ph.D.</td>
<td><a href="mailto:pmcginnis@cortland.edu">pmcginnis@cortland.edu</a></td>
<td>SW 145, x4909</td>
</tr>
<tr>
<td>Jeff Bauer, Ph.D.</td>
<td><a href="mailto:buauerj@cortland.edu">buauerj@cortland.edu</a></td>
<td>SW 147, x5536</td>
</tr>
<tr>
<td>Phil Buckenmeyer, Ph.D.</td>
<td><a href="mailto:buckenmeyerp@cortland.edu">buckenmeyerp@cortland.edu</a></td>
<td>SW A-13, x5558</td>
</tr>
<tr>
<td>*primary instructor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Class Meeting Time/Place:
Monday Evenings 7:00 - 9:30 p.m. SW 132 (class may meet in one of the exercise science labs). You will have one or more scheduled meetings with the faculty member in your area of interest.

### Required Text:


### Optional Text:

### Course Description:
The purpose of this course is to provide students with an integrated background in exercise science and to prepare them for research testing in the area. This will be accomplished through exposure to experimental research methods, intermediate statistical procedures commonly found in exercise science research. Additionally, students will be introduced to current trends and research topics coupled with laboratory techniques in the areas of Motor Behavior, Biomechanics and Exercise Physiology.

Prerequisites: (EXS297 and EXS387 and EXS397 - these may be taken concurrently) and (PED434 or MAT201 or PSY201 or ECO221 or COM230).

### Course Objectives:
1. The student will have a working knowledge of the necessary steps in writing and conducting a research project including statement of the research problem, statement of the research hypotheses, methodology considerations, subject selection procedures and other research considerations.

2. The student will be able to differentiate among various experimental research designs.

3. The student will be able to appropriately apply, computer analyze and interpret various statistical techniques found in exercise science research, such as the t-test (dependent and independent), ANOVA (repeated measures and between-subjects designs), regression analysis and others.
The student will become knowledgeable in a variety of research studies and current issues in the areas of Motor Behavior, Exercise Physiology and Biomechanics.

The student will be able to prepare and set-up equipment, collect data and interpret the results using various laboratory techniques and equipment in exercise science.

The student will be able to locate, review and critically analyze research studies in the literature relating to exercise science.

The student will develop, write and orally present a proposal (with appropriate technology) for a research study that could be conducted as an independent study project the following semester.

The student will become aware of cultural considerations for various populations in research testing.

**Class Requirements**:  

*aAbstracts (20%)* - Articles will be assigned throughout the semester to be read and then summarized in abstract form. These must be typed (2 pages max, double-spaced). Each abstract will be worth 10 points and assessed by three 3-point rubrics (knowledge, quality product and critical analysis) and 1 point for following the APA format.

*Mini-project assignments and laboratory Experiences (up to 15%)* - Periodically throughout the semester, students will be given various assignments regarding some aspects of exercise science. These may include researching a topic, running a statistical analysis on a computer, interpreting some data, and/or collecting and analyzing data in one of the labs.

*Research Proposal (50%)* - An integral component of this course is the development and presentation of a research proposal, which will lead to an independent research project next semester (for EXS 490). The specifics on project requirements will be explained at a future date, however general information is described in chapters 3-4 of the text. The proposal will be submitted in written form (and on a CD) and presented to the class as a PowerPoint presentation. Included in this will be submission of Human Subjects Application (for students) at: [http://www.cortland.edu/osp/humsubj.html](http://www.cortland.edu/osp/humsubj.html)

*Midterm Exam (15%)* – The exam will be a comprehensive Blue Book exam covering book chapters to date, articles, Human Participation information and the Belmont Report. Details will be given at a later date.

*Human Subjects On-line Tutorial* - Satisfactory completion of the Human Participant Protections Education for Research Team tutorial at [http://69.5.4.33/c01/](http://69.5.4.33/c01/)

*Note that your abstract and proposal chapter drafts will be available for pick-up on Fridays following their due dates. It is your responsibility to pick up papers from faculty to obtain feedback prior to turning-in the next assignment.*

---

1 Students must meet minimum competencies in each area above in order to pass the class.
Course Outline:

I. Research Techniques
   A. Experimental Designs
      1. Repeated Measures
      2. Factorial Designs
   B. Statistical Procedures
      1. T-test
         a. Independent Samples
         b. Dependent Samples
      2. ANOVA
      3. Regression Analysis
      4. Test Criteria
         a. Reliability
         b. Validity
         c. Objectivity
   C. Formulating a Proposal
      1. Statement of the problem
      2. Research Hypotheses
      3. Review of the Literature
      4. Methodology and Procedures
   D. Research Considerations
      1. Human Subjects Consent (Belmont Report)
      2. Subject Selection
      3. Generalizability
      4. Ethical Considerations
      5. Cultural Considerations

II. Laboratory Techniques
   A. Biomechanics
   B. Exercise Physiology
   C. Motor Behavior

III. Current Research Issues and Topics
   A. Biomechanics
   B. Exercise Physiology
   C. Motor Behavior

Academic Integrity:

The College is an academic community which values academic integrity and takes seriously its responsibility for upholding academic honesty. All members of the academic community have an obligation to uphold high intellectual and ethical standards. For more information on academic integrity and how academic dishonesty can occur, please refer to the College Handbook, the College Catalog, the Code of Student Conduct and Related Policies and at the following web site http://w3.cortland.edu/conduct/sa.htm, or ask your instructor(s). All work submitted for this course must be each student's own work. Any work submitted (in part or whole) that is not unique will be considered plagiarized and will be treated as such per academic policy. This includes, but is not limited to, material retrieved from references; therefore proper documentation of cited material (using APA format) is a must!
### Tentative Class Schedule:

<table>
<thead>
<tr>
<th>DATE</th>
<th>Class Title</th>
<th>Instructor(s)</th>
<th>Reading</th>
<th>Assignments Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 30</td>
<td>Introduction, Ethics, How to write an abstract</td>
<td>Hendrick</td>
<td>Ch. 1,5; Belmont Rpt</td>
<td></td>
</tr>
<tr>
<td>Sept. 6</td>
<td>Literature Review</td>
<td>Hendrick</td>
<td>Ch 2</td>
<td>Complete Human Participation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tutorial; Meet in Library</td>
</tr>
<tr>
<td>Sept. 13</td>
<td>Developing the Problem</td>
<td>Hendrick</td>
<td>Ch 2 continued</td>
<td>Abstract 1</td>
</tr>
<tr>
<td>Sept. 20</td>
<td>Presenting the Problem</td>
<td>Hendrick</td>
<td>Ch 3</td>
<td></td>
</tr>
<tr>
<td>Sept. 27</td>
<td>Formulating the Method</td>
<td>Hendrick</td>
<td>Ch 4</td>
<td>Abstract 2</td>
</tr>
<tr>
<td>Oct. 4</td>
<td>Midterm exam</td>
<td>Hendrick</td>
<td>Ch. 16-18</td>
<td>Topic Due</td>
</tr>
<tr>
<td>Oct. 11</td>
<td>Statistical Applications</td>
<td>Hendrick</td>
<td>Ch 6-9</td>
<td>Abstract 3</td>
</tr>
<tr>
<td>Oct. 18</td>
<td>October Break</td>
<td>no class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct. 25</td>
<td>Research in Exercise Physiology</td>
<td>Hokanson/</td>
<td></td>
<td>Proposal Ch. 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Buckenmeyer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov. 1</td>
<td>Research in Biomechanics</td>
<td>Bauer/McGinnis</td>
<td></td>
<td>Abstract 4</td>
</tr>
<tr>
<td>Nov. 8</td>
<td>Research in Motor Behavior</td>
<td>Hendrick</td>
<td></td>
<td>Proposal Ch. 2</td>
</tr>
<tr>
<td>Nov. 15</td>
<td>Mini Research Project</td>
<td>All Faculty</td>
<td></td>
<td>Proposal Ch. 3</td>
</tr>
<tr>
<td>Nov. 22</td>
<td>Mini Research Project</td>
<td>All Faculty</td>
<td></td>
<td>Proposal Draft Ch. 1-3 due</td>
</tr>
<tr>
<td>Nov. 29</td>
<td>Mini Research Project</td>
<td>All Faculty</td>
<td></td>
<td>Human Subjects Forms due</td>
</tr>
<tr>
<td>Dec. 6</td>
<td>Proposal Presentation (Power Point)</td>
<td>All Faculty</td>
<td></td>
<td>Final Proposal Due</td>
</tr>
</tbody>
</table>

* Abstract topics:

  - Abstract #1 = exercise physiology
  - Abstract #2 = biomechanics
  - Abstract #3 = motor learning/control
  - Abstract #4 = your choice from your topic

Disability Services

"SUNY Cortland is committed to upholding and maintaining all aspects of the federal Americans with Disabilities Act of 1990 (ADA) and Section 504 of the Rehabilitation Act of 1972. If you are a student with a disability and wish to request accommodations, please contact the Office of Disability Services located in B-40 Van Hoesen Hall or call 607-753-2066 for an appointment. Any information regarding your disability will remain confidential. Because many accommodations require early planning, requests for accommodation should be made as early as possible. Any requests for accommodations will be reviewed in a timely manner to determine their appropriateness to this setting."

\[jlh 8/04\]