Chair: Tracy Christofero | **GC#6: Course Addition**

Request for Graduate Course Addition

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Health Professions Dept/Division: School of Kinesiolog HS 535 Alpha Designator/Number: GHC0-MS (•) Graded ( ) CR/NC

Contact Person: Dr Suzanne Konz Phone: 304 696 2926

NEW COURSE DATA:

New Course Title: Biomechanical Instrumentation with Data Processing in MatLab

Alpha Designator/Number: H S 5 3 5

Title Abbreviation: B i o m e c h I n s t r u m e n t M a t L a b

(Limit of 25 characters and spaces)

Course Catalog Description: (Limit of 30 words)
This course teaches students the skills to use biomechanical sensors as instruments for research, and the use of MatLab programming language to process the data they collect from their instruments.

Co-requisite(s): First Term to be Offered: Fall 2017

Prerequisite(s): Credit Hours: 3.0

Course(s) being deleted in place of this addition (*must submit course deletion form*):

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

Dept. Chair/Division Head	Date 9/29/16
Registrar Sonya McCa 511199	Date 10-4-16
College Curriculum Chair	Date 10/13/16
Graduate Council Chair C Christofero	Date 11-10-16

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College: Health Professions | Department/Division: School of Kinesiology | Alpha Designator/Number: GHC0-MS

Provide complete information regarding the new course addition for each topic listed below. Before routing this form, a complete syllabus also must be attached addressing the items listed on the first page of this form.

1. FACULTY: Identify by name the faculty in your department/division who may teach this course.

Dr Suzanne Konz and Dr Steven Leigh

2. DUPLICATION: If a question of possible duplication occurs, attach a copy of the correspondence sent to the appropriate department(s) describing the proposal. Enter "***Not Applicable***" if not applicable.

Not Applicable

3. REQUIRED COURSE: If this course will be required by another deparment(s), identify it/them by name. Enter "***Not Applicable***" if not applicable.

Not Applicable

4. AGREEMENTS: If there are any agreements required to provide clinical experiences, attach the details and the signed agreement. Enter "***Not Applicable***" if not applicable.

Not Applicable

5. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials to teach this course, attach an estimate of the time and money required to secure these items. (Note: Approval of this form does not imply approval for additional resources.) Enter "***Not Applicable***" if not applicable.

Not Applicable

6. COURSE OBJECTIVES: (May be submitted as a separate document)

1. Students will be able to compare and contrast different sensors used to measure forces (kinetics)
2. Students will be able to compare and contrast different sensors used to measure human movement (kinematics)
3. Students will be able to compare and contrast different sensors used to measure muscular activity (electromyography)
4. Students will be able to select and use appropriate motion or force sensors to collect biomechanical data
5. Students will be able to evaluate the structure and format of biomechanical data files
6. Students will be able to write MatLab code to manipulate data for the purposes of filtering, integrating, differentiating, and graphing
7. Students will be able to load, process, and output biomechanical data using MatLab

7. COURSE OUTLINE (May be submitted as a separate document)

The purpose of this course is to provide students with an advanced study into biomechanical instrumentation and processing. Students will develop the skills needed to collect biomechanical data using various sensors, and then to process that data using MatLab code. To develop these skills, students will be introduced to the fundamental concepts of an instrument during a lecture, and then lead through a data collection using that instrument, then introduced to MatLab programming language and functions necessary to process the data they collected, and then lead through the development of MatLab code to process and output their data. This sequence will be repeated for various instruments.

Week 1 = Course overview, Fundamentals of force transducers
Week 2 = Data collection using force transducers
Week 3 = Force data structures, MatLab functions for data searching
Week 4 = MatLab functions for integration and graphing
Week 5 = MatLab processing of force data
Week 6 = Fundamentals of accelerometers
Week 7 = Data collection using accelerometers
Week 8 = Accelerometer data structures
Week 9 = MatLab functions for filtering, MatLab functions for differentiation
Week 10 = MatLab processing of accelerometer data
Week 11 = Fundamentals of electromyography
Week 12 = Data collection using electromyography
Week 13 = Electromyography data structures, MatLab functions for the frequency domain
Week 14 = MatLab functions for filtering and normalizing
Week 15 = MatLab processing of electromyography data

8. SAMPLE TEXT(S) WITH AUTHOR(S) AND PUBLICATION DATES (May be submitted as a separate document)

Required: Attaway, S. (2013). Matlab: a practical introduction to programming and problem solving. Oxford, UK: Butterworth-Heinemann.
Recommended: Robertson, G., Caldwell, G., Hamill, J., Kamen, G., & Whittlesey, S. (2013). Research methods in biomechanics. Champaign, IL: Human Kinetics.

9. EXAMPLE OF INSTRUCTIONAL METHODS (Lecture, lab, internship)

This class will be a mixture of lectures, tutorials, and practical assessments. During lectures students will be introduced to instrumentation and programming concepts. They will then apply these concepts in tutorials where they will collect data using biomechanical instruments, and manipulate collected data with MatLab. They will demonstrate their knowledge in the practical assessments by collecting data and writing MatLab programs to process their collected data.

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10. EXAMPLE EVALUATION METHODS (CHAPTER, MIDTERM, FINAL, PROJECTS, ETC.)

Students will sit examinations to test their knowledge of instrument design and implementation, and fundamental computer programming concepts.
Students will complete practical assessments by collecting data and writing MatLab programs to process their collected data.

11. ADDITIONAL GRADUATE REQUIREMENTS IF LISTED AS AN UNDERGRADUATE/GRADUATE COURSE

Graduate students will need to design and conduct a new biomechanical experiment where they collect data using the instruments covered in the course, and process those data using a new MatLab program they have written.

12. PROVIDE COMPLETE BIBLIOGRAPHY (May be submitted as a separate document)

Attaway, S. (2013). Matlab: a practical introduction to programming and problem solving. Oxford, UK: Butterworth-Heinemann.

Ahmadi, A., Rowlands, D., & James, D. A. (2009). Towards a wearable device for skill assessment and skill acquisition of a tennis player during the first serve. Sports Technology, 2(3-4), 129-136.

Bachschmidt, R. A., Harris, G. F., & Simoneau, G. G. (2001). Walker-assisted gait in rehabilitation: a study of biomechanics and instrumentation. Ieee Transactions on Neural Systems and Rehabilitation Engineering, 9(1), 96-105.

Brodie, M., Walmsley, A., & Page, W. (2008). Fusion motion capture: a prototype system using inertial measurement units and GPS for the biomechanical analysis of ski racing. Sports Technology, 1(1), 17-28.

Chowdhury, H., Alam, F., Mainwaring, D., Subic, A., Tate, M., Forster, D., & Beneyto-Ferre, J. (2009). Design and methodology for evaluating aerodynamic characteristics of sports textiles. Sports Technology, 2(3-4), 81-86.

Fuss, F. K., Lythgo, N., Smith, R. M., Benson, A. C., & Gordon, B. (2011). Identification of key performance parameters during off-spin bowling with a smart cricket ball. Sports Technology, 4(3-4), 159-163.

Ghista, D. (1981). Biomechanics of medical devices. Boca Raton, FL: CRC Press.

Jackson, L. B. (2013). Digital Filters and Signal Processing: With MATLAB® Exercises. New York, NY: Springer Science & Business Media.

Khandpur, R. S. (1992). Handbook of biomedical instrumentation. New York, NY: McGraw-Hill Education.

Nigg, B. (1983). Selected methodology in biomechanics with respect to swimming. Biomechanics and Medicine in Swimming, 72-80.

Robertson, G., Caldwell, G., Hamill, J., Kamen, G., & Whittlesey, S. (2013). Research methods in biomechanics. Champaign, IL: Human Kinetics.

Winter, D. A. (2009). Biomechanics and motor control of human movement. Hoboken, NJ: John Wiley & Sons.

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Please insert in the text box below your course summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings):

Department:
Course Number and Title:
Catalog Description:
Prerequisites:
First Term Offered:
Credit Hours:

Department: School of Kinesiology
Course Number and Title: HS 535 Biomechanical Instrumentation with Data Processing in MatLab (Biomech Instrument MatLab)
Catalog Description: This course teaches students the skills to use biomechanical sensors as instruments for research, and the use of MatLab programming language to process the data they collect from their instruments.
Prerequisites: HS 365, PHY 203/204
First Term Offered: Fall 2017
Credit Hours: 3.0

Marshall University
School of Kinesiology

Biomechanical Instrumentation with Data Processing in Matlab (HS-453/535): Syllabus

Instructor:	Dr. Steven Leigh
Office:	Gullickson Hall 114B
Phone:	(304) 696-5405
Email:	leighs@marshall.edu
Office Hours:	Monday/Wednesday 10:00 am - 12:00 pm, Tuesday/Thursday 9:00 am - 11:00 am
Lecture Days/Times:	TBD
Lecture Location:	TBD
Credit Hours:	3.0
Prerequisites:	Knowledge of Fundamental Physics and Linear Algebra
Required Text:	Attaway, S. (2016): Matlab: a practical introduction to programming and problem solving. ISBN 10: 0128045256 ; ISBN 13: 978-0128045251
Recommended Text:	Robertson, G., Caldwell, G., Hamill, J., Kamen, G., & Whittlesey, S. (2013). Research methods in biomechanics. ISBN 10: 0736093400 ; ISBN 13: 978-0736093408
Lecture Notes:	PowerPoint presentations and notebooks will be made available on Blackboard
Class Activities:	Practical instruction in biomechanical data collection will be provided in-class Practical instruction in MatLab data processing will be provided in-class

Course Objectives and Outcomes

Catalog Description:

This course teaches students the skills to use biomechanical sensors as instruments for research, and the use of MatLab programming language to process the data they collect from their instruments.

Course Overview:

Biomechanics is the study of the mechanics of human movement. To study mechanics quantitatively, biomechanists must use sensors to record the forces generated by and resulting from human movement, as well as record the movement itself. Sensors output data in the form of electric signals, which must be processed using a computer. MatLab is one computer programming language that is commonly used in the processing of electric signals from biomechanics instruments. This course will provide you with a program of study into instrumentation, data structures, and programming functions to collect and analyze biomechanical data. You will develop the skills needed to collect biomechanical data using various force and motion sensors, and then process and analyze that data using MatLab code. You will explore ways to interpret your processed data, and use your data as evidence to guide practice. In this course you have an opportunity to explore the answers to questions such as:

- How can I help a clinician, trainer, coach, or teacher evaluate the movements that their patients, clients, athletes, or students make objectively and numerically?
- How can I provide clear feedback about a biological process that I can't see by looking or with a video camera?
- How can I measure the movements of a baseball pitcher in competition?
- How can I select one critical value to give to a clinician/trainer/coach/teacher from a huge dataset?

Whether you are a clinician, scientist, teacher, trainer, or coach, the fundamental concepts that underlie these answers will be of value to you.

Course Objectives:

To provide students with an advanced understanding of human movement through the application of biomechanical principles. To investigate the use of force transducers, accelerometers, electrodes, and potentiometers for measuring human movement. To manipulate data structures mathematically using a computer program. To challenge students to apply their knowledge by solving practical problems. To provide students with the skills to evaluate movement using custom biomechanical technology.

Learning Outcomes and Assessment Measures:

Upon completion of their course experience, students will be able to:	**This learning outcome will be practiced and assessed using:**
Compare and contrast different sensors used to measure forces (kinetics)	Final and Midterm Exams
Compare and contrast different sensors used to measure human movement (kinematics)	Final and Midterm Exams
Compare and contrast different sensors used to measure muscular activity (electromyography)	Final and Midterm Exams
Select and use appropriate sensors to collect biomechanical data	Final and Midterm Exams Instrumentation and Processing Projects Sensor-Based Investigation
Determine the structure and format of biomechanical data files	Final and Midterm Exams Instrumentation and Processing Projects Sensor-Based Investigation
Write MatLab code to manipulate biomechanical data files for the purposes of filtering, integrating, differentiating, and graphing	Instrumentation and Processing Projects Sensor-Based Investigation
Load, process, and create output of biomechanical data using MatLab	Instrumentation and Processing Projects Sensor-Based Investigation

Course Modules

The design of this course is linear modular - you need to complete all modules in sequence. There are six modules in this course. Each module includes learning activities and class assignments to determine whether the module learning outcomes have been achieved. The list below highlights the learning outcomes for each module:

Module 1 – Force Transducers:

- Describe the physical components of a force transducer
- Describe the circuitry of a force transducer
- Classify and compare various force transducers
- Measure external forces using an appropriate force transducer
- Measure human kinetics using an appropriate force transducer
- Design a human performance test utilizing a force transducer

Module 2 – MatLab Processing of Force Data:

- Describe the characteristics of force data files
- Evaluate the structure of a force data file

- Write a MatLab function to perform simple algebraic manipulation of a force data file
- Write a MatLab function to identify the maximum, minimum, and mean values within a force data file
- Write a MatLab function to numerically integrate one vector in a force data file
- Write a MatLab function to generate a graph of multiple vectors of a force data file
- Design a MatLab routine to calculate and graph impulse during walking, running, and jumping
- Design a MatLab routine to identify discrete kinetic variables of walking, running, and jumping

Module 3 – Accelerometers:

- Describe the physical components of an accelerometer
- Describe the circuitry of an accelerometer
- Classify and compare various accelerometers
- Measure object/implement accelerations using an appropriate accelerometer
- Measure body and limb accelerations using an appropriate accelerometer
- Measure joint angular accelerations using an appropriate accelerometer
- Design a human performance test utilizing an accelerometer

Module 4 – MatLab Processing of Accelerometer Data:

- Describe the characteristics of acceleration data files
- Evaluate the structure of an acceleration data file
- Write a MatLab function to perform simple algebraic manipulation of an acceleration data file
- Write a MatLab digital filter function and apply the digital filter to an acceleration data file
- Write a MatLab function to numerically differentiate one vector in an acceleration data file
- Design a MatLab routine to calculate accelerations, velocities, and displacements during reaching, throwing, and running
- Design a MatLab routine to graph hand paths for reaching
- Design a MatLab routine to graph joint angular velocities for throwing
- Design a MatLab routine to graph velocity profiles and stride characteristics for running
- Design a MatLab routine to identify discrete kinematic variables of reaching, throwing, and running

Module 5 – Electromyography:

- Describe the physical components of a surface EMG electrode
- Describe the physical components of an indwelling EMG electrode
- Describe the circuitry of an EMG electrode
- Classify and compare various EMG electrodes
- Measure muscle activation using an appropriate EMG electrode
- Design a human performance test utilizing EMG electrodes

Module 6 – MatLab Processing of Electromyography Data:

- Describe the characteristics of EMG data files
- Evaluate the structure of an EMG data file
- Write a MatLab function to perform a fast fourier transform of an EMG data file
- Select appropriate cutoff frequencies for a digital filter based on a fast fourier transform of data
- Write a MatLab digital filter function with varying cutoff frequencies and apply the filter to an EMG data file
- Write a MatLab function to numerically integrate a vector of an EMG data file
- Design a MatLab routine to graph EMG linear envelopes
- Design a MatLab routine to identify discrete EMG variables of Max, Mean, and iEMG

Course Assessments

Your progress in achieving the module and course learning outcomes will be practiced and assessed using: two written class exams, three instrumentation and processing projects, and a sensor-based investigation. You will be graded on correctness and not effort. Remember that mere submission of work does not necessarily constitute successful completion. Each piece of work submitted will be evaluated in regard to quality factors such as correctness of information, clarity of thought and presentation, adherence to guidelines, evidence of effort, and timeliness. The assessments are explained in more detail below, and will be used to calculate your final grade based on a weighted scale.

Written Class Exams:

There will be two written class exams covering material from the lectures. The exams will be comprised of multi-part short answer questions where you will where you will be challenged to apply your knowledge of biomechanical instruments and MatLab code by explaining, describing, discussing, comparing, contrasting, drawing, defining, giving an example, analyzing, etc. The first written class exam will cover the material of modules 1 to 3 and the second written class exam will cover the material of modules 4 to 6.

Instrumentation and Processing Projects

During the semester you will be asked to work with one other classmate to collect kinematic, kinetic, and EMG data, and then process those data into meaningful output using MatLab. Your group will need to prepare three abstracts, one for each project, that you could submit for presentation at a scientific meeting. The idea behind these projects is for you to gain hands on experience in analyzing biomechanical data, and to expose you to equipment and software you may be asked to work with in a future position. Detailed instructions will be provided for each project in separate documents on Blackboard.

Sensor-Based Investigation

As a graduate student, you will demonstrate your high level mastery of instrumentation, data processing, and data reduction by designing and conducting a novel biomechanical experiment utilizing the tools learned during this course. You will need to choose a topic of interest to you, define a research question to be used to investigate human movement related to your topic, design a method to use a sensor or sensor array to instrument a human subject to measure variables to answer your research question, collect sensor data as the subject performs the movement of interest, and write MatLab code to process, reduce, and display your selected variables. You will need to provide a demonstration of your sensor setup, a sample of data you collected, and your MatLab code. Detailed instructions will be provided in a separate document on Blackboard.

Assessment Weighting Distribution:	Total = 100%
Kinetic Instrumentation and Processing Project	15%
Kinematic Instrumentation and Processing Project	15%
Muscle Instrumentation and Processing Project	15%
Written Class Exam 1	20%
Written Class Exam 2	20%
Sensor-Based Investigation	15%

Course Grading Scale:

Percentage	Grade	Percentage	Grade	Percentage	Grade
93.00 - 100.0	**A**	80.00 - 82.99	**B-**	67.00 - 69.99	**D+**
90.00 - 92.99	**A-**	77.00 - 79.99	**C+**	63.00 - 66.99	**D**

87.00 - 89.99	**B+**	73.00 - 76.99	**C**	60.00 - 62.99	**D-**
83.00 - 86.99	**B**	70.00 - 72.99	**C-**	00.00 - 59.99	**F**

Evaluation Criteria:

The purpose of student evaluation is to inform students of their performance during the course and to provide feedback. All students will be held to the following overall academic performance standards:

A = outstanding performance, significantly exceeded all basic/minimum criteria.
B = above average performance, exceeded most basic/minimum criteria.
C = average performance, met basic/minimum criteria.
D = below average performance, failed to meet some basic/minimum criteria.
F = unsatisfactory performance, failed to meet most basic/minimum criteria

Course Schedule

Lecture Schedule:

This is the lecture schedule for the semester, and will be followed as closely as possible. Note the textbook readings for each lecture; you should have read the relevant chapter from Matlab: A Practical Introduction to Programming and Problem Solving. Also note that some classes have an Instrumentation and Processing Project (IPP) or aspects of the Sensor-Based Investigation (SBI) associated with them. This indicates the day the work will be assigned, due dates will be set during the class session and listed on Blackboard.

Class	Day/Date	Class Topic	Reading	Assignment
1	TBD	Course overview	Syllabus	
2	TBD	Fundamentals of force transducers	Research Methods, Chapter 4	SBI: Topic
3	TBD	Measurements made with force transducers	Research Methods, Chapter 4	
4	TBD	Data collection using force transducers	Research Methods, Chapter 4	IPP1: Kinetics
5	TBD	Force data structures	MatLab, Chapters 2&8	SBI: Question
6	TBD	MatLab functions for data searching	MatLab, Chapter 3	
7	TBD	MatLab functions for integration	MatLab, Chapter 6	
8	TBD	MatLab functions for graphing	MatLab, Chapters 3&11	
9	TBD	MatLab processing of force data	MatLab, Chapter 10	
10	TBD	MatLab reduction of force data	MatLab, Chapter 10	
11	TBD	Presentation of data with MatLab	MatLab, Chapter 9	
12	TBD	Fundamentals of accelerometers	Research Methods, Chapters 1&2	
13	TBD	Measurements made with accelerometers	Research Methods, Chapters 1&2	
14	TBD	Data collection using accelerometers	Research Methods, Chapters 1&2	IPP2: Kinematics
15	TBD	Accelerometer data structures	MatLab, Chapters 2&8	SBI: Instrument
16	**TBD**	**Written Class Exam 1 (Modules 1 to 3)**		
17	TBD	MatLab functions for filtering	MatLab, Chapters 4-6	
18	TBD	MatLab functions for differentiation	MatLab, Chapters 3&6	
19	TBD	MatLab processing of accelerometer data	MatLab, Chapter 10	

20	TBD	MatLab reduction of accelerometer data	MatLab, Chapter 10	SBI: Data collection
21	TBD	Fundamentals of electrodes	Research Methods, Chapters 8&9	
22	TBD	Fundamentals of electromyography	Research Methods, Chapters 8&9	
23	TBD	Measurements made with electromyography	Research Methods, Chapters 8&9	
24	TBD	Data collection using electromyography	Research Methods, Chapters 8&9	IPP3: Muscles
25	TBD	Electromyography data structures	MatLab, Chapters 2&8	SBI: MatLab Code
26	TBD	MatLab functions for frequency domains	Research Methods, Chapters 12&14	
27	TBD	Further MatLab functions for filtering	MatLab, Chapters 4-6	
28	TBD	MatLab functions for normalizing	MatLab, Chapters 3&6	
29	TBD	MatLab processing of EMG data	MatLab, Chapters 10&15	
30	TBD	MatLab reduction of EMG data	MatLab, Chapters 10&15	
31	**TBD**	**Written Class Exam 2 (Modules 4 to 6)**		

Course Policies

Class Attendance:

All class sessions are mandatory. One of the major determinants of course performance is time on task, i.e. the more classes you attend the higher your grade is likely to be. As a general rule, for each class missed you should expect that your final grade will be a grade level lower than if you had attended class. One grade level will be deducted from your final grade if you are absent for two or more class sessions and you do not have a valid University Excused Absence. Four unexcused absences will result in you being asked to drop the course, or the University's Forced Withdrawal Policy will be used. If you need to miss a class or lab session for a reason that would be excused, it is your responsibility to notify me prior to this absence and/or to acquire a University Excuse Absence from the Dean of Student Affairs. If I do not receive the notification within a week of your absence, the absence will be counted against you. Class will start at the assigned time, and when someone arrives late to class it interrupts everyone else's concentration and is detrimental to the class environment, so lateness of more than 5 minutes will be considered an unexcused absence.

If there is inclement weather (e.g. snow) I may cancel class or the university may be closed. I will email the class if I have to cancel class. The university will broadcast the information if campus is closed. If weather conditions are dangerous in your area, but class has not been cancelled, use your judgment when deciding to travel to campus, and let me know you will miss class.

Professionalism:

General: You are expected to conduct yourself in a professional manner during class and lab sessions. The classroom is a special environment in which students and faculty come together to promote learning and growth. It is essential to this learning environment that respect for the rights of others seeking to learn, respect for the professionalism of the instructor, and the general goals of academic freedom are maintained. Differences of viewpoint or concerns should be expressed in terms in which students and faculty may learn to reason with clarity and compassion, to share of themselves without losing their identities, and to develop an understanding of the community in which they live. Student conduct that disrupts the learning process will not be tolerated and may lead to disciplinary action and/or removal from class.

This course adheres to the Marshall University academic affairs policies on:

- **Academic Dishonesty**
  - http://www.marshall.edu/academic-affairs/policies/#AcademicDishonesty
- **Excused Absences**
  - http://www.marshall.edu/academic-affairs/policies/#ExcusedAbsences
- **University Computing Services' Acceptable Use**
  - http://www.marshall.edu/academic-affairs/policies/#UCS
- **Inclement Weather**
  - http://www.marshall.edu/academic-affairs/policies/#InclementWeather
- **Dead Week**
  - http://www.marshall.edu/academic-affairs/policies/#DeadWeek
- **Students with Disabilities**
  - http://www.marshall.edu/academic-affairs/policies/#Disability
- **Academic Dismissal**
  - http://www.marshall.edu/academic-affairs/policies/#Dismissal
- **Academic Forgiveness**
  - http://www.marshall.edu/academic-affairs/policies/#Forgiveness
- **Academic Probation and Suspension**
  - http://www.marshall.edu/academic-affairs/policies/#ProbationUndergrad
  - http://www.marshall.edu/academic-affairs/policies/#ProbationGrad
- **Affirmative Action**
  - http://www.marshall.edu/academic-affairs/policies/#AAUndergrad
  - http://www.marshall.edu/academic-affairs/policies/#AAGrad
- **Sexual Harassment**
  - http://www.marshall.edu/academic-affairs/policies/#Harassment

If you have not read these policies, please do so, it is in your best interest to become familiar with them.

Participation: You are expected to participate during class and use the time provided to your benefit. Participation in class discussions is highly encouraged, and helps promote understanding of the material.

Note-Taking: You are expected to take notes during class. It will be difficult to understand the class material without them. You may print any Powerpoint slides or other material posted on Blackboard. You should not rely on Powerpoint slides as your sole source of class information. You should add to the information with your own notes. Copyright law protects this syllabus, my lectures, and all materials distributed and presented by me during this course. You are authorized to take notes in this class but that authorization extends only to making one set of notes for your own personal use and no other use. You are not authorized to sell, license, commercially publish, distribute, transmit, display, or record (audio or video) from this class unless you have my consent to do so.

Electronic Devices: To prevent interruptions to learning, please turn off all electronic devices during class time. When you use your phone or laptop during class it also distracts me and those around you. You may use your laptop to take notes, but there are times when I will ask that all laptops or other devices be closed during discussions. If you are asked to stop using your phone or laptop during class, your final grade will be penalized by one grade level.

Collaboration: You will be working collaboratively for the Instrumentation and Processing Projects, but you must contribute to your group. If you plan to simply utilize other people's work, you will do badly, you will probably not enjoy this course, and you will not achieve your potential for learning. If you participate and practice active learning and application of the material covered in this course, you will retain an understanding of the concepts that you will be able to apply in the future. For the written class exams, everything must be your own unique work and you may not work collaboratively.

Contacting Me:

Email: The best way to reach me is through email. Please put the name of this course in the subject line, and use polite email etiquette. While I try to be as responsive as possible, please allow 24 hours during the week and 48 hours over the weekend before anticipating a response. Emails sent to me from non-Marshall accounts may get flagged as spam, so you are responsible for avoiding miscommunication by using your Marshall MU account. You can also come to see me in my office during my scheduled office hours, or you can make an appointment. Questions about the class content can also be asked during class time.

Previewing and Submitting Work: I will preview and provide feedback on any work emailed to me at least five days before the due date listed in the class schedule. This means you may submit work to me, get help, and then submit it again for grading. You may also make a 15-minute appointment with me up to the due date of an assignment for me to preview your work in person. Students who have requested my feedback in the past have earned higher grades on their assignments. To ensure that you earn complete credit for your work, upload your documents to Blackboard by the due date. Late work will be penalized 25% per 24 hours, and will not be accepted 3 days after the assignment due date. If you notify me before the due date of any technological failure or other emergency, and we agree upon a new delivery time, there will be no penalty on your grade. In order for me to be able to read your work, all documents must be in Microsoft Word (.doc or .docx) format, or portable document format .pdf. For professionalism and consistency, all work must follow APA guidelines for citations.

Getting Help with This Course: If you feel you are struggling with the content of this class, please make an appointment to see me. Attending office hours or speaking with me during class time should be your first step for getting help.

To further your education, you must read and write. Reading assignments from the textbook for each module are listed in the course schedule. You should read and think about them between each class. You are also expected to review the relevant reading material after the module. In your assessments, you are expected to demonstrate your ability to communicate complex scientific ideas by writing clearly. You must communicate clear and precise information in proper written English at a level appropriate for an American university student. Your grades for your assignments will, in part, reflect your writing abilities. If you do not learn to communicate in words, you cannot formulate fully developed critical thoughts based on facts. If you need assistance with your writing, you can consult the Marshall University Writing Center, located on the 2nd floor of the Drinko Library. The staff there can help you develop your written communications skills.

Tools and Resources:

You will use the following tools to achieve the module and course learning outcomes:

- Blackboard course management system with a folder for each module containing:
  - Powerpoint lecture presentations
  - Instrument datasheets
  - MatLab coding examples and M files
  - Assignment submission dropboxes
  - Links to helpful resources
- Lecture Textbook: Matlab: A Practical Introduction to Programming and Problem Solving by Attaway
- Biomechanics Lab Equipment, specifically sensors
- MatLab program

Your most important tool will be yourself. You are joining a community of scientists by exploring the biological and mechanical principles involved in human movement under the guidance of an expert biomechanist. To work well in this class, you must take responsibility for your own learning, and you should participate as an active learner. Reading, discussing, asking questions, and participating in activities will allow you to achieve the module and course learning outcomes to the best of your ability.

While the provisions of this syllabus are as accurate and complete as possible, I reserve the right to change any provision if circumstances so warrant. You will be kept advised of any changes, and information about changes will be available from me. It is your responsibility to successfully complete the requirements of this course.

Chair: Tracy Christofero | **GC#6: Course Addition**

Request for Graduate Course Addition

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Health Professions Dept/Division: SOK- Biomechanics Alpha Designator/Number: HS 578 GHCO-MS ○ Graded ○ CR/NC

Contact Person: _____ Phone: _____

NEW COURSE DATA:

New Course Title: HS 578 BIOMECHANICS RESEACH PRACTICUM

Alpha Designator/Number: H S 5 7 8

Title Abbreviation: B i o m e c h R e s a e r c h P r a c t

(Limit of 25 characters and spaces)

Course Catalog Description: (Limit of 30 words)
This course offers "hands-on" work within the biomechanics lab. The student will assist with current research. This experience that allows students to gain practical experience within a lab setting.

Co-requisite(s): _____ First Term to be Offered: Fall 2017

Prerequisite(s): ? Credit Hours: 1-6

Course(s) being deleted in place of this addition (*must submit course deletion form*): _____

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

Dept. Chair/Division Head _____	Date 9/29/16
Registrar _____ 511199	Date 10-4-16
College Curriculum Chair _____	Date 10/13/16
Graduate Council Chair JChristofero	Date 11-10-16

Form updated 10/2011

Request for Graduate Course Addition - Page 2

College: Health Professions | Department/Division: SOK-Biomechanics | Alpha Designator/Number:

Provide complete information regarding the new course addition for each topic listed below. Before routing this form, a complete syllabus also must be attached addressing the items listed on the first page of this form.

1. FACULTY: Identify by name the faculty in your department/division who may teach this course.

Suzanne Konz
Steve Leigh
Assigned and qualified graduate assistants

2. DUPLICATION: If a question of possible duplication occurs, attach a copy of the correspondence sent to the appropriate department(s) describing the proposal. Enter "***Not Applicable***" if not applicable.

Not applicable

3. REQUIRED COURSE: If this course will be required by another deparment(s), identify it/them by name. Enter "***Not Applicable***" if not applicable.

Not applicable

4. AGREEMENTS: If there are any agreements required to provide clinical experiences, attach the details and the signed agreement. Enter "***Not Applicable***" if not applicable.

Not applicable

5. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials to teach this course, attach an estimate of the time and money required to secure these items. (Note: Approval of this form does not imply approval for additional resources.) Enter "***Not Applicable***" if not applicable.

Qualified graduate assistant to assist with teaching/oversight of student

6. COURSE OBJECTIVES: (May be submitted as a separate document)

See separate document.

7. COURSE OUTLINE (May be submitted as a separate document)

See separate document.

8. SAMPLE TEXT(S) WITH AUTHOR(S) AND PUBLICATION DATES (May be submitted as a separate document)

REQUIRED TEXTBOOK
Relevant scientific (peer-reviewed) articles, reports, manuals and books for the chosen research project. The student is expected to read and explore beyond what is minimally provided by the researcher. The student is expected to delve deeply and thoroughly within the topic area to become well versed and capable.

SUGGESTED TEXTBOOK
Robertson D.G.E., Caldwell G.E., Hamill J., Kamen G., & Whittlesey S.N. Research Methods in Biomechanics. Champaign, IL: Human Kinetics, 2004.

9. EXAMPLE OF INSTRUCTIONAL METHODS (Lecture, lab, internship)

See separate document.

Request for Graduate Course Addition - Page 4

10. EXAMPLE EVALUATION METHODS (CHAPTER, MIDTERM, FINAL, PROJECTS, ETC.)

See separate document.

11. ADDITIONAL GRADUATE REQUIREMENTS IF LISTED AS AN UNDERGRADUATE/GRADUATE COURSE

Graduate students will be required to develop a manuscript for publication or abstract proposal based. This item will be developed for an added component to research that is already being conducted and the student has worked on. The principal investigator must approve the added research question and be willing to assist student in the development of the publication of proposal.

12. PROVIDE COMPLETE BIBLIOGRAPHY (May be submitted as a separate document)

Robertson D.G.E., Caldwell G.E., Hamill J., Kamen G., & Whittlesey S.N. Research Methods inBiomechanics. Champaign, IL: Human Kinetics, 2004.

Kinetics of human motion Zatsiorsky, V. 2002 Champaign, IL: Human Kinetics. QP303 Z383

Kinematics of human motion Zatsiorsky, V. 2002 Champaign, IL: Human Kinetics. QP303 Z383

Three-Dimensional Analysis of Human Locomotion Allard, P. et al. (Eds.) 1998 Ontario: JohnWiley & Sons. QP 303 T585

Three-Dimensional Analysis of Human Movement Allard, P., Stokes, I., & Blanchi, J. (Eds.)1995 Champain, IL: Human Kinetics. QP 303 T59

Gowitzke, B.A. and Milner, M. (1988). Scientific Bases of Human Movement. (3rd. ed.) Baltimore: Williams and Wilkins.
Basic Biomechanics of the Musculoskeletal System Nordin, M. & Frankel, V. 1989 2nd edition, Philadelphia: Lea & Febiger. 1st edition QP 303 F66

Basic Orthopaedic Biomechanics Mow, V. & Hayes, W. 1991 New York: Raven Press

Biomechanics in Sport: Performance Enhancement and Injury Prevention Zatsiorsky, V. (Ed.)2000 Oxford: Blackwell Science. RC 1235 B47

Request for Graduate Course Addition - Page 5

Please insert in the text box below your course summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings):

Department:
Course Number and Title:
Catalog Description:
Prerequisites:
First Term Offered:
Credit Hours:

Department: SOK - Biomechanics

Course Number and Title: HS 578 – Biomechanics Research Practicum

Catalog Description: This course offers "hands-on" work within the biomechanics lab. The student will assist with current research. This experience that allows students to gain practical experience within a lab setting.

Prerequisites: BS227 or equivalent

First Term Offered: Fall 2017

Credit Hours: 1-6

HS 478/578
BIOMECHANICS: RESEACH PRACTICUM
Fall 2017

Instructor:	Class Lecture
Office:	Credit hours:
Phone:	Office Hours:
Email:	Class Location: Biomechanics Labs

MARSHALL UNIVERSITY POLICIES

See the following link for Marshall University Policies related to the listed topics.
(http://www.marshall.edu/academic-affairs/?page_id=802)

1. Academic Dishonesty
2. Excused Absence Policy for Undergraduates
3. University Computing Service Acceptable Use
4. Inclement Weather
5. Dead Week
6. Students with Disabilities
7. Academic Dismissal
8. Academic Forgiveness
9. Academic Probation and Suspension
10. Academic Rights and Responsibilities of Students
11. Affirmative Action
12. Sexual Harassment

CATALOG DESCRIPTION

This course offers "hands-on" work within the biomechanics lab. The student will assist with current research. This experience that allows students to gain practical experience in a lab setting.

COURSE PURPOSE

This class will give you practical experience of assisting within a biomechanics lab. This course will give you real world experience to ready yourself for working in a biomechanics lab of any level. This course allows you to understand and appreciate the intricacies, joys, and struggles of research from implementation through data collection to dissemination to the greater scientific community as well as give you a new understanding of how you can be a knowledgeable consumer of research.

PREREQUISITES – BSC 227 or equivalent (undergraduate only) or permission of faculty

COURSE OBJECTIVES

Following successful completion of the course, the student should:

1. Demonstrate a deepened knowledge and understanding within the area of biomechanics and human performance
2. Demonstrate an insight into how appropriate scientifically based evaluation and testing methods can be applied in a practical/clinical setting within biomechanics and human performance
3. Together with the faculty, plan and carry out a project related to within biomechanics and human performance
4. Perform qualified assessments and practical applications within the chosen area
5. Independently complete written and oral reports of the project where the project is presented based on both scientific and practical aspects

6. Perform qualified, exercise relevant, assessments and solutions within biomechanics
7. Critically assess and evaluate how research and practice are, or can be, integrated within biomechanics and human performance

COURSE LEARNING OUTCOMES:

Following the completion of this course, the student will:

OBJECTIVE	ASSESSED
Demonstrate a deepened knowledge and understanding within the area of biomechanics and human performance	CITI certification Harassment Training Progress Reports Course Evaluations Manuscripts/Proposal/Final Report
Demonstrate an insight into how appropriate scientifically based evaluation and testing methods can be applied in a practical/clinical setting within biomechanics and human performance	CITI certification Harassment Training Progress Reports Course Evaluations Manuscripts/Proposal/Final Report
Together with the faculty, plan and carry out a project related to within biomechanics and human performance	Progress Reports Course Evaluations Manuscripts/Proposal/Final Report
Perform qualified assessments and practical applications within the chosen area of research	CITI certification Harassment Training Progress Reports Course Evaluations Manuscripts/Proposal/Final Report
Independently complete written and oral reports of the project where the project is presented based on both scientific and practical aspects	Progress Reports Course Evaluations Manuscripts/Proposal/Final Report
Perform qualified, exercise relevant, assessments and solutions within biomechanics	CITI certification Harassment Training Manuscripts/Proposal/Final Report
Critically assess and evaluate how research and practice are, or can be, integrated within biomechanics and human performance	Progress Reports Course Evaluations Manuscripts/Proposal/Final Report

REQUIRED TEXTBOOK

Relevant scientific (peer-reviewed) articles, reports, manuals and books for the chosen research project. The student is expected to read and explore beyond what is minimally provided by the researcher. The student is expected to delve deeply and thoroughly into the topic area to become well versed and capable.

SUGGESTED TEXTBOOK

Robertson D.G.E., Caldwell G.E., Hamill J., Kamen G., & Whittlesey S.N. *Research Methods in Biomechanics*. Champaign, IL: Human Kinetics, 2004.

INSTRUCTIONAL METHODS - PRACTICUM

The primary expectations of the course are for the student to independently set-up, collect, plan, analyze and present data carried out at a workplace related to biomechanics and human performance. The course will extend the student's knowledge and experience in the practical side of biomechanics and human performance. And, will allow the student the opportunity to develop and deliver well-researched, properly organized scientific oral and written reports, proposals, or manuscripts.

Teaching Formats

The class is designed to develop the student into a proficient lab assistant. The student will develop a skill set that will allow them to efficiently carry out research within biomechanics and human performance in any setting. This experience is based both on literature searching/reading and practical work. The work is carried out in close collaboration with individuals conducting the research within the lab. The teaching format is mainly in the form of advisory sessions between student and the research group, graduate assistants, and biomechanics professors. The student is expected to assist the researchers and independently work, study and critically evaluate scientific (peer-reviewed) articles, reports, manuals and books relevant to the chosen area of study.

ATTENDANCE

This class is primarily research-driven. Therefore, it is up to the student to find time to be available when data collection and/or analysis if being conducted. If there is no active data collection/analysis being conducted, the student is expected to be in the lab working with the various equipment to work on their skill set. During the initial 2-4 weeks, it is expected that the student will be in the lab and show up at the agreed time to learn the techniques. This course allows up to 6 credits to be used. You must complete 45 hours/credit of practicum experience. You need to complete 270 hours of practicum experience over the length of the semester for a six credit load.

COURSE GRADING

Each student is required to:

1. Keep a journal of daily activities, hours worked, experiences, which should also include a self-evaluation and reflection on your performance. This course allows up to 6 credits to be used. You must complete 45 hours/credit of practicum experience. You need to complete 270 hours of practicum experience over the length of the semester for a six credit load.
2. Summarize his/her activities and self-evaluations at the end of every two weeks and discuss this report with the on-site supervisor. The on-site supervisor should sign the report to indicate he/she has read it. Reports are to submit to the program director/course instructor.
3. Write-up lab findings in a scientific format using APA style. These are brief abstracts of no more than two pages long.
4. Each student will be required to develop a professional paper detailing their experience within the lab as a final report for the class.
5. The undergraduate will develop a manuscript for publication in a peer-reviewed journal or an abstract proposal for conference submission. This item will be developed for an added component to research that is already being conducted, and the student has worked on. The principal investigator must approve the added research question and be willing to assist the student in the development of the publication of the proposal. An undergraduate can but are not expected to develop a manuscript or proposal. Undergraduate students must have the approval of both the program director and the principal investigator.

Graduate Students

Along with the above course grading requirement, graduate students will be required

6. Graduate students will develop a manuscript for publication in a peer-reviewed journal and an abstract proposal for conference submission. This item will be developed for an added component to research that is already being conducted, and the student has worked on. The principal investigator must approve the added research question and be willing to assist the student in the

development of the publication of the proposal. An undergraduate can but are not expected to develop a manuscript or proposal. Undergraduate students must have the approval of both the program director and the principal investigator.

Assignments & Activities Grading Breakdown

Lab Activities	**(60%)**
Progress Reports (7)	
Professional papers	**(30%)**
Final Report	
Manuscript /Proposal development and submission	
(Undergraduate is either Conference proposal or manuscript. Graduate is both)	
Evaluations	**(10%)**
Student experience	
Project supervisors	
Lab supervisor	
TOTAL	100%

Grading Scale		
	A	93%+
	B	85-92%
	C	70-84%
	D	60-69%
	F	< 60%

Academic Integrity

Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving one's grade or obtaining course credit; such acts also include assisting another to do so. Typically, such acts occur in relation to examinations. However, it is the intent of this definition that the term "cheating" not be limited to examination situations only, but that it includes any and all actions by a student that are intended to gain an unearned academic advantage by fraudulent or deceptive means.

Academic dishonesty includes:

CHEATING - use or attempted use of unauthorized materials, information or study aids or an act of deceit by which a student attempts to misrepresent mastery of academic effort or information. Cheating includes unauthorized copying or collaboration on a test or assignment or using prohibited materials and texts.

FABRICATION - falsification or invention of any information (including falsifying research, inventing or exaggerating data and listing incorrect or fictitious references.

ASSISTING - helping another commit an act of academic dishonesty. Assisting includes paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, or taking a test/doing an assignment for someone else (or allowing someone to do these things for you). It is a violation of Oregon state law to create and offer to sell part or all of an education assignment to another person (ORS 165.114).

TAMPERING - altering or interfering with evaluation instruments and documents.

PLAGIARISM - representing the word or ideas of another person as one's own OR presenting someone else's words, ideas, artistry or data as one's own. Plagarsim includes copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project, then submitting it as one's own.

Penalties for cheating and plagiarism range from a zero or "F" on a particular assignment, through an "F" for the course, to expulsion from the university. Any act of academic dishonesty will result in University ramifications as outlined in the *Marshall University Student Handbook*, including the failure of the course.
http://www.marshall.edu/library-biz/plagiarism/plagiarism.htm

Statement on Disruptive Classroom Behavior: The opportunity is a special environment in which students and researcher come together to promote learning and growth. It is essential to this learning environment that respect for the rights of others seeking to learn, respect for the professionalism of the instructor, and the general goals of academic freedom are maintained. Differences of viewpoint or concerns should be expressed in terms in which

students and faculty may learn to reason with clarity and compassion, to share of themselves without losing their identities, and to develop an understanding of the community in which they live. Student conduct that disrupts the learning process shall not be tolerated and may lead to disciplinary action and/or removal from class. Disruptive behavior also includes allowing your cell phone to ring in class. PLEASE BE CONSIDERATE AND TURN YOUR CELL PHONE OFF BEFORE CLASS BEGINS!!!

COURSE OUTLINE

The first five weeks of this class will be "equipment and technique learning" experiences along with assisting and practicing new skills. Once the techniques are understood, the rest of the class will be "out-of-class" data collection where the student will be in charge of the data collection. The graduate assistant or professor will be available to supervise/oversee, but the primary data collection will fall on the students. Students are expected to conduct set-up, collection, analysis, and write independently. If there is no active research being conducted, the student is expected to work with the equipment to improve their proficiency. The data collection also consists of students setting up the lab for the participant, meaning it is necessary to be in the lab before the participant to make sure everything is ready. There will also be frequent readings of journal articles for a better background for the study.

AGENDA

Week	Date	Topic	Items Due
1	8/24	Syllabus Research Ethics - IRB-CITI certification – online Sexual Harassment Training – online Motion Capture	
2	8/31	Force Plates	CITI certification Harassment Training Progress Report 1
3	9/7	Accelerometers	
4	9/14	Isokinetics	Progress Report 2 Evaluations
5	9/21	EMG	
6	9/28	Independent work	Progress Report 3
7	10/5	Independent work	
8	10/12	Independent work	Progress Report 4 Evaluations
9	10/19	Independent work	
10	10/26	Independent work	Progress Report 5
11	11/2	Independent work	
12	11/9	Independent work	Progress Report 6 Evaluations
13	11/16	Independent work	
14	11/30	Independent work	Progress Report 7
15	12/7	Independent work	Evaluations
16		Finals	Manuscripts/Proposal/Final Report

COLLEGE – Health Professions Department – SOK-Biomechanics Alpha Designator –
HS 578 – Biomechanics Research Practicum

Below include the answers to components 6, 7, 9 and 10

6. COURSE OBJECTIVES:

Following successful completion of the course, the student should:

Knowledge and understanding

- Demonstrate a deepened knowledge and understanding within the area of biomechanics and human performance
- Demonstrate an insight into how appropriate scientifically based evaluation and testing methods can be applied in a practical/clinical setting within biomechanics and human performance

Skills and ability

- Together with the supervisor plan and carry out a project related to within biomechanics and human performance
- Perform qualified assessments and practical applications within the chosen area
- Independently complete written and oral reports of the project where the project is presented based on both scientific and practical aspects

Judgment and approach

- Perform qualified, exercise relevant, assessments and solutions within biomechanics
- Critically assess and evaluate how research and practice is, or can be, integrated within biomechanics and human performance.

COURSE LEARNING OUTCOMES:

Following the completion of this course, the student will:

OBJECTIVE	ASSESSED
Demonstrate a deepened knowledge and understanding within the area of biomechanics and human performance	CITI certification Harassment Training Progress Reports Course Evaluations Manuscripts/Proposal/Final Report
Demonstrate an insight into how appropriate scientifically based evaluation and testing methods can be applied in a practical/clinical setting within biomechanics and human performance	CITI certification Harassment Training Progress Reports Course Evaluations Manuscripts/Proposal/Final Report
Together with the faculty, plan and carry out a project related to within biomechanics and human performance	Progress Reports Course Evaluations Manuscripts/Proposal/Final Report

Perform qualified assessments and practical applications within the chosen area of research	CITI certification Harassment Training Progress Reports Course Evaluations Manuscripts/Proposal/Final Report
Independently complete written and oral reports of the project where the project is presented based on both scientific and practical aspects	Progress Reports Course Evaluations Manuscripts/Proposal/Final Report
Perform qualified, exercise relevant, assessments and solutions within biomechanics	CITI certification Harassment Training Manuscripts/Proposal/Final Report
Critically assess and evaluate how research and practice are, or can be, integrated within biomechanics and human performance	Progress Reports Course Evaluations Manuscripts/Proposal/Final Report

7. COURSE OUTLINE

Week	Topic	Items Due
1	Syllabus Research Ethics - IRB-CITI certification – online Sexual Harassment Training – online Motion Capture	
2	Force Plates	CITI certification Harassment Training Progress Report 1
3	Accelerometers	
4	Isokinetics	Progress Report 2
5	EMG	
6	Independent work	Progress Report 3
7	Independent work	
8	Independent work	Progress Report 4
9	Independent work	
10	Independent work	Progress Report 5

11	Independent work	
12	Independent work	Progress Report 6
13	Independent work	
14	Independent work	Progress Report 7
15	Independent work	
16	Finals	Manuscripts/Proposal/Final Report

9. EXAMPLE OF INSTRUCTIONAL METHODS

INSTRUCTIONAL METHODS - PRACTICUM

The primary expectations of the course are for the student to independently set-up, collect, plan, analyze and present data carried out at a workplace related to biomechanics and human performance. The course will extend the student's knowledge and experience in the practical side of biomechanics and human performance. And, will allow the student the opportunity to develop and deliver well researched, properly organized scientific oral and written reports, proposals, or manuscripts.

Teaching Formats

The class is designed to develop the student into a proficient lab assistant. The student will develop a skill set that will allow them to efficiently carry out research within biomechanics and human performance in any setting. This experience is based both on literature searching/reading and practical work. The work is carried out in close collaboration with individuals conducting the research within the lab. The teaching format is mainly in the form of advisory sessions between student and the research group, graduate assistants, and biomechanics professors. The student is expected to assist the researchers and independently work, study and critically evaluate scientific (peer-reviewed) articles, reports, manuals and books relevant for the chosen area of study.

10. EXAMPLE OF EVALUATION METHODS

COURSE GRADING

Each student is required to:

1. Keep a journal of daily activities, hours worked, experiences, which should also include a self-evaluation and reflection on your performance. This course allows up to 6 credits to be used. You must complete 45 hours/credit of practicum experience. You need to complete 270 hours of practicum experience over the length of the semester for a six credit load.
2. Summarize his/her activities and self-evaluations at the end of every two weeks and discuss this report with the on-site supervisor. The on-site supervisor should sign the report to indicate he/she has read it. Reports are to submit to the program director/course instructor.
3. Write-up lab findings in a scientific format using APA style. These are brief abstracts of no more than two pages long.
4. Each student will be required to develop a professional paper detailing their experience within the lab as a final report for the class.
5. The undergraduate will develop a manuscript for publication in a peer-reviewed journal or an abstract proposal for conference submission. This item will be developed for an added component to research that is already being conducted, and the student has worked on. The principal

investigator must approve the added research question and be willing to assist the student in the development of the publication of the proposal. An undergraduate can but are not expected to develop a manuscript or proposal. Undergraduate students must have the approval of both the program director and the principal investigator.

Graduate Students

Along with the above course grading requirement, graduate students will be required

6. Graduate students will develop a manuscript for publication in a peer-reviewed journal and an abstract proposal for conference submission. This item will be developed for an added component to research that is already being conducted, and the student has worked on. The principal investigator must approve the added research question and be willing to assist the student in the development of the publication of the proposal. An undergraduate can but are not expected to develop a manuscript or proposal. Undergraduate students must have the approval of both the program director and the principal investigator.

Assignments & Activities Grading Breakdown

Lab Activities	**(60%)**
Progress Reports (7)	
Professional papers	**(30%)**
Final Report	
Manuscript /Proposal development and submission	
(Undergraduatee is either Conference proposal or manuscript. Graduate is both)	
Evaluations	**(10%)**
Student experience	
Project supervisors	
Lab supervisor	
TOTAL	100%

Chair: Tracy Christofero | **GC#6: Course Addition**

Request for Graduate Course Addition

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

College: Health Professions Dept/Division: SOK-Biomechanics Alpha Designator/Number: ~~HS 595~~ GHCO-MS (•) Graded ( ) CR/NC

Contact Person: Suzanne Konz Phone: 696-2926

NEW COURSE DATA:

New Course Title: Trends In Biomechanical Analysis 2

Alpha Designator/Number: H S 5 9 5

Title Abbreviation: T r e n d s i n B i o m e c h i c s 2

(Limit of 25 characters and spaces)

Course Catalog Description: (Limit of 30 words)
The purpose of this course is to expose the student to the research process as it pertains to the field of biomechanics. This course is intended to continue the process started in HS ~~475~~/575.

Co-requisite(s):

First Term to be Offered: Spring 2017

Prerequisite(s): HS 575

Credit Hours: 3

Course(s) being deleted in place of this addition (*must submit course deletion form*):

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

Dept. Chair/Division Head	Date 9/29/16
Registrar Sonya L Cates 511 199	Date 10-4-16
College Curriculum Chair	Date 10/13/16
Graduate Council Chair TChristofero	Date 11-10-16

Request for Graduate Course Addition - Page 2

College: Department/Division: Alpha Designator/Number:

Provide complete information regarding the new course addition for each topic listed below. Before routing this form, a complete syllabus also must be attached addressing the items listed on the first page of this form.

1. FACULTY: Identify by name the faculty in your department/division who may teach this course.

2. DUPLICATION: If a question of possible duplication occurs, attach a copy of the correspondence sent to the appropriate department(s) describing the proposal. Enter "***Not Applicable***" if not applicable.

Not applicable

3. REQUIRED COURSE: If this course will be required by another deparment(s), identify it/them by name. Enter "***Not Applicable***" if not applicable.

Not applicable

4. AGREEMENTS: If there are any agreements required to provide clinical experiences, attach the details and the signed agreement. Enter "***Not Applicable***" if not applicable.

Not applicable

5. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials to teach this course, attach an estimate of the time and money required to secure these items. (Note: Approval of this form does not imply approval for additional resources.) Enter "***Not Applicable***" if not applicable.

Qualified graduate student(s) to assist with teaching and lab oversight.

6. COURSE OBJECTIVES: (May be submitted as a separate document)

See attached.

7. COURSE OUTLINE (May be submitted as a separate document)

See attached.

8. SAMPLE TEXT(S) WITH AUTHOR(S) AND PUBLICATION DATES (May be submitted as a separate document)

See attached.

9. EXAMPLE OF INSTRUCTIONAL METHODS (Lecture, lab, internship)

The primary expectations of the course are for the student to independently set-up, collect, plan, analyze and present data carried out at a workplace related to biomechanics and human performance. The course will extend the student's knowledge and experience in the practical side of biomechanics and human performance. And, will allow the student the opportunity to develop and deliver well researched, properly organized scientific oral and written reports, proposals, or manuscripts.

Request for Graduate Course Addition - Page 4

10. EXAMPLE EVALUATION METHODS (CHAPTER, MIDTERM, FINAL, PROJECTS, ETC.)

Completion of a research project with submission to a conference for presentation and to qualified journal for publication.

11. ADDITIONAL GRADUATE REQUIREMENTS IF LISTED AS AN UNDERGRADUATE/GRADUATE COURSE

Completion of a research project with submission to a conference for presentation and to qualified journal for publication.

12. PROVIDE COMPLETE BIBLIOGRAPHY (May be submitted as a separate document)

See attached.

Request for Graduate Course Addition - Page 5

Please insert in the text box below your course summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings):

Department:
Course Number and Title:
Catalog Description:
Prerequisites:
First Term Offered:
Credit Hours:

Department: School of Kinesiology - Biomechancis
Course Number and Title: HS 595 Trends in Biomechanical Analysis 2
Catalog Description: The purpose of this course is to expose the student to the research process as it pertains to the field of biomechanics. This course is intended to continue the process started in HS ~~475~~575.
Prerequisites: HS 575
First Term Offered: Spring 2017
Credit Hours: 3

MARSHALL UNIVERSITY
COLLEGE OF HEALTH PROFESSIONS
HS 495/595 - 3 CREDIT HOURS
TRENDS IN BIOMECHANICAL ANALYSIS II

COURSE SYLLABUS FOR SPRING 2017

Days/Time	N/A
Location	N/A
Instructor	Suzanne Konz, Ph.D., ATC, CSCS Steven Leigh, Ph.D.
Office	GH 114 A – Dr. Konz GH 114 B – Dr. Leigh
Phone	6-2926
E-Mail	konz@marshall.edu
Office/Hours	
University Policies	By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy be going to www.marshall.edu/academic-affairs and clicking on "Marshall University Policies." Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802 Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment

UNIVERSITY POLICIES

See the following link for Marshall University Policies related to the listed topics.(http://www.marshall.edu/academic-affairs/?page_id=802)

I. Academic Dishonesty
II. Excused Absence Policy for Undergraduates
III. University Computing Service Acceptable Use
IV. Inclement Weather
V. Dead Week
VI. Students with Disabilities
VII. Academic Dismissal
VIII. Academic Forgiveness
IX. Academic Probation and Suspension
X. Academic Rights and Responsibilities of Students
XI. Affirmative Action
XII. Sexual Harassment

PREREQUISITES

HS 475 (for undergraduate only)

CATALOG DESCRIPTION

A final investigation into normal and abnormal human movement patterns in sport, the workplace, and in activities of daily living.

PURPOSE/OVERVIEW OF COURSE

The purpose of this course is to expose the student to the research process as it pertains to the field of biomechanics. This course is intended to continue the process started in HS 475 (for undergraduate only).

COURSE OBJECTIVES

Upon completion of this course, students will be able to:

1. Critically analyze the strengths and weaknesses of a research paper.
2. Synthesize the existing body of knowledge pertaining to an area of research.
3. Demonstrate proficiency in the introduction and justification of the need for a research study.
4. Demonstrate proficiency in the explanation of the methods chosen to answer a research question.
5. Demonstrate proficiency in the collection of data to answer a research question.
6. Demonstrate proficiency in the synthesis of data in order to present information via multiple media outlets.
7. Demonstrate proficiency in the presentation of research findings in oral form
8. Develop and submit an abstract proposal for conference and/or a manuscript for a peer-reviewed journal.

Student Learning Outcomes and Assessment Measures
Each student-learning outcome will be assessed in the following manner:

Critically analyze the strengths and weaknesses of a research paper.	Review/Update of Pilot work Final Results/Discussion Conference Proposal/Journal Manuscript Final Oral Presentation
Synthesize the existing body of knowledge pertaining to an area of research.	Review/Update of Pilot work Recruitment tool Data Collection Data Analysis Final Results/Discussion Conference Proposal/Journal Manuscript Final Oral Presentation
Demonstrate proficiency in the introduction and justification of the need for a research study.	Review/Update of Pilot work Recruitment tool Conference Proposal/Journal Manuscript Final Oral Presentation
Demonstrate proficiency in the explanation of the methods chosen to answer a research question.	Review/Update of Pilot work Recruitment tool Conference Proposal/Journal Manuscript Final Oral Presentation
Demonstrate proficiency in the collection of data to answer a research question.	Review/Update of Pilot work Recruitment tool Data Collection Data Analysis
Demonstrate proficiency in the synthesis of data in order to present information via multiple media outlets.	Review/Update of Pilot work Final Results/Discussion Conference Proposal/Journal Manuscript Final Oral Presentation
Demonstrate proficiency in the presentation of research findings in oral form	Conference Proposal Final Oral Presentation
Develop and submit an abstract proposal for a conference and/or a manuscript for a peer-reviewed journal.	Conference Proposal/Journal Manuscript

STYLE and MODE

The course will utilize limited traditional lecture format with discussion. The majority of the class will be independent work through hands-on experience. The primary expectations of the course are for the student to independently set-up, collect, plan, analyze and present data carried out at a workplace related to biomechanics and human performance. The course will extend the student's knowledge and experience in the practical side of biomechanics and human performance. And, will allow the student the opportunity to develop and deliver well researched, properly organized scientific oral and written reports, proposals, or manuscripts. Student initiative, decision-making, and responsibility are emphasized throughout the course. A willingness to accept responsibility is essential for success in the class.

TEXTBOOKS:

Required: None

Handouts of pertaining material will be distributed through the online classroom.

PROJECT

Research Project/ Presentation

In order to give a better understanding of the research process as it pertains to the field of biomechanics. Each student will form a research question, develop the methods, write an IRB proposal, conduct pilot research on the defined topic, write an abstract on the project and present the results to faculty. The basis for the project began in HS475. You will need to correct any issues with your project at the beginning of the semester to allow for a better overall project in the end. See the Project guidelines at the end of the syllabus.

This project will be completed in the following progression.

1.Review/Update of Pilot work-
- IRB
- Introduction
- Literature review
- Methods
- Pilot Data Results
- Pilot Data Summary

2.Recruitment tool
3.Data Collection
4.Data Analysis
5.Final Results/Discussion
6.Conference Proposal and/or Journal Manuscript (undergraduates select one option)
7.Final Oral Presentation

This progression will allow the student to complete the project over time and will demonstrate goal setting by using deadlines for each component. Due dates and times are listed on the Agenda at the end of the syllabus

The conference proposal or journal manuscript is to follow the most common format of research writing in the field of biomechanics. This format is APA format and the newest edition (be sure to use the current edition for your paper). The format for the submission will be dictated by the intended journal or conference. Length will vary depending on the topic, but must cover the topic thoroughly. References should be professional journals (peered reviewed) and can include textbooks (but kept to a minimum)

GRADES: No assignments will be accepted after XXXX on the due date unless excused.

Undergraduate course grading

Review/Updateof Pilot work-	
IRB	20
Introduction	20
Literature review	20
Methods	20
Pilot Data Results	20
Pilot Data Summary	20
Recruitment tool	50
Data Collection	50
Data Anaylsis	75
Final Results/Discussion	100
Conference Proposal or Journal Manuscript	100
Final Presentation	100
TOTAL	*595*

Graduate course grading

Review/Updateof Pilot work-	
IRB	20

Introduction	20
Literature review	20
Methods	20
Pilot Data Results	20
Pilot Data Summary	20
Recruitment tool	50
Data Collection	50
Data Anaylsis	75
Final Results/Discussion	100
Conference Proposal	100
Journal Manuscript	100
Final Presentation	100
TOTAL	***695***

Grading Scale				
	A	93%+	827+	920+
	B	85-92%	756-826	841-919
	C	70-84%	623-755	693-840
	D	60-69%	534-622	594-692
	F	< 60%	< 534	< 594

Statement on Disruptive Classroom Behavior: The classroom is a special environment in which students and faculty come together to promote learning and growth. It is essential to this learning environment that respect for the rights of others seeking to learn, respect for the professionalism of the instructor, and the general goals of academic freedom are maintained. Differences of viewpoint or concerns should be expressed in terms in which students and faculty may learn to reason with clarity and compassion, to share of themselves without losing their identities, and to develop an understanding of the community in which they live. Student conduct that disrupts the learning process shall not be tolerated and may lead to disciplinary action and/or removal from class. Disruptive behavior also includes allowing your cell phone to ring in class. PLEASE BE CONSIDERATE AND TURN YOUR CELL PHONE OFF BEFORE CLASS BEGINS!!!

Copyright notice

Copyright law protects this syllabus, my lectures, and all materials distributed and presented by me during this course. You are authorized to take notes in this class, but that authorization extends only to making one set of notes for your own personal use and no other use. You are not authorized to sell, license, commercially publish, distribute, transmit, display, or record (audio or video) from this class unless you have my written consent to do so.

Important Notice

While the provisions of this syllabus are as accurate and complete as possible, I reserve the right to change any provision herein without actual notice if circumstances so warrant. Effort will be made to keep you advised of such changes and information about such changes will be available from me. It is your responsibility to know what changes, if any, have been made to the provisions of this syllabus and to successfully complete the requirements of this course.

Academic Integrity

Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving one's grade or obtaining course credit; such acts also include assisting another to do so. Typically such acts occur in relation to examinations. However, it is the intent of this definition that the term "cheating" not be limited to examination situations only, but that it includes any and all actions by a student that are intended to gain an unearned academic advantage by fraudulent or deceptive means.

Academic dishonesty includes:

- **CHEATING** - use or attempted use of unauthorized materials, information or study aids or an act of deceit by which a student attempts to misrepresent mastery of academic effort or information. Cheating includes unauthorized copying or collaboration on a test or assignment or using prohibited materials and texts.

- **FABRICATION** - falsification or invention of any information (including falsifying research, inventing or exaggerating data and listing incorrect or fictitious references.

- **ASSISTING** - helping another commit an act of academic dishonesty. Assisting includes paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, or taking a test/doing an assignment for someone else (or allowing someone to do these things for you). It is a violation of Oregon state law to create and offer to sell part or all of an education assignment to another person (ORS 165.114).

- **TAMPERING** - altering or interfering with evaluation instruments and documents.

- **PLAGIARISM** - representing the word or ideas of another person as one's own OR presenting someone else's words, ideas, artistry or data as one's own. Plagiarism includes copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project, then submitting it as one's own.

Penalties for cheating and plagiarism range from a zero or "F" on a particular assignment, through an "F" for the course, to expulsion from the university. Any act of academic dishonesty will result in University ramifications as outlined in the *Marshall University Student Handbook*, including failure of the course.

http://www.marshall.edu/library-biz/plagiarism/plagiarism.htm

AGENDA

Please note that this is a basic outline that will be followed as closely as is possible but there may be times that will necessitate a change from the posted schedule. Each student is responsible for keeping up with the class schedule, schedule changes and requirements including reading assignments.

Date	**Topic Coverage**	**Reading**	**Assignments**
Week 1	Syllabus	Syllabus	**IRB, Intorudction, Literature review, and Methods Review/Update**
Week 2	Data Collection		**Research participant recruitment begins – Recruitment tool**
Week 3	Data Collection		
Week 4	Data Collection		
Week 5	Data Collection		
Week 6	Data Collection		
Week 7	Data analysis		**DATA COLLECTED BY THIS DATE**
Week 8	Data analysis		
Week 9	Data analysis		
Week 10	Data analysis		**DATA ANALYSIS MUST BE COMPLETE BY THIS DATE**
Week 11	Statistics Review		
Week 12	Statistics Review		
Week 13	Results and Discussion		**Results and Discussion due**
Week 14	Writing & Presentation		
Week 15	Poster Presentations		**Final Confernce Proposal and/or Manuscript due** **Presentation Due**
Week 16	Poster Presentations		**Presentation Due**

Capstone Research Project. Part 2

Introduction
Today, much of the new scientific knowledge is first reported to the scientific community at a scientific conference. Usually, in order to present new scientific knowledge at such a conference, scientists must first submit a short abstract describing the findings of their scientific study. This semester you will be asked to work with two other classmates in researching a topic that involves biomechanics. Your group will need to prepare an abstract in a format similar to that used to submit for presentation at a scientific meeting.

Step One
You will continue on with the project that was begun in previous semester. You will review, modify, and/or correct methods, etc based upon feedback from last semester. This will be done by review all materials submitted for the previous class.

Step Two
You will develop a recruitment tool to recruit participants. The method must be approved by the faculty. Any public notifications must be approved as well.

Step Three
You will collect the data on the required number of subjects indicated in your proposal to the MU IRB. Do not wait until the last minute to do this. Others may also be using the same instruments as you. You will do this by the due date listed in the Agenda.

Step Four
You will analyze the data collected. You will set up the data in the appropriate manner to be statistically analyzed. You will run you own statistical analysis. You will also submit a copy of the properly set-up data tables to your faculty investigator for them to run your analysis. Do not wait until the last minute to do this. You will do this by the due date listed in the Agenda.

Step Five
You and your faculty investigator will select either a conference or a journal to target. You must be willing to present your findings at the particular conference, if that is the avenue chosen. Otherwise, you will develop a manuscript for submission to a journal or magazine. You will follow the chosen format dictated by the conference or journal. Graduate students must submit both a proposal and a manuscript.

Do not wait until the last minute to do this. Conferences have submission deadlines. However, if the deadlines for submission are not until after the class is ended. The conference proposal abstract/paper or manuscript is still due by the date listed in the Agenda. Also, your faculty advisor needs to proof this. They cannot perform miracles in getting items edited and back to you. It will also take more than one draft to perfect. So again, do not wait until the last minute for this process to start.

Step Six

You will prepare a final presentation of your results to present to the class.
You presentation will be 20-25 minutes in length with time for questions.
The following must be included in your presentation:

1) You will very ***briefly*** introduce your study and:
   Show the landmark studies
   Show the gaps and how your study fills those
   Details the following as it pertains to your study:
   - Limitations
   - Delimitations
   - Assumptions
   - Statement of the Problem
   - Hypothesis (written in Null format)
2) You will provide brief detail of your methods
3) You will provide complete relevant results
4) You will provide conclusions and practical application of your results
5) You will appropriately reference and cite literature within your presentation
6) You will use appropriate grammar and punctuation

COURSE ADDITION INFORMATION

HS 495/595 - 3 CREDIT HOURS
TRENDS IN BIOMECHANICAL ANALYSIS II

COURSE OBJECTIVES

Upon completion of this course students will be able to:

Critically analyze the strengths and weaknesses of a research paper.

Synthesize the existing body of knowledge pertaining to an area of research.

Demonstrate proficiency in the introduction and justification of the need for a research study.

Demonstrate proficiency in the explanation of the methods chosen to answer a research question.

Demonstrate proficiency in the collection of data to answer a research question.

Demonstrate proficiency in the synthesis of data in order to present information via multiple media outlets.

Demonstrate proficiency in the presentation of research findings in oral form

Develop and submit an abstract proposal for conference and a manuscript for a peer-reviewed journal.

COURSE OUTLINE

Date	**Topic Coverage**	**Reading**	**Assignments**
Week 1	Syllabus	Syllabus	**IRB, Intorudction, Literature review, and Methods Review/Update**
Week 2	Data Collection		**Research participant recruitment begins – Recruitment tool**
Week 3	Data Collection		
Week 4	Data Collection		
Week 5	Data Collection		
Week 6	Data Collection		
Week 7	Data analysis		**DATA COLLECTED BY THIS DATE**
Week 8	Data analysis		
Week 9	Data analysis		
Week 10	Data analysis		**DATA ANALYSIS MUST BE COMPLETE BY THIS DATE**

Week 11	Statistics Review		
Week 12	Statistics Review		
Week 13	Results and Discussion		**Results and Discussion due**
Week 14	Writing & Presentation		
Week 15	Poster Presentations		**Final Confernce Proposal and/or Manuscript due**
Week 16	Poster Presentations		**Presentation Due**

BIBLIOGRAPHY

SAMPLE TEXTS WITH AUTHORS

Kinetics of human motion Zatsiorsky, V. 2002 Champaign, IL: Human Kinetics. QP303 Z383

Kinematics of human motion Zatsiorsky, V. 2002 Champaign, IL: Human Kinetics. QP303 Z383

Biomechanics in Sport: Performance Enhancement and Injury Prevention Zatsiorsky, V. (Ed.)2000 Oxford: Blackwell Science. RC 1235 B476

Three-Dimensional Analysis of Human Locomotion Allard, P. et al. (Eds.) 1998 Ontario: JohnWiley & Sons. QP 303 T585

Three-Dimensional Analysis of Human Movement Allard, P., Stokes, I., & Blanchi, J. (Eds.)1995 Champain, IL: Human Kinetics. QP 303 T59

Enoka, R. Neuromechanics of Human Movement, Fourth Edition (2008). Human Kinetics. Champaign, IL

Gowitzke, B.A. and Milner, M. (1988). Scientific Bases of Human Movement. (3rd. ed.) Baltimore: Williams and Wilkins.

INSTRUCTIONAL METHODS

The primary expectations of the course are for the student to independently set-up, collect, plan, analyze and present data carried out at a workplace related to biomechanics and human performance. The course will extend the student's knowledge and experience in the practical side of biomechanics and human performance. And, will allow the student the opportunity to develop and deliver well researched, properly organized scientific oral and written reports, proposals, or manuscripts.

Chair: Tracy Christofero | **GC#7: Course Change**

Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

HS 615

College: Health Professions Dept/Division: SOK - Biomechaincs Current Alpha Designator/Number: GHCO-MS

Contact Person: Suzanne Konz Phone: 696-2926

CURRENT COURSE DATA:

Course Title: HS 615 Mechanical Analysis of Activity

Alpha Designator/Number: H S 6 1 5

Title Abbreviation: M e c h a n i c a l A n a l y s i s

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

Dept. Chair/Division Head	Date 9/29/16
Registrar 5111 99	Date 10-4-16
College Curriculum Chair	Date 10/13/16
Graduate Council Chair Christofero	Date 11-10-16

Request for Graduate Course Change - Page 2

College: Health Professions | Department/Division: SOK-Biomechanics | Alpha Designator/Number: GHCO-MS

Provide complete information regarding the course change for each topic listed below.

Change in CATALOG TITLE: ☒ YES ☐ NO

From: Mechanical Analysis of Activit (limited to 30 characters and spaces)

To: Kinematic Anal App Biomechanic

If Yes, Rationale: A better representation of the course and the content covered within the class. It is limits the confusion with other classes in the Biomechanics major,. And, it remove the redundancy in course titles.

Change in COURSE ALPHA DESIGNATOR:

From: ____ To: ____ ☐ YES ☐ NO

If Yes, Rationale:

Change in COURSE NUMBER: ☐ YES ☒ NO

From: ____ To: ____

If Yes, Rationale:

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale:

Change in CATALOG DESCRIPTION: ☒ YES ☐ NO IF YES, fill in below:

From: An investigation into the instrumentation used in biomechanical research and the effective use of it in biomechanical research.

To: This course entails a study of kinematics as it relates to the analysis of human movement involving the mechanical and anatomical characteristics of physical skills through the utilization research equipment.

If Yes Rationale: This course needs better distinction from HS 635. This course entails learning instrumentation and application of data from research tools that focus on kinematic data; where, HS 635 focuses on kinetic related data collection and analysis.

Request for Graduate Course Change - Page 3

Change in COURSE CREDIT HOURS: ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

Change in COURSE CONTENT: ☐ YES ☐ NO

From

To

Rationale

Request for Graduate Course Change-Page 4

College: Health Professions

Department: SOK - Biomechanics

Course Number/Title HS 615 Kinematic Analysis & Application in Biomechanics

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

YES

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

N/A

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

None

Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

COURSE DESCRIPTION CHANGE	COURSE NUMBER CHANGE	COURSE TITLE CHANGE
Department:	Department:	Department:
Course Number and Title:	Current Course Number/Title:	Current Course Number/Title:
Rationale:	New Course Number:	New Course Title:
Course Description (old)	Rationale:	Rationale:
Course Description: (new)	Catalog Description:	Catalog Description:
Catalog Description:	Credit hours:	

DESCRIPTION CHANGE
Department: SOK- Biomechanics
Course Number and Title: HS 615 Kinematic Analysis & Application in Biomechanics
Rationale: This course needs better distinction from HS 635. This course entails learning instrumentation and application of data from research tools that focus on kinematic data.
Course Description (old) - An investigation into the instrumentation used in biomechanical research and the effective use of it in biomechanical research.
Course Description: (new) -This course entails a study of kinematics as it relates to the analysis of human movement involving the mechanical and anatomical characteristics of physical skills through the utilization research equipment.
Catalog Description: This course entails a study of kinematics as it relates to the analysis of human movement involving the mechanical and anatomical characteristics of physical skills through the utilization research equipment.

COURSE TITLE CHANGE
Department: SOK-Biomechanics
Current Course Number/Title: HS 615Mechanical Analysis of Activity
New Course Title: HS 615 Kinematic Analysis & Application in Biomechanics
Rationale: This course needs better distinction from HS 635. This course entails learning instrumentation and application of data from research tools that focus on kinematic data; where, HS 635 focuses on kinetic related data collection and analysis.
Catalog Description: This course entails a study of kinematics as it relates to the analysis of human movement involving the mechanical and anatomical characteristics of physical skills through the utilization research equipment.

MARSHALL UNIVERSITY
COLLEGE OF HEALTH PROFESSIONS
HS 615 - 3 CREDIT HOURS
Kinematics Analysis and Application in Biomechanics
Spring 2016

Instructor: Suzanne M. Konz, PhD ATC CSCS
Office: Gullickson Hall 100D
Office Hours: MW 10-12:00PM
Email: konz@marshall.edu

Class Lecture: 9:30-10:45 AM T/TH
Class Location: GH 120 & Biomechanics Lab HC 1021

PREREQUISITES
HS 610 Advanced Biomechanics or equivalent, Fundamental Physics & Linear Algebra

CATALOG DESCRIPTION
This course entails a study of kinematics as it relates to the analysis of human movement involving the mechanical and anatomical characteristics of physical skills through the utilization research equipment.

PURPOSE/OVERVIEW OF COURSE
The purpose of the course is to provide students with the skills to perform research using instruments and software that help to advance biomechanical concepts and their applications to humans. The intent of this course is to fulfill the biomechanical analysis needs and interest of graduate students specializing in biomechanics, as well as, athletic training, and exercise physiology. This course may also meet the needs of students from other curricular areas who are interested in the study of the kinematics of biological systems.

This course is designed to provide students with an understanding of how to use various technologies in a biomechanics lab for measuring kinematics. These tools include accelerometers, electronic digitization, cinematography, computer analysis, stroboscopic photography, temporal analysis, videography, and visual evaluation techniques. Along with making measurements, students will also learn how to perform the calculations involved in analysis of collected data.

COURSE OBJECTIVES
Upon completion of this course, the student will be able:

1. Understand general concepts that are related to the collection and analysis of biomechanical data. Some of these concepts include: analog to digital conversion, sampling rate, frequency analysis, signal noise and filters, and other signal processing techniques and issues.
2. Understand how to use electromyography in order to better understand involved muscular activity during human motion.
3. Understand how to use several different instruments that can measure external load (force platform and load cell), in order to better understand forces that are involved during human motion.
4. Understand how to use various motion analysis instrumentation (primarily high speed videography and accelerometry) to evaluate the kinematics of human motion.
5. know how to combine kinematic and kinetic data, and perform inverse dynamics calculation in order to more fully understand the dynamics of human motion.

COURSE TOPIC OUTLINE

1. Overview
    a. Coordinate Systems
    b. 2-D vs 3-D
    c. Steps of Motion Analysis
2. Three-dimensional cinematography/videography
    a. Direct linear transformation (DLT) method
    b. Multiphase DLT method
    c. Non-linear transformation (NLT)
    d. Lab: Comparison of methods
3. Smoothing and differentiation methods

c. Non-linear transformation (NLT)
d. Lab: Comparison of methods

3. Smoothing and differentiation methods
    a. Overview of major methods
    b. Lab: Comparison of methods
4. Body segment inertial properties
    a. Overview of major studies
    b. Lab: Comparison of prediction methods
5. Three-dimensional analysis techniques
    a. Kinematics
    b. Linear and angular momentum
    c. Resultant joint forces and moments

TEXTBOOKS:

Required:
Robertson D.G.E., Caldwell G.E., Hamill J., Kamen G., & Whittlesey S.N. *Research Methods in Biomechanics*. Champaign, IL: Human Kinetics, 2004.

Suggested:
Winter, D. A., (1990). *Biomechanics and motor control of human movement* (2nd ed.). New York, NY: John Wiley & Sons.

Class Attendance. Attendance of class is the basis of the University concept and imperative for understanding of the course material. All class sessions are mandatory. You are expected to attend all classes. **Late to class is an absence. One letter grade will be deducted from the student's final grade that misses more than one (1) class session for unexcused absences. A second unexcused miss will result in an administrative withdrawal from the courseA third unexcused miss and the student will be asked to drop.** Qualified excused absences will be considered to be an illness, family crisis or approved institutional activity. This does not include routine medical appointments (unless of special nature and only with prior written notification and approval.). **A class miss counting as an excused absence must be verified, in writing with the instructor ahead of time if of a scheduled institutional activity.** However, it is inevitable that situations arise and a student might have to miss a class. It is the student's responsibility to notify the instructor prior to this absence OR as soon as possible in the event of an illness, accident, etc. The student must provide the instructor with **written documentation and verification within one week of the class missed.** It is also the student's responsibility to make up any work missed. No examinations, quizzes, etc will be allowed to be made up unless prior consent of instructor has been established. No examinations, quizzes, etc will be allowed to be made up unless communication with the instructor regarding illness or emergency has been established as soon as possible. **YOU ARE NOT ALLOWED TO MAKE UP AN UNEXCUSED ABSENCE OF AN EXAM, ASSIGNMENT, OR LAB**

Style/Mode. This class will be a mixture of independent reading, independent work, lecture, assignments, projects and written exams. I will be using online classroom for posting of articles and receiving of assignments or projects. Please check the online classroom for announcements or updates.

Email and Communication. It is required that students enrolled in this class use their Marshall email account as the primary means of communication. Emails that are forwarded to yahoo, etc. accounts often view messages coming from the University as spam. Therefore, any directions, updates, or feedback is often not seen by those who do not check their Marshall email account as a result of the spam filter. Information will also be placed on the online course site, so be sure to check the course web page often for updates. The instructor is not responsible for miscommunication if the student does not use his/her Marshall email accounts.

Timeliness. Class begins at xxxx and typically a quiz, an examination or important information will be administered or delivered at that time. Do not be late. You will not be allowed to hold up class do to your tardiness. Also, these events will not be re-scheduled or be allowed to be made up without PRIOR notification. Assignments are due at the beginning of class. All homework must be submitted via THE ONLINE CLASSROOM by xxxx the day it is due unless otherwise noted. NO LATE work will be accepted. NO EXCEPTIONS! Notify me ASAP if you are sick or need to miss an exam

or assignment for emergency type situations. We can make arrangements to get the missed work made up ASAP due to sickness or emergency.

Class Participation. Each student is expected to read assigned material prior to each class and actively participate in class discussion and activity. Participation in class discussion is highly encouraged and helps promotes understanding of the material. Just showing up for class does not equate to full participation. You must contribute, engage, and stay awake during class. Use the time provided to your benefit.

Course Grading

Minimum Requirement and Assignments
Students will be expected to participate in discussion and activities. NO LATE ASSIGNMENTS WILL BE ACCEPTED. All Assignments must be submitted via Digital Drop Box. All assignments are to be placed in their individual drop boxes. Your proof of turn in is the time and date stamp on MUONLINE. If an assignment is missed or late, a score of "0" will result. No late work will be allowed without a University excuse. The registrar's office sends me a notification of this. You will not be allowed to make up late/missed work until I receive an email from them. **Due dates are listed in the tentative course syllabus. I do not remind you as to what is due and when; that is your responsibility. NO LATE work will be accepted without a university excuse. NO EXCEPTIONS!**

Assignments & Activities Grading Breakdown

Class activities (50%)	
Mini Projects (4 @ 25 points)	100 points possible
Exams (10%)	
Final Exam	50 points possible
Term Project (40%)	
Project Mechanics	150 points possible
Project abstract	50 points possible
Presentation	50 points possible
TOTAL 100%	

Grading Scale	A	93%+
	B	85-92%
	C	70-84%
	D	60-69%
	F	< 60%

Mini-projects
Six mini-projects will be required during the term. They are designed to help you practice using the instrumentation in the biomechanics lab and determine appropriate interpretations of collected data.

#1: Projectile Motion (work alone on this project)

This project is designed to help you learn to derive characteristics of projectiles to determine the trajectory a projectile will follow

- Look at the projectile motion equations from the text.
- Write out the derivation of maximum height, horizontal displacement, and flight time (the long and short equations).
  - These will be shown in class
- Use the golf ball simulator (see link on MU ONLINE) to see what the optimal velocity is to get the ball in the cup for the following situations:
  - Angle of 20 deg with a range from 1.204 kg/m^3 to 0.77 kg/m^3
  - Angle of 20 deg and wind from -8 to +8 m/s
- Answer the following questions:

- What happens to the optimal velocity as air density is decreased (Be descriptive, is the slope linear)?
- What happens to the optimal velocity as wind goes from -8 to +8 m/s (Be descriptive, is the slope linear)?
- What happens to the optimal angle when going for maximum distance when using a velocity of 70 m/s as air dentisty goes down and gravity goes up (try air density of 1.0 kg/m^3 and g = -9.797 m/s^2 when compared with a starting air density of 1.2 kg/m^3 and g = -9.806 m/s^2)?

Turn in your derivations of the characteristics of projectile equations (probably handwritten). Turn in your responses to the questions (preferably typed).

#2: Velocity & Acceleration (work with one partner on this project)

This project is designed to help you learn to calculate velocity and acceleration from position and time data.

- Save the horizontal and vertical position data from the ball we will drop in class and track with the Vicon system
- Bring the horizontal and vertical position data into a spreadsheet.
- Calculate the velocity and acceleration horizontally vertically and create graphs of each (six graphs total).
- Answer the following questions
  - What is the vertical velocity of the ball at the highest point of the flight?
  - In theory, what should the horizontal acceleration of the ball be?
  - In theory, what should the vertical acceleration of the ball be?
  - Explain the discrepancies between the measured and theoretical accelerations.

#3: Angular Kinematics (work with one partner on this project)

You will learn in this project how angular momentum, angular velocity, and linear velocity all relate to each other in a tetherball game.

- We will measure the position of a ball attached to a string attached to a post as it spins around. The string will wrap around the pole leading to a shortening radius.
- You will have a spreadsheet showing the radius and the position.
- Calculate the angular inertia, angular momentum, and angular and linear velocities.
- Create graphs of the above variables versus time.

Turn in the spreadsheet

#4: DLT (work with one partner on this project)

This project will provide you practice with using Vicon Motus to perform a DLT and check the accuracy of it.

- Setup a survey pole calibration (The "Survey Template" will help you obtain coordinates).
- Follow the steps you learned in class for filming and digitizing a calibration in Vicon Motus
- Film a golf swing and digitize the end of the grip and the clubhead throughout the forwards motion of the swing.
- Answer the following questions:
  - How much did the velocity of the club decrease as a result of the impact?
  - How much did the length of the club from digitized coordinates vary from the actual club length?
  - What methods will you use to obtain the most accurate data when using Motus?

Turn in the responses to the questions and be prepared to discuss the answers in class.

#5: Running Mechanics (work alone on this project)

This project will provide you the opportunity to practice using the Vicon or Motus systems and pull information related to the mechanics of running as velocity is increased.

- Take any data you are interested in from Vicon after the data collection is performed in class.
- Create a graph of some characteristics you measured and write up about 150 words discussing what you found.

Turn in the responses to the questions and be prepared to discuss your project in class.

Term Pilot Project

You will complete a term project with the purpose of utilizing equipment that may be of help to you during your thesis. Topics should relate to the material presented in class. Topics should be considered as soon as possible, as they need to be cleared by the instructor. These may be group or individual projects. If students choose to work in a group,The number in the group maybe no more than 2. The contributions of all students involved must be listed following the list of references. Group members must be declared no later than XXXX. Each group member must make a notable contribution to the assignment.

Format - Projects must be word processed (Minimums: 10pt, 1.5 spaced, 1" margins), and follow the general guidelines set forth by the Marshall University Office of Research Integrity IRB format. You should also include the following sections:

- Abstract: 150 words or less. Sub-headings are optional. This part may be single spaced.
- Introduction and Rationale – Include some background, previous studies, and why the proposed study is important. This section should include a respectable review of literature, covering critical articles related to the rationale, methods and anticipated results of your study. Basically, get out your rationale for wanting to do the study and include literature citations.
- Purpose – This needs to be measurable and clearly stated purpose and hypothesis(es).
- Methods – Address the following where appropriate: Subjects, Task, Trials, Visits, Variables, How variables will be measured, Instruments/Equipment used and any important specifications (e.g. sampling rate, specific method), anticipated filtering or post-processing, calculations used to derive variables, statistics you plan to use. You don't have to go into extreme detail, but get the important stuff in there.
- Anticipated Results, Discussion, Conclusions and Future Direction – Relate your expected results back to your hypotheses and introduction. Elaborate on any future research you think your study will lead to, or gaps that your study may fill. Cover anything you discern as important regarding your study.
- References – Follow APA or other peer-reviewed publication journal format (number or author in-text reference style is acceptable). A minimum of 8 references should be utilized. You will likely have more.
- Author Contributions and Appendix – Only for group projects. Present names and contributions of each student proposal author. Include any equations, large diagrams, or pertinent information not fitting in text.

Assessment will be based on: 1) Title and adequate references; 2) Format (text and references); 3) Clarity of the study's significance and purpose; 4) Overall organization; 5) Spelling and grammar; 6) Thoroughness and content within each section; 7) Paragraph flow and transition; 8) Synthesis of material presented in introduction and discussed. Each proposal will be presented to the class near the end of the semester. Rubric will be posted online.

Oral Presentations: We will do 2 to 3 presentations per day on the last two days of class. This will allow for approximately 15-20 minutes per presentation. Each student will therefore have 15-17 minutes to present, and 3-5 minutes will be given for questions and answers. Presentations should be of professional quality – i.e. present as if this were a conference. An overhead LCD projector will be available for giving PowerPoint presentations.

Final Exam

One exam will be completed during finals week. It will cover information from all chapters discussed in class. Some of it will be solving mathematical problems and others will be short answer problems dealing with methodology, interpretation, limitations, and assumptions.

Collaborative Work

Collaborative work is not allowed unless otherwise specified. No homework assignments, quizzes, or test will be completed via group work. You are to complete on your own. Any evidence of copying or sharing of homework assignments, quizzes, tests, practical exams will result in the implementation of the Marshall Academic Integrity Policy.

Copyright notice

Copyright law protects this syllabus, my lectures, and all materials distributed and presented by me during this course. You are authorized to take notes in this class but that authorization extends only to making one set of notes for your own personal use and no other use. You are not authorized to sell, license, commercially publish, distribute, transmit, display, or record (audio or video) from this class unless you have my written consent to do so.

Important Notice

While the provisions of this syllabus are as accurate and complete as possible I reserve the right to change any provision herein without actual notice if circumstances so warrant. Effort will be made to keep you advised of such changes and information about such changes will be available from me. It is your responsibility to know what changes, if any, have been made to the provisions of this syllabus and to successfully complete the requirements of this course

Academic Integrity

Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving one's grade or obtaining course credit; such acts also include assisting another to do so. Typically such acts occur in relation to examinations. However, it is the intent of this definition that the term "cheating" not be limited to examination situations only, but that it includes any and all actions by a student that are intended to gain an unearned academic advantage by fraudulent or deceptive means.

Academic dishonesty includes:

CHEATING - use or attempted use of unauthorized materials, information or study aids or an act of deceit by which a student attempts to misrepresent mastery of academic effort or information. This includes unauthorized copying or collaboration on a test or assignment or using prohibited materials and texts.

FABRICATION - falsification or invention of any information (including falsifying research, inventing or exaggerating data and listing incorrect or fictitious references.

ASSISTING - helping another commit an act of academic dishonesty. This includes paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, or taking a test/doing an assignment for someone else (or allowing someone to do these things for you). It is a violation of Oregon state law to create and offer to sell part or all of an education assignment to another person (ORS 165.114).

TAMPERING - altering or interfering with evaluation instruments and documents.

PLAGIARISM - representing the word or ideas of another person as one's own OR presenting someone else's words, ideas, artistry or data as one's own. This includes copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project, then submitting it as one's own.

Penalties for cheating and plagiarism range from a zero or "F" on a particular assignment, through an "F" for the course, to expulsion from the university. Any act of academic dishonesty will result in University ramifications as outlined in the *Marshall University Student Handbook*, including failure of the course.
http://www.marshall.edu/library-biz/plagiarism/plagiarism.htm

Academic Accommodation: In order for students with disabilities to receive the proper academic accommodation(s) they must provide documentation from the Disabled Student Services, HELP Program, or other M.U. approved programs to the class professor prior to exams, quizzes, etc. ESSR policy states that all exams are to be taken in Gullickson Hall at an appropriate location approved by the professor on the regularly scheduled exam date/time. Exam proctors must meet with the course professor prior to the exam to have content/process explained to him/her.

Statement on Disruptive Classroom Behavior: The classroom is a special environment in which students and faculty come together to promote learning and growth. It is essential to this learning environment that respect for the rights of others seeking to learn, respect for the professionalism of the instructor, and the general goals of academic freedom are maintained. Differences of viewpoint or concerns should be expressed in terms in which students and faculty may learn to reason with clarity and compassion, to share of themselves without losing their identities, and to develop an understanding of the community in which they live. Student conduct that disrupts the learning process shall not be tolerated and may lead to disciplinary action and/or removal from class. Disruptive behavior also includes allowing your cell phone to ring in class. PLEASE BE CONSIDERATE AND TURN YOUR CELL PHONE OFF BEFORE CLASS BEGINS!!!

MARSHALL UNIVERSITY POLICICES

See the following link for Marshall University Policies related to the listed topics. (http://www.marshall.edu/academic-affairs/?page_id=802)

I. Academic Dishonesty
II. Excused Absence Policy for Undergraduates
III. University Computing Service Acceptable Use
IV. Inclement Weather
V. Dead Week
VI. Students with Disabilities
VII. Academic Dismissal
VIII. Academic Forgiveness
IX. Academic Probation and Suspension
X. Academic Rights and Responsibilities of Students
XI. Affirmative Action

TENATIVE COURSE SCHEDULE

Week	Week of...	Topic Covered	Reading Due	Assignment Due
1	Jan 13	Introduction	Syllabus Chapters 1	
2	Jan. 20	Kinovea/Dartfish	Chapters 2 Mini Project #1	
3	Jan. 27	Vicon Motus	Chapter 3	
4	Feb. 3	Cameras and Optics	Chapters 10	
5	Feb 10	DLT	Mini Project #2	Mini Project #1
6	Feb 17	Vicon MX	Chapter 5	
7	Feb 24	Vicon MX	Mini Project #3	
8	Mar 3	Filtering	Chapters 11	
9	Mar 10	Linear Kinematics	Chapter 4	Min Project #2
		SPRING BREAK MAR 18-22		
10	Mar 24	Angular Kinematics		
11	Mar 31	XOS sport motion		Min Project #3
12	Apr 7	XOS sport motion	Chapters 7	
13	Apr 14	Gait Mechanics Walking Running	Mini Project #4	
14	Ape 21	Gait Mechanics Walking Running		Mini Project #4
16	Apr 28	Term Project Presentations		Term Project
Finals Week	May 5			

Chair: Tracy Christofero | **GC#7: Course Change**

Request for Graduate Course Change

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. ***The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.***

HS 635

College: Health Professions Dept/Division: School of Kinesiolog Current Alpha Designator/Number: GHC0-MS

Contact Person: Dr Suzanne Konz Phone: (304) 696-2926

CURRENT COURSE DATA:

Course Title: Research Methods in Biomechanics

Alpha Designator/Number: H S 6 3 5

Title Abbreviation: R e s e a r c h M e t h B i o

1. Complete this **five** page form in its entirety and route through the departments/committees below for changes to a course involving: course title, alpha designator, course number, course content, credit hours, or catalog description.
2. If this change will affect other departments that require this course, please send a memo to the affected department and include it with this packet, as well as the response received from the affected department.
3. If the changes made to this course will make the course similar in title or content to another department's courses, please send a memo to the affected department and include it with this packet as well as the response received from the affected department.
4. List courses, if any, that will be deleted because of this change (*must submit course deletion form).*
5. If the faculty requirements and/or equipment need to be changed upon approval of this proposal, attach a written estimate of additional needs.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

Dept. Chair/Division Head	Date 9/29/16
Registrar 511199	Date 10-4-16
College Curriculum Chair	Date 10/18/16
Graduate Council Chair Christofero	Date 11-10-16

Request for Graduate Course Change - Page 2

College: Health Professions | Department/Division: School of Kinesiology | Alpha Designator/Number: GHC0-MS

Provide complete information regarding the course change for each topic listed below.

Change in CATALOG TITLE: ☒ YES ☐ NO

From: Research Meth Bio (limited to 30 characters and spaces)

To: Kinetics in Biomech

If Yes, Rationale: This change reflects the shift in focus of the course to cover kinetic research methods in particular. This also aligns the course in the biomechanics program with the partner course HS 615, which will cover kinematic research methods.

Change in COURSE ALPHA DESIGNATOR:

From: ____ To: ____ ☐ YES ☒ NO

If Yes, Rationale:

Change in COURSE NUMBER: ☐ YES ☒ NO

From: ____ To: ____

If Yes, Rationale:

Change in COURSE GRADING

From ☐ Grade To ☐ Credit/No Credit

Rationale:

Change in CATALOG DESCRIPTION: ☒ YES ☐ NO IF YES, fill in below:

From: This course is designed to provide students with an understanding of how to 1) use various technologies in a biomechanics lab for measuring kinematics and 2) develop effective methods to answer the research questions within a study. Along with making measurements and method development, students will also learn how to perform the calculations involved in analysis of collected data.

To: Students will gain knowledge regarding biomechanics technologies to measure kinetics, acquire the skills to investigate forces and the human body, and learn how to process, analyze, and interpret kinetic data.

If Yes Rationale: This change reflects the shift in focus of the course to cover kinetic research methods. This also aligns the course in the biomechanics program with the partner course HS 615, which will cover kinematic research methods.

Change in COURSE CREDIT HOURS: ☐ YES ☒ NO If YES, fill in below:

NOTE: If credit hours increase/decrease, please provide documentation that specifies the adjusted work requirements.

From

To

Change in COURSE CONTENT: ☒ YES ☐ NO

From: The use various technologies in a biomechanics lab for measuring kinematics.

To: The use of biomechanics technologies to measure kinetics, applied to investigate forces and the human body by collecting, processing, analyzing, and interpreting kinetic data.

Rationale: This change will direct the focus of the course to the area of kinetics in biomechanics. Students will still learn how to use various technologies in a biomechanics lab, however, these will be technology related to measuring forces. Students will still learn how to process and analyze data, however, these will be force-related data. With the associated realignment of HS 615 to focus on kinematic research methods, this provides a more directed course sequence.

Request for Graduate Course Change-Page 4

College: Health Professions

Department: School of Kinesiology

Course Number/Title HS 635

1. REQUIRED COURSE: If this course is required by another department(s), identify it/them by name and attach the written notification you sent to them announcing to them the proposed change and any response received. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

2. COURSE DELETION: List any courses that will be deleted because of this change. A *Course Deletion* form is also required. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

3. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials as a result of this change, attach an estimate of the time and cost etc. required to secure these items. (NOTE: approval of this form does not imply approval for additional resources. Enter NOT APPLICABLE if not applicable.

NOT APPLICABLE

Request for Graduate Course Change - Page 5

Please insert in the text box below your course change summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings) based on the appropriate change:

COURSE DESCRIPTION CHANGE	COURSE NUMBER CHANGE	COURSE TITLE CHANGE
Department:	Department:	Department:
Course Number and Title:	Current Course Number/Title:	Current Course Number/Title:
Rationale:	New Course Number:	New Course Title:
Course Description (old)	Rationale:	Rationale:
Course Description: (new)	Catalog Description:	Catalog Description:
Catalog Description:	Credit hours:	

COURSE DESCRIPTION CHANGE
Department: School of Kinesiology
Course Number and Title: HS 635
Rationale: This change reflects the shift in focus of the course to cover kinetic research methods. This also aligns the course in the biomechanics program with the partner course HS 615, which will cover kinematic research methods.
Old Course Description: This course is designed to provide students with an understanding of how to 1) use various technologies in a biomechanics lab for measuring kinematics and 2) develop effective methods to answer the research questions within a study. Along with making measurements and method development, students will also learn how to perform the calculations involved in analysis of collected data.
New Course Description: Students will gain knowledge regarding biomechanics technologies to measure kinetics, acquire the skills to investigate forces and the human body, and learn how to process, analyze, and interpret kinetic data.

COURSE NUMBER CHANGE
No change to course number or credit hours.

COURSE TITLE CHANGE
Department: School of Kinesiology
Current Course Number/Title: HS 635 Research Methods in Biomechanics
New Course Title: Kinetic Analysis and Application in Biomechanics
Rationale: This change reflects the shift in focus of the course to cover kinetic research methods in particular.
Catalog Description: Students will gain knowledge regarding biomechanics technologies to measure kinetics, acquire the skills to investigate forces and the human body, and learn how to process, analyze, and interpret kinetic data.

Chair: Tracy Christofero | **GC#9: Non-Curricular**

Request for Graduate Non-Curricular Changes

PLEASE USE THIS FORM FOR ALL NON-CURRICULAR CHANGE REQUESTS (changes in admission requirements or requirements for graduation, changes in or new policies/procedures, changes in program descriptions in catalog, general language changes in catalog.)

SIGNATURES may not be required, depending on the nature of the request and from where it originates. Consult Graduate Council chair.

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one PDF copy without signatures to the Graduate Council Chair.
3. The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.

College: COHP

Dept/Division: Nursing

Contact Person: Rebecca Appleton

Phone: 6-2632

Rationale for Request

(May attach separate page if needed)

Pre. and Co. requisites updated.

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.
NOTE: all requests may not require all signatures.

Department/Division Chair [signature]	Date 9/6/16
Registrar [signature] 513802	Date
College Curriculum Committee Chair (or Dean if no college curriculum committee) [signature]	Date 10/13/16
Graduate Council Chair [signature]	Date 11-10-16

NOTE: please complete information required on the following pages before obtaining signatures above.

Request for Graduate Non-Curricular Changes-Page 2

1. **Current Catalog Description (if applicable)**: Please insert the catalog description from the current catalog for entries you would like to change. (May attach separate page if needed)

606 **Advanced Nursing Research. 3 hrs.**
Provides the opportunity to develop a research approach to nursing situations. Focus is upon the development of a research proposal.
PR: NUR 602

608 **Issues in Health Care. 3 hrs.**
Explores and evaluates concerns germane to contemporary nursing. Focus is upon the role of nursing in addressing health issues affected by social, economic, political, and technological forces. Admission to MSN program or permission.

616 **Curriculum Development in Nursing. 3 hrs.**
Introduces the various component in the curriculum development process. Emphasis is on philosophy, objectives, curriculum designs, and program evaluation. Factors influencing curriculum development, implementation, evaluation, and nursing curriculum patterns are examined.
(PR: NUR 606 or permission)

618 **Teaching in Nursing. 3 hrs.**
Investigates the responsibilities of the educator in contemporary nursing. Emphasis is upon the instructional process. Practicum allows student t to practice the role of the teacher in a variety of educational experiences. (PR: NUR 606 or permission).

619 **Practicum: Teaching in Nursing. 6 hrs.**
Guided experience in didactic teaching of nursing clinical teaching, supervision and evaluation of students. (PR: NUR 618 & NUR 616).

620 **Advanced Pathophysiology I. 2 hrs.**
Advanced knowledge of body systems altered by disease and/or injury. The body systems or diseases studied will include: cell. Cardiovascular, pulmonary, digestive, musculoskeletal, neurologic and reproductive across the lifespan. PR: Admission to MSN program or permission

622 **Advanced Physical Assessment. 5 hrs.**
Introduction to knowledge and skills essential for comprehensive health assessments, analysis of data, formulation of diagnoses, development of the therapeutic plans, and implementation of health promotion and maintenance activities. Practicum included.

624 **Advanced Family Nursing Practice I. 5 hrs.**
Provides advanced knowledge and nursing management of common and acute self-limiting health problems of individuals and families of various age groups. Includes pathology and therapeutic modalities related to specific health problems. Practicum included. (PR: NUR 622)

626 **Advanced Family Nursing Practice II. 5 hrs.**
Provides advanced knowledge of chronic illness and the long-term nursing management of health care problems. Includes pathology and therapeutic modalities related to management of chronic health problems. Practicum included. (PR: NUR 624)

642 **Organizational Dynamics in Nursing. 3 hrs.**
Focus is upon the organizational dynamics as they apply to the nurse manager role in health care delivery systems CO or PR 604.

646 **Nursing Management in Health Care Settings I. 6 hrs.**
Focuses on the application of theories and principles related to nursing management. Practicum included. PR: NUR 642 & NUR644 & NUR 606.

663 **Advanced Pharmacology I. 2 hrs.**
Focus on the science of drugs and the application to patient care across the lifespan. Principles of pharmacology covered include infectious diseases, fluids and electrolytes, peripheral nervous and cardiovascular systems. PR: Admission to MSN program or permission

695 **Internship: Advanced Family Nursing. 6 hrs.**
Focus is upon the role of the family nurse practitioner using the case management approach in a supervised contractual work study arrangement with a health care agency. (400 hrs. minimum) (PR: NUR 626)

Request for Graduate Non-Curricular Changes-Page 3

2. **Edits to current description:** Attach a PDF copy of the current catalog description prepared in MS WORD with strikethroughs to mark proposed deletions and use the highlight function to indicate proposed new text.

606 **Advanced Nursing Research. 3 hrs.**
Provides the opportunity to develop a research approach to nursing situations. Focus is upon the development of a research proposal. ~~(PR: or concurrent NUR 602 or Perm)~~ PR: NUR 602

608 **Issues in Health Care. 3 hrs.**
Explores and evaluates concerns germane to contemporary nursing. Focus is upon the role of nursing in addressing health issues affected by social, economic, political, and technological forces.PR: Admission to MSN program or permission.

616 **Curriculum Development in Nursing. 3 hrs.**
Introduces the various component in the curriculum development process. Emphasis is on philosophy, objectives, curriculum designs, and program evaluation. Factors influencing curriculum development, implementation, evaluation, and nursing curriculum patterns are examined.
(PR: NUR 606 or permission)

618 **Teaching in Nursing. 3 hrs.**
Investigates the responsibilities of the educator in contemporary nursing. Emphasis is upon the instructional process. Practicum allows student t to practice the role of the teacher in a variety of educational experiences. (PR: NUR 606 or permission).

619 **Practicum: Teaching in Nursing. 6 hrs.**
Guided experience in didactic teaching of nursing clinical teaching, supervision and evaluation of students. (PR: NUR 618 & NUR 616).

620 **Advanced Pathophysiology I. 2 hrs.**
Advanced knowledge of body systems altered by disease and/or injury. The body systems or diseases studied will include: cell. Cardiovascular, pulmonary, digestive, musculoskeletal, neurologic and reproductive across the lifespan. ~~(PR: Permission of instructor)~~ P R: Admission to MSN program or permission

622 **Advanced Physical Assessment. 5 hrs.**
Introduction to knowledge and skills essential for comprehensive health assessments, analysis of data, formulation of diagnoses, development of the therapeutic plans, and implementation of health promotion and maintenance activities. Practicum included. ~~(PR or concurrent: NUR 602, NUR 604)~~

624 **Advanced Family Nursing Practice I. 5 hrs.**
Provides advanced knowledge and nursing management of common and acute self-limiting health problems of individuals and families of various age groups. Includes pathology and therapeutic modalities related to specific health problems. Practicum included. (PR: NUR 622, ~~PR or concurrent: NUR 606~~)

626 **Advanced Family Nursing Practice II. 5 hrs.**
Provides advanced knowledge of chronic illness and the long-term nursing management of health care problems. Includes pathology and therapeutic modalities related to management of chronic health problems. Practicum included. (PR: NUR 624)

642 **Organizational Dynamics in Nursing. 3 hrs.**
Focus is upon the organizational dynamics as they apply to the nurse manager role in health care delivery systems. CO or PR: NUR 604

646 **Nursing Management in Health Care Settings I. 6 hrs.**
Focuses on the application of theories and principles related to nursing management. Practicum included. ~~(PR or concurrent: NUR 604, NUR 606; PR: NUR 642, NUR 644)~~ PR: NUR 642 & NUR644 & NUR 606.

663 **Advanced Pharmacology I. 2 hrs.**
Focus on the science of drugs and the application to patient care across the lifespan.Principles of pharmacology covered include infectious diseases, fluids and electrolytes, peripheral nervous and cardiovascular systems. ~~(PR: instructor permission)~~ PR: Admission to MSN program or permission

695 **Internship: Advanced Family Nursing. 6 hrs.**
Focus is upon the role of the family nurse practitioner using the case management approach in a supervised contractual work study arrangement with a health care agency. (400 hrs. minimum) (PR: NUR 626)

Graduate Council
Request for Non-Curricular Changes-Page 4

3. **New Catalog Description**: Provide a "clean" copy of your proposed description without strikethroughs or highlighting. This should be what you are proposing for the new description. (May attach separate page if needed)

606 **Advanced Nursing Research. 3 hrs.**
Provides the opportunity to develop a research approach to nursing situations. Focus is upon the development of a research proposal.
PR: NUR 602

608 **Issues in Health Care. 3 hrs.**
Explores and evaluates concerns germane to contemporary nursing. Focus is upon the role of nursing in addressing health issues affected by social, economic, political, and technological forces. Admission to MSN program or permission.

616 **Curriculum Development in Nursing. 3 hrs.**
Introduces the various component in the curriculum development process. Emphasis is on philosophy, objectives, curriculum designs, and program evaluation. Factors influencing curriculum development, implementation, evaluation, and nursing curriculum patterns are examined.
(PR: NUR 606 or permission)

618 **Teaching in Nursing. 3 hrs.**
Investigates the responsibilities of the educator in contemporary nursing. Emphasis is upon the instructional process. Practicum allows student t to practice the role of the teacher in a variety of educational experiences. (PR: NUR 606 or permission).

619 **Practicum: Teaching in Nursing. 6 hrs.**
Guided experience in didactic teaching of nursing clinical teaching, supervision and evaluation of students. (PR: NUR 618 & NUR 616).

620 **Advanced Pathophysiology I. 2 hrs.**
Advanced knowledge of body systems altered by disease and/or injury. The body systems or diseases studied will include: cell. Cardiovascular, pulmonary, digestive, musculoskeletal, neurologic and reproductive across the lifespan. PR: Admission to MSN program or permission

622 **Advanced Physical Assessment. 5 hrs.**
Introduction to knowledge and skills essential for comprehensive health assessments, analysis of data, formulation of diagnoses, development of the therapeutic plans, and implementation of health promotion and maintenance activities. Practicum included.

624 **Advanced Family Nursing Practice I. 5 hrs.**
Provides advanced knowledge and nursing management of common and acute self-limiting health problems of individuals and families of various age groups. Includes pathology and therapeutic modalities related to specific health problems. Practicum included. (PR: NUR 622)

626 **Advanced Family Nursing Practice II. 5 hrs.**
Provides advanced knowledge of chronic illness and the long-term nursing management of health care problems. Includes pathology and therapeutic modalities related to management of chronic health problems. Practicum included. (PR: NUR 624)

642 **Organizational Dynamics in Nursing. 3 hrs.**
Focus is upon the organizational dynamics as they apply to the nurse manager role in health care delivery systems CO or PR 604.

646 **Nursing Management in Health Care Settings I. 6 hrs.**
Focuses on the application of theories and principles related to nursing management. Practicum included. PR: NUR 642 & NUR644 & NUR 606.

663 **Advanced Pharmacology I. 2 hrs.**
Focus on the science of drugs and the application to patient care across the lifespan. Principles of pharmacology covered include infectious diseases, fluids and electrolytes, peripheral nervous and cardiovascular systems. PR: Admission to MSN program or permission

695 **Internship: Advanced Family Nursing. 6 hrs.**
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Graduate Council
Request for Non-Curricular Changes-Page 5

Please insert in the text box below your proposed change information for the Graduate Council agenda. Please enter the information exactly in this way (including headings):

Type of change request:
Department:
Degree program:
Effective date *(Fall/Spring/Summer, Year)*

Type of change request: Change of Pre. and Co. requisite requirements
Department: Nursing
Degree program: MSN
Effective Date: Spring 2017