APPLICATION FOR NEW COURSE

1. Submitted by College of Health Science Date 11/13/04
   Department/Division offering course Department of Rehabilitation Sciences/Division of Athletic Training

2. Proposed designation and Bulletin description of this course
   a. Prefix and Number AT 685
   b. Title* Principles and Application of Kinesiological EMG
      *NOTE: If the title is longer than 24 characters (including spaces), write
      A sensible title (not exceeding 24 characters) for use on transcripts
      Principle & Appl Kinesiol EMG
   c. Lecture/Discussion hours per week 3
   d. Laboratory hours per week
   e. Studio hours per week
   f. Credits 3
   g. Course description
      To introduce the student to the principles and application of kinesiologic electromyography (EMG). Kinesiological EMG research incorporates the study of human movement with direct assessment of the muscles involved with human motion. The primary aim for this course is to provide the student with background and practical knowledge of kinesiological EMG in order to be able to perform and critically analyze kinesiological EMG studies. Students will enhance their understanding of neuromuscular properties of skeletal musculature. Students will be exposed to the common procedures used to collect, analyze, and interpret both surface and indwelling kinesiological EMG research. During the regularly scheduled class meetings students will be engaged in lecture, discussion, and laboratory activities.
   h. Prerequisites (if any)
      KHP 615 or comparable graduate level biomechanics course, the course can be taken concurrently.
   Approval of instructor
   i. May be repeated to a maximum of ____________________________________ (if applicable)

4. To be cross-listed as
   Prefix and Number
   Signature, Chairman, cross-listing department

5. Effective Date Spring 06 will be offered in Spring 07 (semester and year)

6. Course to be offered □ Fall ☒ Spring □ Summer

7. Will the course be offered each year? □ Yes ☒ No
   (Explain if not annually)
   No, it will be offered on a two year rotating cycle with other advanced biomechanic type courses offered in association with the Department of Kinesiology and Health Promotion and the Department of Rehabilitation Sciences graduate programs. Due to the limited number of faculty we are unable to offer this course annually. Additionally, the number of graduate students requiring this as part of their course of study is relatively small, in 5-8 range.

8. Why is this course needed?
   This course will serve primarily to educate graduate student interested in better understanding the clinical application of electromyography and the use of the EMG as a research tool. This course will also improve the student's ability to critically analyze scientific literature in area of biomechanical research that incorporates electromyography as a component of the research.
9. a. By whom will the course be taught?  
Tim L. Uhl PhD ATC PT

b. Are facilities for teaching the course now available?  
☐ Yes  ☐ No  
If not, what plans have been made for providing them?
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10. What enrollment may be reasonably anticipated?  5-8

11. Will this course serve students in the Department primarily?  
   Will it be of service to a significant number of students outside the Department? 
   If so, explain.

   This course will be of interest to any graduate student in the fields of human performance, rehabilitation, and neuromuscular control. I expect it to be of interest only to a relatively small number of graduate students primarily in the fields listed above. The other potential area of interest would be with some neuroscientists that are interested in clinical assessment techniques.

12. Will the course serve as a University Studies Program course?  
   If yes, under what Area?

13. Is this course applicable to the requirements for at least one degree or certificate at the University of Kentucky?

14. Is this course part of a proposed new program?  
   If yes, which?

15. Will adding this course change the degree requirements in one or more programs?  
   If yes, explain the change(s) below

16. Attach a list of the major teaching objectives of the proposed course and outline and/or reference list to be used.

17. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.  
   Check here if 100-200.

18. If the course is 400G or 500 level, include syllabi or course statement showing differentiation for undergraduate and graduate students in assignments, grading criteria, and grading scales.  
   Check here if 400G-500.

19. Within the Department, who should be contacted for further information about the proposed course?

   Name  Tim L. Uhl PhD ATC PT  Phone Extension  323-1100 x 80858

*NOTE: Approval of this course will constitute approval of the program change unless other program modifications are proposed.
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Signatures of Approval:

_________________________________________  Date
Department Chair

_________________________________________  Date
Dean of the College

_________________________________________  Date
Undergraduate Council

_________________________________________  Date
University Studies

_________________________________________  Date
Graduate Council

J Blackwell

*Approved by ACMC April 19, 2005

_________________________________________  Date
Academic Council for the Medical Center

_________________________________________  Date
Senate Council (Chair)

*If applicable, as provided by the Rules of the University Senate

__________________________
ACTION OTHER THAN APPROVAL

Rev 3/04
AT685
Principles and Application of Kinesiological EMG

Instructors:
Co-instructor: Tim L. Uhl PhD ATC PT
Office: Charles T. Wethington Bldg, 210c
Phone: 323-1100 ext. 80858, cell phone 859-230-7841
E-mail: tluhl2@uky.edu

Course Rationale
Kinesiological application of electromyography is to introduce the student to the principles and application of kinesiologic electromyography (EMG). Kinesiological EMG research incorporates the study of human movement with direct assessment of the muscles involved with human motion. The primary aim for this course is to provide the student with background and practical knowledge of kinesiological EMG in order to be able to perform and critically analyze kinesiological EMG studies. Students will enhance their understanding of neuromuscular properties of skeletal musculature. Students will be exposed to the common procedures used to collect, analyze, and interpret both surface and indwelling kinesiological EMG research.

Course Goals and Objectives
At the completion of this course, the student will be able to:
• Understand the capabilities and limitation of kinesiological electromyographical data.
• Develop the skills necessary to use both surface and fine wire electrodes in data collection.
• Understand the various parameters in collecting and analyzing electromyographic data.
• Understand how to utilize software to analyze electromyographic data, primarily DataPac software.

Instructional Strategies
The class will meet for one three hour session per week. The class will meet on Wednesday evenings in the Musculoskeletal laboratory (Rm 222) in the Charles T. Wethington building. This class will be taught primarily as a lecture and discussion class with practical laboratory experiences incorporated throughout the course to familiarize the student with the proper use of equipment. Students will be given readings to complete for class discussion. Students will also have the opportunity to collect and analyze EMG data to interpret as part of class assignments.

Learning Resources
Required Text:

Recommended Texts:
Basmajian JV and De Luca CJ. Muscle Alive, Their Functions Revealed by Electromyography. 5th ed Williams and Wilkins, Baltimore 1985.
## Assessments and Evaluations

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage of final grade</th>
<th>Date due</th>
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</thead>
<tbody>
<tr>
<td>Annotated bibliography of 3 similar articles related to a specific EMG topic</td>
<td>15</td>
<td>Week 4</td>
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<tr>
<td>Presentation of EMG topic</td>
<td>5</td>
<td>Week 5</td>
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<tr>
<td>Mid-term examination</td>
<td>15</td>
<td>Week 9</td>
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<tr>
<td>Laboratory project – proposal</td>
<td>15</td>
<td>Week 10</td>
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<tr>
<td>Laboratory project – data collection/analysis</td>
<td>20</td>
<td>TBD</td>
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<tr>
<td>Laboratory project – final write up</td>
<td>15</td>
<td>Finals week</td>
</tr>
<tr>
<td>Final examination</td>
<td>15</td>
<td>Finals week</td>
</tr>
</tbody>
</table>

Unexcused absence from class will result in 5% drop in final grade for each absence.

A = 90 – 100%
B = 80 – 89%
C = 70 – 79%
E = Below 70%

## Administrative

### Feedback
1. Students are encouraged to come to the instructor’s office to discuss progress in the class.
2. Tests and/or papers will be retained by the course coordinator until approximately three weeks into the succeeding semester.

### Academic Honesty
1. Each student in the class is expected to adhere to the highest standards of academic honesty. Cheating and plagiarism violate the rules of the University and the ethical standards of members in the allied health profession. Violations of the university’s rules regarding academic honesty can lead to a failing grade in the course and expulsion from the University. Students may view the Student Rights & Responsibilities Document at [http://www.uky.edu/StudentAffairs/Code/part1.html](http://www.uky.edu/StudentAffairs/Code/part1.html).

## Withdrawals and Incompletes
1. The last day to withdraw from the course is at the end of the ninth week for fall or spring semester. No withdrawals will be approved after that date.

2. It is the student’s responsibility to properly process withdrawals. Students who fail to process withdrawals or who process them after the time that grade report sheets are printed, will receive a grade of E on the official grade sheet. To correctly process a withdrawal the student must obtain the signature of Dr. Uhl, obtain the signature of the student’s advisor, and take the withdrawal form to the Registrar’s office.

3. Incomplete (I) grades will be given only in extenuating circumstances and never as a replacement for a failing or substandard grade. Any student requesting an incomplete grade must see the course coordinator, Dr. Uhl, for approval and for additional rules governing incomplete grades.
University Closing
Students should be aware of the following sources of information in the event of inclement weather or other problems that might cause the University to close. Remember, if the University is open, students are expected to be in attendance and all tests will be administered. If the University is closed on a test day, the test will be given on the next class day.

The cancellation or delay of classes will normally be announced by 6:00 a.m. through the local media. The latest information will be available on the University of Kentucky INFOLINE at 257-5684, University of Kentucky TV Cable Channel 16, and WUKY or the UK Website at www.uky.edu.

Course Content

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<th>Topics</th>
<th>Reading Assignment</th>
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<tr>
<td>Week 1</td>
<td>Overview, Motor Unit, Application of EMG</td>
<td>Chp 1 &amp; 2 (Cram and Kasman)</td>
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<td>Week 2</td>
<td>Applications and Limitations of surface EMG</td>
<td>Chp 3 (Cram and Kasman) Limitations and application of surface EMG</td>
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<td></td>
<td>Instrumentation and Data Collection</td>
<td>J. Biomech 13:135-163, 1997 Standards for EMG reporting</td>
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<tr>
<td>Week 3</td>
<td>Instrumentation and Data Collection Surface Electrode Application</td>
<td>Chp 3 (Cram and Kasman) Surface EMG recommendations</td>
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<tr>
<td>Week 4</td>
<td>Laboratory session</td>
<td>Electrode application (surface and indwelling), skin preparation, Introduction to</td>
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<td>data collection hardware</td>
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<td>Week 5</td>
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<td>Integrating EMG with Kinematic and other analog devices</td>
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<td>Week 6</td>
<td><strong>Presentation of EMG Topic</strong></td>
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<td>Week 7</td>
<td>Data processing</td>
<td>Signal processing</td>
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<td>Week 8</td>
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<td>Normalization</td>
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<td>Week 9</td>
<td><strong>Mid-Term Examination</strong></td>
<td>Manual section</td>
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<td>Week 10</td>
<td>SPRING BREAK</td>
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<td>Week 11</td>
<td>Data processing</td>
<td>Onsets determination</td>
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<td>Week 12</td>
<td>Project data collection</td>
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<tr>
<td>Week 13</td>
<td>Project data collection</td>
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<tr>
<td>Week 14</td>
<td>Project data collection/analysis</td>
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<tr>
<td>Week 15</td>
<td>Data processing</td>
<td>Ensemble averaging</td>
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<td>Week 16</td>
<td>Data processing</td>
<td>Fatigue</td>
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<td>Week 17</td>
<td>Interpretation of research findings</td>
<td>Write up of results following guideline standards</td>
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<td></td>
<td><strong>Final Examination</strong></td>
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</table>