Analysis of Human Performance  
PED 303-01

Time: 9:00-9:50 MTWR  
Location: Wh 301  
Instructor: J. Grant White  
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Ext: 1350  
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Website: [Exercise Physiology: The Methods and Mechanisms Underlying Performance](http://home.hia.no/~stephens/exphys.htm)

On-Line Course Syllabus: [www.northland.edu/oe -> Courses -> Analysis of Human Performance Listing -> Syllabus](www.northland.edu/oe)

Please note: Students in need of academic or medical accommodation should contact Patti Fenner-Leino, @ ext. 1230, Rm. 229 of the Ponzio Center.

Attention: It is essential that all Northland students check their Northland College Email accounts, on a regular basis, to keep up to date on information regarding the H 1, N 1 Influenza outbreak

Course Overview

This course combines the two dissimilar disciplines of Exercise Physiology and Biomechanics that share the characteristic of helping to explain the workings of the human body while in motion. Exercise physiology deals with the reactions and adaptations of human internal systems to the stimulation of exercise. The field of Biomechanics results when principles of mechanical physics are applied to human motion. This course will offer the student the opportunity to develop concepts based on fundamental scientific principles in each area and to apply them to meaningful, real life situations.

Your instructor believes that each academic discipline develops its own system of thought, which is the basis for understanding all existing information and synthesizing new ideas in that field. More than anything else, it is his wish to use the information and ideas presented in this course to foster an understanding among his students of the system of thought in this particular subject area. While retention of the specific information presented in this class will be short term (unless it is reinforced by frequent use), the concepts and ideas that constitute the “system of thought” will persist and will enable the student to recover the forgotten specifics, explore and understand other related information, and to remain current, active, and creative in this field.
The instructor will attempt at all times to help students to develop concepts from the information taught, and to relate the material to familiar life experiences and to future applications in a vocational setting.

It is imperative that students understand that this information is truly alive and useful and does not merely represent an attempt on the part of the college to make their lives difficult. Mastery of this material will help students to analyze motion, diagnose movement and technique errors, manipulate a variety of physiological and mechanical variables in adapting activities for participants with mixed abilities, incorporate scientifically sound principles into training, performance, and technique, and become intelligent and informed consumers of the professional and popular literature in this field.

**Outcomes**
Upon completion of this course, students will have developed a:

- Functional (conceptual) understanding the food fuel and bioenergetics

- Functional (conceptual) understanding of energy metabolism:
  - how it changes in response to changes in exercise intensity
  - how it can be targeted in interval training
  - how it can be enhanced through other specific training methodologies

- Functional (conceptual) understanding of the physiology of muscular contraction, muscle fiber types, their recruitment, and response to training

- Functional (conceptual) understanding of the Vestibular and Kinesthetic receptors and their functions in:
  - monitoring movement
  - facilitation/inhibition of contraction
  - performance contexts
  - plyometric training methods

**The Course Progression**
*What follows should be understood to represent a general progression of the class. Content and timing will vary according to the needs and interests of the class.*

**Week 1**
Course intro. /overview; food fuels--carbohydrate, protein, fat, and their effects on health, performance, and body composition

Read chaps. 1 & 2 MK&K

**Week 2**
Food fuels continued

Read chap. 3 MK&K

**Week 3**
Finish food fuels, energy overview, introduce energy transfer

Read chaps. 4 & 5 MK&K
Week 4
Metabolic pathways for energy transfer
Read chaps. 6 & 7 MK&K

Week 5
Aerobic and anaerobic work, energy metabolism and exercise
Read chaps. 8 & 9 MK&K,
Maximal Oxygen Consumption- The VO$_2$ MAX
http://home.hia.no/~stephens/vo2max.htm

Week 6
“Oxygen dept” and recovery from exercise
Read chaps. 10 & 11 MK&K,
The Lactate Threshold <http://home.hia.no/~stephens/lacthres.htm>,
Efficiency and Endurance Performance <http://home.hia.no/~stephens/effiperf.htm>

Week 7
Fall Break: No Classes

Week 8
Interval training and aerobic conditioning methods
Read chap. 21 MK&K,
Principles of Training- Revisited <http://home.hia.no/~stephens/traprin.htm>,
Understanding Intervals: Matching training characteristics to physiological changes
http://home.hia.no/~stephens/interval.htm,
The effects of age and exercise on short term maximal performance: A model based on physiological systems <http://home.hia.no/~stephens/maxpower.htm>,
Myocardial Adaptations to Training <http://home.hia.no/~stephens/hrttrn.htm>
Understanding Heart Rate and Exercise
<http://home.hia.no/~stephens/hrchngs.htm>,
The Time Course of Training Adaptations
<http://home.hia.no/~stephens/timecors.htm>

Week 9
Muscle structure and function from gross to microscopic (physiology of contraction),
fiber type, implications of fiber type on performance
Read chap. 18 MK&K,
Basic Skeletal Muscle Physiology <http://home.hia.no/~stephens/musfacts.htm>,
Skeletal Muscle Fiber Type <http://home.hia.no/~stephens/fibtype.htm>

Week 10
Training muscles for strength
Read chap. 22 MK&K,
Training Adaptations in Skeletal Muscle
<http://home.hia.no/~stephens/mustrn.htm>,
Aging Effects on Skeletal Muscle <http://home.hia.no/~stephens/musage.htm>
**Week 11**
Overview of the Nervous System, overview of the physiology of nerve transmission, the interaction between the nervous and muscular systems

Read chap. 19 MK&K,
The Brain-Body Link and Adaptation to Training <http://home.hia.no/~stephens/brnbody.htm>

**Week 12**
Kinesthetic and Vestibular Systems

Read pp. 101-120 H&K

**Week 13**
Basic Biomechanics terminology and concepts, concepts of motion, types, displacement/distance, speed/velocity, acceleration, trajectories

**Week 14**
Linear motion, Newton’s laws, forces and their effects

**Lecture Exams**
Lecture exams will take the form of a series of guided investigations (take-home exams) the nature of which will be explained in class. The pervasive theme will be application of the information in question to solve problems that are practical and relevant to the future work and play of the students in the class.

**Grading**
Grades in this class will be calculated on a straight percentage basis. This is accomplished by dividing the number of points earned by the total number of points possible. I do not grade on improvement except to the extent that improved scores will bolster the student’s overall point total. Full and enthusiastic class participation is expected of all students and should not be viewed as something extra that can be counted on to compensate for poor performance on written assignments.

The grading scale is as follows: 93-100 A; 90-92 A-; 87-89 B+; 83-86 B; 80-82 B-; 77-79 C+; 73-76 C; 70-72 C-; 67-69 D+; 60-66 D; 0-59 F.

**Attendance**
Due to increasing problems with inattendance, it has become necessary to restate and reassert the attendance policy for this class. Understand that a grade in a class, in effect, certifies that the student has been exposed to the curriculum as described in the syllabus, has participated in all activities associated with the class, and has completed all assignments to a degree reflected in the final grade. In other words, **you must attend the class, in order to pass the class!**

*That being said, the policy for attendance and late assignments with respect to grading is as follows:*
Attendance in this class **does count** with **1 point** being deducted from your final point total for each hour of unexcused absence. Excused absences include such things as illness, certain family obligations, and certain school sponsored activities and trips. Studying for an exam for another class is **not** an excused absence on the basis of it being a school sponsored activity. Misses can be made up by writing and submitting a paper which covers the material covered in class on the day in question. **Under no circumstances should a student assume that by merely submitting a paper, they have made up for 100% of the class missed.** In order to be considered equivalent, the paper must be of adequate length, substance, and quality based on the judgment of the course professor. For purposes of calculating a final grade for the class, the one point deduction for the absence will be thrown out if a paper is submitted. The paper will be graded, and the grade averaged with the scores on all other written work. Therefore, the degree to which the paper actually substitutes for the class experiences on the day missed will be directly reflected in the final grade.

Because this professor has had students run a doctor’s appointment scam as a means to generate excused absences, he will expect students to schedule medical appointments outside of class time. Exceptions will be made for emergencies and extenuating circumstances.

In this class, attendance is taken with an attendance sheet. Any forgeries of signatures (another scam) will result in the hour being counted as an unexcused absence for both the forger and the person for whom the forgery was attempted.

**Late Work**
It is the instructor’s policy to allow the class to negotiate due dates for out of class assignments. That being said, assignments **must** be turned in on time. There will be a penalty of –5% per day late. Any exceptions must be negotiated in advance.

**Internet Resources**
For easy access to these sites go to [http://www.northland.edu/oe](http://www.northland.edu/oe), click on “Course Descriptions,” scroll down to the *Analysis of Human Performance* heading, click on it to view an on-line syllabus, and click on the links listed below.

*Exercise Physiology: The Methods and Mechanisms Underlying Performance*
By: Stephen Seiler
[http://home.hia.no/~stephens/](http://home.hia.no/~stephens/)
Exercise Physiology: The Methods and Mechanisms Underlying Performance
[http://home.hia.no/~stephens/exphys.htm](http://home.hia.no/~stephens/exphys.htm)

This is a superb site combining excellent content and depth with clear explanations. This is a great adjunct source of information for this course.

*SEACSM (Southeast American College of Sports Medicine)*
[http://www.fau.edu/divdept/exsci/resources.htm](http://www.fau.edu/divdept/exsci/resources.htm)

This is a resource super-site with links to every imaginable sports medicine resource.

*Frank I. Katch*
[http://www-unix.oit.umass.edu/~katch/index.html](http://www-unix.oit.umass.edu/~katch/index.html)
Frank Katch is one of your textbook authors. This is a new site but may have useful, supplemental information.
Kinesiology and Physical Education Links
http://books.valdosta.edu/read/kspe.html

Physical Education Links including Biomechanics sites

Eric Midkiff Exercise Science Links

Human Performance Links
http://www.humanperformance.org/map.htm

Triathlon Related Links
http://www.ens-lyon.fr/~desprez/FILES/TRIATH/links.html

Exercise Physiology & Sports Medicine
http://www.geocities.com/HotSprings/8982/exphys.html

Health Oasis: Mayo Clinic
http://www.mayoclinic.com/index.cfm

Wheeless’ Textbook of Orthopaedics
http://www.ortho-u.net/?menu=9