NATIONAL INSTITUTE OF EDUCATION
NANYANG TECHNOLOGICAL UNIVERSITY
PHYSICAL EDUCATION & SPORTS SCIENCE

MES815 Sport Biomechanics

Module Description

This course introduces students to qualitative as well as quantitative methods for determining mechanical parameters of movement. Students will be provided with opportunities to gather and examine kinematic and kinetic data of human movement through laboratory work. Such procedures will allow the teacher or coach to effectively analyse movement, explain causes of observed effects and to remediate errors using a safe and scientific approach. . Participants should have completed the mechanical and anatomical bases of human motion before enrolling for this module.

Module Objectives

At the end of module, the students will be able to:

1. Use measurement techniques involving motion analysis, dynamometry, accelerometry and goniometry.

2. Understand and apply qualitative, quantitative and predictive methods of analysis.

3. Quantify and analyze movement parameters in sports manoeuvres, using relevant mechanical concepts and principles

4. Be familiar with current literature and issues in sports biomechanics.

Module Content

Review of mechanical concepts and applications.

Introduction to instrumentation used in biomechanics.

Analysis – qualitative, quantitative and predictive

Anthropometry

Filming - Video techniques, optical system

Inverse dynamics to quantify movement parameters

Filming and analysis of a sports manoeuvre

Module Evaluation

1. Laboratory report 25 %

2. Project work 25%

3. Term Paper 25%

4. Class Test 25 %

References

1. Winter, D.A. (1990). Biomechanics and motor control of human movement. Singapore: Wiley Inter-Science.

2. Bartlett, R. (2007). Introduction to Sports Biomechanics (2nd Edition). London: E & FN Spon

3. Hay, J.G. (1993). The biomechanics of sports technique (Fourth Edition). Englewood Cliffs, N.J: Prentice-Hall.

4. Gordon R. Caldwell, G. Hamill, J. Kamen G., Whittlesey, S. (2004) Research methods in Biomechanics. Champaign,IL: Human Kinetics.