

Guidelines and Standards for Undergraduate Kinesiology

The word *kinesiology* is currently used in two ways. Its broader meaning is that of a discipline whose focus is the study of human movement. A narrower, but time honored, use of the word defines it as the study of the anatomical and mechanical phenomena which underlie human motion. It is in this latter context that the word *kinesiology* is used in this paper.

Kinesiology is an essential area of study of human beings engaging in motor performance and therefore should be a required part of the undergraduate curriculum for all students of human motion regardless of their professional or vocational direction. The purpose of the study of kinesiology at the undergraduate level is twofold. It should provide students with (1) the knowledge necessary to undertake a systematic approach to the analysis of motor skill activities and exercise programs and (2) the experience in applying that knowledge to the execution and evaluation of both the performer and the performance in the clinical or educational milieu.

Accomplishment of the purpose requires both a theoretical understanding of the subject area and the ability to make professional application. In this context the use of some quantitative methodology for purposes of increasing understanding of fundamental concepts is desirable. On the other hand, the emphasis for the teaching and practicing of the application of this knowledge to the kinesiological evaluation of human movements should be qualitative. Command of the qualitative method of analysis through practice in observation of performance and discrimination in quality of performance based on sound theoretical knowledge must be a primary goal of all undergraduate introductory kinesiology courses.

Nationally approved guidelines and standards for the content of introductory kinesiology follow. Prerequisite knowledge necessary to undertake the study of kinesiology and the minimum knowl-

There is a growing concern that undergraduate kinesiology has "lost its way" and that steps must be taken to redefine kinesiology's place in the undergraduate curriculum. The results of a national survey on the present status of kinesiology conducted in preparation for the National Conference on the Undergraduate Teaching of Kinesiology (held at the University of Illinois in June, 1977), a review of well over 100 course outlines submitted by teachers of kinesiology, and the speeches and discussions which were part of the conference demonstrated great diversity in content in the basic undergraduate kinesiology course, large differences in viewpoint, and great confusion about what should be.

The Executive Committee of the NASPE Kinesiology Academy viewed the problem as one requiring immediate attention. A task force was formed with the charge of developing a proposal for the standardization of content for the basic undergraduate course, to present to Kinesiology Academy members at the 1978 AAHPER Convention in Kansas City.

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As the Task Force worked on it, the form which the proposal took was a working paper titled "Standards and Guidelines for the Teaching of Undergraduate Kinesiology." The results of the national survey (previously mentioned) and the beliefs of the Task Force members with respect to content, terminology, structure, and entering and exit competencies provided the basis for the paper. It was studied and discussed by Kinesiology Academy members who attended a workshop for that purpose during the AAHPER National Convention in Kansas City in 1978. Their comments and recommendations as well as those of other interested Academy members served as a guide for the present revision of the paper which was completed by the Task Force members in New Orleans in March, 1979.

The Task Force next recommended the acceptance of the document as an officially sanctioned set of standards to the Executive Committees of the Kinesiology Academy and NASPE. The "Guidelines and Standards for Undergraduate Kinesiology" which follow have received that endorsement. It is hoped that they will provide the basis for greater standardization in undergraduate course content and focus than is currently the case and, where needed, furnish rationale for course addition or reorganization, improved equipment and facility, and improved personnel qualifications.

edge to be achieved through such study are stated in terms of student competencies. Provisions for the development of these competencies may assume a variety of course patterns depending upon differences in institutional curricular and course designs. However, regardless of course arrangements, it is unlikely that an adequate level of competency will be

achieved in less than four semester hours of credit including at least two hours of laboratory work per week. Moreover, one third or more of the total time allotted for the basic required course content in kinesiology should be devoted to the application of kinesiological concepts (II, C in Guidelines and Standards).

I. PREREQUISITES (ENTERING MINIMUM COMPETENCIES)¹

A. ANATOMY

1. The student is able to name and locate surface bony landmarks in the human body.
2. The student is able to name and locate major superficial muscles causing surface body contours.
3. The student is able to name and locate the individual bones of the human skeleton.
4. The student is able to describe the basic formation and structure of bone and the changes which occur in growth and development.
5. The student is able to name, locate, and classify articulations of the human body.
6. The student is able to describe the structure of human articulations, and distinguish among types.
7. Based upon a knowledge of classification of human joints, the student is able to name and demonstrate movements possible in major joints when these movements are started from the anatomical standing position.
8. The student is able to name and locate muscles and muscle groups important in human motion and to identify their primary actions.
9. The student is able to name and describe the general organization of the nervous system.
10. The student is able to describe the neuron and distinguish among the types of neurons.
11. The student is able to define and describe the motor unit.

B. MATHEMATICS²

1. The student knows the order of precedence where series of arithmetic operations are involved and is able to complete such series where they involve addition, subtraction, multiplication, division, radical signs, parentheses or brackets.
2. The student is able to perform arithmetic operations involving fractions, decimals or percents.
3. The student is able to work with and solve problems when data appear in the form of proportions, formulas or equations.
4. The student is able to solve simple algebraic equations of the linear type.
5. The student is able to solve word problems requiring the use of simple proportions or linear equations.
6. The student is competent both in general graphing procedures, and in the interpretation of graphs.

7. The student is able to use the Pythagorean theorem in solving right triangle problems.
8. The student is able to use the metric system of measure.

II. COURSE KNOWLEDGE (MINIMUM EXIT COMPETENCIES)³

A. ANATOMICAL CONSIDERATIONS

1. Joint Structure and Function
 - a. The student is able to name and define the fundamental planes and axes.
 - b. The student is able to describe and demonstrate joint movements with respect to plane and axis of motion.
 - c. The student is able to explain the relationships between joint structure and function.
 - d. The student is able to name and demonstrate the actions possible in each joint in other than the anatomical starting position.
 - e. The student is able to state the factors contributing to joint range of motion and stability.
 - f. The student is able to measure a joint's range of motion and to state appropriate procedures for improving that range.
 - g. The student is able to analyze human movement patterns in terms of joint actions.
2. Muscular Function
 - a. The student is able to name the major muscles or muscle groups active in any given joint action.
 - b. The student is able to identify the type(s) of muscular contraction (static, concentric, eccentric) occurring in any given joint action.
 - c. The student is able to explain the cooperative action of muscles in controlling joint actions and to identify the role (agonist, antagonist, stabilizer, neutralizer) played by the muscle(s) in a given movement.
 - d. The student is able to explain the mechanical characteristics (e.g. force-velocity and length-tension relationships) of muscle contraction in static and dynamic movements and understand their implications.
3. Neuromuscular Considerations⁴
 - a. The student is able to name and define the basic structures (e.g. motor unit, muscle spindle and proprioceptors) of the neuromuscular system.

- b. The student is able to describe the anatomic bases for reflex acts and to name and define examples of reflexes (e.g., stretch reflex, righting and support reflexes, and reciprocal inhibition or co-contraction) affecting skeletal movements.

B. MECHANICAL CONSIDERATIONS

1. Basic Considerations
 - a. The student is able to describe the nature of vector quantities and to identify such quantities.
 - b. The student is able to combine and resolve two dimensional vectors.
2. Motion
 - a. The student is able to name and describe the various forms of motion experienced by the human body.
 - b. The student is able to define both absolute and relative motion.
3. Description of Motion (Kinematics)
 - a. The student is able to name and define the basic terms of distance, displacement, speed, velocity, and acceleration as they relate to linear and angular motion, and to name and use the appropriate metric units.
 - b. The student is able to describe the behavior of projectiles in both qualitative and quantitative terms.
 - c. The student is able to explain the kinematic relationships between linear and angular motion.
 - d. The student is able to use simple concepts of motion description (kinematics) to analyze human motion in qualitative terms.
4. Determination of Motion (Kinetics)
 - a. The student is able to name and define basic terms (e.g., force, inertia, mass, momentum, and weight) applicable to linear motion, and to name and use the appropriate metric units.
 - b. The student understands and can identify the important characteristics (e.g., magnitude, direction, point of application and components) of internal (muscular) and external forces.
 - c. The student is able to state the linear forms of Newton's laws of motion and to show the relationship between the behavior of a body experiencing linear motion and the forces responsible for that motion.
 - d. The student is able to enumerate and explain the effects of the six significant forces encountered in

biomechanical analyses, namely, weight, normal reaction, friction, buoyancy, drag and lift.

- e. The student is able to explain the significance of the impulse-momentum, work-energy, and conservation of momentum relationships in the case of a body experiencing linear motion.
- f. The student is able to name and define basic terms (e.g., angular momentum, couple, eccentric force, moment, moment of inertia and torque) applicable to angular motion and to name and use the related metric units appropriately.
- g. The student is able to state the angular form of Newton's laws of motion and to show the relationship between the behavior of a body experiencing angular motion and the forces responsible for that motion.
- h. The student is able to locate the center of gravity of an individual experimentally, and, generalizing from that knowledge, is able to estimate the location of the center of gravity of persons in any position.
- i. The student understands and is able to enumerate the factors which affect stability in the human body.
- j. The student is able to explain the kinetic relationships between linear and angular motion.

C. APPLICATION OF KINESIOLOGICAL CONCEPTS

At the conclusion of the basic kinesiology course(s) the student should be able to apply anatomical and mechanical analysis of human motion to a wide variety of activities including the learning and improvement of performance in motor skills, the evaluation of exercises for special purposes, and the evaluation of equipment used in athletics and exercise. This ability should be developed to the extent that the student is able to demonstrate a systematic approach to an analysis and to complete it with a *basic* level of competence. Specifically:

1. The student is able to observe and describe a movement technique accurately.
2. The student is able to determine the anatomical and mechanical factors basic to the performance of an observed movement.
3. The student is able to evaluate the suitability of a performer's technique with reference to the task at hand.

4. The student is able to identify those factors which limit performance and to establish a priority for change in those factors most likely to lead to improvement in performance.

III. FACILITIES AND EQUIPMENT

The requirements of this course cannot be completed satisfactorily unless suitable laboratory space and equipment are available.

A. LABORATORY

There should be a separate room of adequate size (a minimum of 600 sq. ft.) specifically designated as a laboratory and suitably equipped to accommodate undergraduate student laboratory experiences. (Enrollments for laboratory sections should not exceed 20).

B. EQUIPMENT

Although not necessarily part of a permanent inventory, the equipment listed should be available for use in undergraduate kinesiology.

1. Essential equipment
 - a. Anatomical charts and models
 - b. Goniometers
 - c. Motion picture camera (variable speed)
 - d. Motion picture projector (variable speed)
 - e. Slide projector *or* overhead projector *or* opaque projector
 - f. Stop watches or equivalent timing devices
 - g. Scales (ht. & wt.)
 - h. Film library
2. Desirable equipment
 - a. Electrogoniometer
 - b. Electromyograph
 - c. Film reader or motion analyzer
 - d. Force measurement device(s)
 - e. Polaroid camera
 - f. Polaroid sequence camera
 - g. Programmable calculator
 - h. Strip chart recorder
 - i. Video-tape equipment
 - j. Strobe
 - k. Computer terminal (in-house)
 - l. Photoelectric cells
 - m. Oscilloscope
 - n. Reaction board
 - o. Film editor

IV. FACULTY

Teachers of undergraduate kinesiology should be specialists whose academic preparation includes graduate *specialization in kinesiology* and whose continuing education includes additional course work or workshop attendance. In a field where knowledge is expanding at a very rapid rate, the need to participate in activities which assist with the process of keeping current is critical.

Doctoral students specializing in kinesiology should be encouraged to *assist* in the teaching of undergraduate kinesiology but should not have sole responsibility for these courses.

¹The courses in which the student would most likely develop these entering competencies are human anatomy and pre-calculus mathematics.

²The use of calculators in demonstrating competency in the operations listed is encouraged.

³The order of presentation of standards should not be interpreted as the recommended order for planning a course.

⁴It may not be necessary to include this section if material is covered in other courses such as motor learning and development.

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