Academic Year of Report: 2010-2011        College: CEPS
Department Nutrition, Exercise and Health Sciences (NEHS)
Program: Master of Science Exercise Science

1. **What student learning outcomes were assessed this year, and why?**
   In answering this question, please identify the specific student learning outcomes you assessed this year, reasons for assessing these outcomes, with the outcomes written in clear, measurable terms, and note how the outcomes are linked to department, college and university mission and goals.

   NEHS assessed the following student learning outcome:

   **Student Learning Outcome 1. Students will demonstrate knowledge of correctly interpreting and understanding research, and knowledge of advanced exercise physiology principles.** This outcome is linked with Departmental Goal 1 which states Students will demonstrate the knowledge and skills to be successful contributors in their fields, College Goal 1, Provide for an outstanding academic and professional growth experience, and also tied into University Goals 1 and 6, Maintain and strengthen an outstanding academic and student life, and Build inclusive and diverse campus communities that promote intellectual inquiry and encourage civility, mutual respect, and cooperation.

   **Reasons for assessing student learning outcome 1.**

   It is critical for students in the graduate program in exercise science to acquire an in-depth knowledge of exercise physiology. A strong knowledge base in anatomy, physiology and physiology of exercise is essential for success in professional work outlets such as teaching (community or four year college), cardiac rehabilitation (hospital or private setting), bariatric clinics, physical therapy clinics, private fitness and health clinics, and athletic development clinics. Furthermore, the added knowledge base that comes from a master level program serves students who will pursue further study at the doctoral or professional level. The courses highlighted below for student learning outcome #1 are designed to enhance the students overall knowledge in anatomy, physiology, physiology of exercise and provide students with a strong research background in order to understand and correctly interpret research, and to further develop a student’s analytical, oral and written communication skills.

2. **How were they assessed?**
   In answering these questions, please concisely describe the specific methods used in assessing student learning. Please also specify the population assessed, when the assessment took place, and the standard of mastery (criterion) against which you will compare your assessment results. If appropriate, please list survey or questionnaire response rate from total population.

   **A) What methods were used?**
B) Who was assessed?

C) When was it assessed?

Student learning outcome (SLO) #1, Students will demonstrate knowledge of correctly interpreting and understanding research, and knowledge of advanced exercise physiology principles, was assessed via EXSC 551 Advanced Physiology of Exercise I: Metabolism and Skeletal Muscle (Fall), EXSC 560 Inferential Statistics in Exercise and Nutritional Sciences (Fall), EXSC 552 Advanced Physiology of Exercise II: Pulmonary and Cardiovascular Systems (Winter), EXSC 557 Research Methods and Design in Exercise and Nutritional Sciences (Winter) and EXSC 553 Laboratory Techniques in Stress Physiology (Spring). Individuals taking these courses are graduate students in Exercise Science. EXSC 551 involves the study of metabolism and skeletal muscle. EXSC 552 encompasses the study of pulmonary and cardiovascular exercise physiology along with supporting organ systems including the nervous and endocrine organ systems. EXSC 551 and 552 evaluated goal 1 via examinations, student presentations, and a major written research report. EXSC 560 evaluated SLO 1 by employing test statistics to analyze various exercise physiology data sets. Students conduct the appropriate test statistic based on the study design under which the data was collected, interpret and prepare a series of reports involving statistical analysis and interpretation. In addition, students in EXSC 560 prepare a research report of a major data set. EXSC 557 evaluated SLO 1 by examinations and preparation of a research proposal. EXSC 557 is designed to help students understand those basic methods and design skills to plan a study. EXSC 553 evaluated SLO 1 via written reports on select laboratory experiences. Students prepare instrumentation for measurements of physiological responses during rest and exercise, collect data, employ statistical tests on collected data, and prepare a report of their findings. EXSC 553 integrates the student’s knowledge base of anatomy, physiology, exercise physiology, research methods, design, and statistics. A common theme in the aforementioned course work is integration of information from numerous disciplines including anatomy, physiology, biochemistry, physiology of exercise, research methods and design, and statistics. Students are engaged in reading review articles and original research papers to prepare for class lecture and presentations. Students also incorporate their review of the literature into written reports on select physiology topics, papers reflecting statistical analyses, and written laboratory assignments. Mastery of criterion level of achievement for the aforementioned classes and select written assignments was considered a grade of “B+” or better (note: original criterion was “B” or better).

3. What was learned?

In answering this question, please report results in specific qualitative or quantitative terms, with the results linked to the outcomes you assessed, and compared to the standard of mastery (criterion) you noted above. Please also include a concise interpretation or analysis of the results.

Student learning outcome #1, Students will demonstrate knowledge of correctly interpreting and understanding research, and knowledge of advanced exercise physiology principles.

Table 1 presents percent of students achieving a B+ grade or better for select courses in the graduate curriculum that are in alignment to SLO #1. Forty four percent of students achieved the master criterion for EXSC 551, while 75 percent of students achieved mastery for EXSC 552.
Table 1. Courses assessed for student learning outcome #1 and students achieving a “B+” grade for the course.

<table>
<thead>
<tr>
<th>Courses assessed</th>
<th>Students achieving a B+ grade point for the course (%)</th>
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<tbody>
<tr>
<td>EXSC 551 Advanced Physiology of Exercise I</td>
<td>44</td>
</tr>
<tr>
<td>EXSC 552 Advanced Physiology of Exercise II</td>
<td>75</td>
</tr>
<tr>
<td>EXSC 553 Lab Techniques in Stress Physiology</td>
<td>61</td>
</tr>
<tr>
<td>EXSC 557 Research Methods and Design in Exercise and Nutritional Sciences</td>
<td>94</td>
</tr>
<tr>
<td>EXSC 560 Inferential Statistics in Exercise and Nutritional Sciences</td>
<td>53</td>
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Note: Achieving a B+ grade indicates mastery of outcome.

Sixty-one percent of students achieved mastery of criterion in EXSC 553. Fifty three percent of students achieved mastery in EXSC 560 while 94 percent achieved the standard for EXSC 557. Data reveals a noticeable level of variation among the classes in mastery of criterion level (B+ or better).

Table 2 illustrates percent of students achieving a B+ grade or better for select assignments which are aligned with assessing SLO #1. Forty four percent achieved a grade of B+ or greater on a written research report prepared for EXSC 551, while 88 percent achieved or exceeded a B+ grade for a written research report prepared in EXSC 552 and EXSC 557. Seventy one percent achieved mastery for a “major” statistical report for EXSC 560.

These findings suggest that many of our students are meeting the mastery criterion, thus implying that these students are achieving a level of academic understanding of anatomy, physiology, exercise physiology, statistical, and research methods/design principles that will place them in a favorable position to successfully complete a final culminating experience (Thesis, Project, Examination) during their second year of study. Students achieving the criteria suggests that they have expanded their knowledge base of physiology of exercise and related basic sciences, have acquired skills to correctly interpret research in their own area, and demonstration of an appropriate level of oral and written communication skills. Findings also indicate that some of our students did not achieve the criterion of B+ or greater.
4. What will the department or program do as a result of that information?
In answering this question, please note specific changes to your program as they affect student learning, and as they are related to results from the assessment process. If no changes are planned, please describe why no changes are needed. In addition, how will the department report the results and changes to internal and external constituents (e.g., advisory groups, newsletters, forums, etc.).

There is evidence that a reasonable percentage of students achieved mastery of criterion for select classes and assignments associated with student learning outcome #1. Outcomes were assessed and compared to an a-priori established standard of mastery. Many of our exercise science graduate students gained the appropriate knowledge base in exercise physiology and related sciences, statistics, methods/design and acquired appropriate technological skills to place them in a favorable position to successfully complete their final culminating experiences (Thesis, Project, Examination). Completion of the final culminating experience is critical for successful graduation. Students graduating from our program have gone on for further studies at the doctoral or professional level (currently 12 students are working on a doctoral degree), and are employed in jobs utilizing their graduate degree (higher education, clinical settings and sports science).

It is also recognized that some of our students did not meet the criterion of a B+ or greater. Over recent years, the graduate faculty in NEHS have engaged in many discussions regarding the writing ability of our graduate students. Students with better writing skills would be more likely to meet the newly established criterion of B+ or greater. We find considerable variability in writing skills among our graduate students, and, we find a level of variability in students meeting the final grade criterion for courses assessed. The reason for the observed student variability in achieving the criterion for select courses is not certain but may be related to faculty employing different standards among the classes, learning experiences in the Fall (w/ EXSC 551 & EXSC 560) translating into greater student success in classes offered during subsequent quarters (EXSC 552, EXSC 557 & EXSC 553), or a combination of the latter two possibilities.

In light of our concern with writing, NEHS recently added a Scientific Writing Example to the Admissions Requirements for entry into the graduate program in exercise science (implemented Winter 2011). The scientific writing example along with the letter of intent are scored with an eye on organization, grammar, spelling, content, and flow of thoughts. Although we have been fortunate to have very good students in our program over the years, our faculty would like to bring on board a co-hort that is more homogenous in its abilities to succeed at a high academic level in our program.

Below is an example question that prospective students address as part of the application process,

Scientific writing example. Prepare a brief appropriately referenced (maximum of 5) review paper (two page maximum, single spaced, 1” margins, 12 pt Times font), on the following topic:

Describe the impact of 4 months of endurance training on intracellular energy pathways in skeletal muscle. Highlight the significance of these changes for exercise performance.
The evaluation form provided to the clinical physiology and exercise science faculty for the purpose of reviewing an application is presented below. Note the specific section on evaluation of writing. In addition, we have also added the graduate record examination as part of the admissions requirement (see evaluation section on GRE in table below). We have also gone to great lengths to evaluate the prospective graduate student in a more systematic way. This is reflected in the evaluation form below.

### Graduate Student Evaluation for Admission – Exercise Science

<table>
<thead>
<tr>
<th>Reviewer _______________________________</th>
<th>Date _____________</th>
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#### Categories

<table>
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<tr>
<th>Possible Score</th>
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<tr>
<td>25 points</td>
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**Academic Preparation**

- ≥ B for each class (1 pt if sub-standard (class repeat required), 3 pts if reach standard (B), 5 pts if exceeded for each class)
  - Human Anatomy and Physiology
  - Exercise Physiology
  - Biomechanics/Kinesiology
  - Statistics/Research methods-design-measurement/ or comparable course
  - Elements of chemistry and/or advanced biology course

**Letters of Recommendation**

- Does the referee comment on the criteria listed?
- Is applicant highly recommended?
- Are personal/professional characteristics of significance noted?
- Are significant strengths and weaknesses described?

Note: at least two letters from professors in science based classes

**Evaluation of writing**

- Letter of intent - clear, concise, and informative (something about the applicant, why an interest in graduate school, goals, evidence of relevant research/professional activities, future research interest, relevant awards/grants, work experience) (10 pt)
- Scientific writing sample (2 page maximum) - were guidelines followed (i.e. addressing specified topic, single spaced, 1” margins, 12 pt Times font)?, premise, logic, flow, scientific writing style, appropriate referencing, addressing basic scientific aspects of topic, practical application (20 pt)

**Grade Point Average and GRE:** total score reflects overall GPA, major GPA, and GRE scores

<table>
<thead>
<tr>
<th>GPA</th>
<th>Overall</th>
<th>Major GPA</th>
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<tbody>
<tr>
<td>3.60-4.0</td>
<td>10</td>
<td>3.80-4.0</td>
</tr>
<tr>
<td>3.59-3.2</td>
<td>6</td>
<td>3.79-3.6</td>
</tr>
<tr>
<td>3.19-3.0</td>
<td>2</td>
<td>3.39-3.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.19-3.0</td>
</tr>
</tbody>
</table>

**GRE scores**

- Verbal: >30%ile (2pts), >50%ile(3pts), >60%ile(5 pts)
- Quantitative: >30%ile (2pts), >50%ile(3pts), >60%ile(5 pts)

**Bonus points**

- Do grades improve throughout undergraduate program?
- Are there additional qualifications that should be considered (lab skills, coaching background, work experience, certifications)?
- Maturity, self reliance.
- Academic Performance in related course work?

<table>
<thead>
<tr>
<th>Score</th>
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<tbody>
<tr>
<td>10 points</td>
</tr>
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</table>
5. What did the department or program do in response to last year’s assessment information?
In answering this question, please describe any changes that have been made to improve student learning based on previous assessment results. Please also discuss any changes you have made to your assessment plan or assessment methods.

The department increased the grade for mastery of criterion (higher standard) to “B+” versus a standard of “B” grade or better as in previous years. There was a concern from a previous report that the standard of attaining a “B” might be “low” thereby having resulted in a high number of students meeting the standard in prior assessment periods. Also, we have made our admission requirements more robust with the intention of admitting individuals who are academically stronger. Theoretically, this may result in more students meeting our newly established criterion of B+ for select courses and assignments that are in-line with student learning outcome #1.

Thank you.