

# Global Learning Semesters

## Course Syllabus

Course: SPSC-220 Kinesiology & Biomechanics of Sports

Department: Liberal Arts

Host Institution: Intercollege, Nicosia, Cyprus



Course Summary		
Course Code	Course Title	Recommended Credit Hours
SPSC-220	Kinesiology & Biomechanics of Sports	3
Semester Offered	Contact Hours	Prerequisites
Please contact us	42-45	SPSC-105, SPSC-106
Department	Level of Course	Language of Instruction
Liberal Arts	Lower Division	English

### Course Description

The first part of the course will introduce students to the study of biomechanics. Students will develop a secure understanding of under-pinning mechanical principles and an understanding of the mechanics of sports movements using kinematic and kinetic analyses of linear and angular motions. A wide variety of sport and exercise situations will be used to demonstrate the application of these principles. The second part of the course will be concerned with the biomechanics of complex movements and equipment design. Laboratory experimentation will provide the opportunity for students to develop practical skills in the use of a range of analysis equipment such as a force plate and computer-based motion analysis.

### Prerequisites

SPSC-105, SPSC-106

### Topic Areas

1. The mechanics of sports movements using kinematic and kinetic analyses of linear and angular motions.
2. Techniques of motion capture and force plate.
3. Data collection and their use in the mechanical analysis of sports movements.
4. The relationship between the structure of the musculoskeletal system and its function in human movement, sport and exercise.
5. 2-D/3D video analysis.
6. Static and dynamic equilibrium.
7. Calculation of centre of mass.
8. Determination of joint torques using inverse dynamics.

### Learning Outcomes

On completion of this course, students should be able to:

1. Describe the type, structure and motion of joints (conferring, name of the movement, anatomical planes in which the movement occurs, and the degrees of freedom of the joint).
2. Undertake a kinesiological analysis: describe planes, axis, joint and muscle actions using anatomical terminology in a sporting context.
3. Identify key biomechanical terms, abbreviations, units and formulae.
4. Demonstrate basic knowledge and understanding of linear kinematics, linear kinetics, aerodynamics, buoyancy, gravity and friction.

5. Demonstrate the application of knowledge to simple movements in sport and exercise.
6. Develop an understanding of the mechanical principles governing human movement and of the mathematical modeling of sports movements.
7. Describe in depth the sequence and timing of events during activities (such as walking and pulls-ups).
8. Observe a human movement pattern (force of gravity, work, energy, Newton's laws of motion, etc.).
9. Perform a basic biomechanical analysis of a movement.

#### Assessment

Midterm Examination:	(30%)
Final Examination:	(50%)
Coursework/Essays:	(20%)
Attendance/Participation:	(10%)

## Readings and Resources

### Required Textbooks

1. McGinnis, P. (1999) Biomechanics of sport and exercise science Human Kinetics, Champaign, IL.
2. Bartlett, R.M. (1996) Introduction to sport biomechanics London: E & F.N.Spon.

### Recommended Textbooks

1. Carr, G. (1997) Mechanics of sport: a practitioner's guide Human Kinetics, Champaign, IL.
2. Hamill, J. and Knutzen, K.M. (1995) Biomechanical basis of human movement Williams and Wilkins, London.
3. Hay, J.G. (1993) The biomechanics of sports techniques 4th ed. Prentice-Hall, Englewood Cliffs NJ.