

Research Project

The purpose of this project is to study how the concepts discussed in the class (i.e. statics and dynamics) are used in biomechanics. Each student should pick a specific biomechanical application and then provide a detailed report on the importance and utility of the mechanical concepts in the context of the selected biomechanical application. Example of the mechanical concepts and biomechanical applications include but not limited to:

Mechanical Concepts:

- Kinematics (position, velocity, acceleration)
- Kinetics (forces and moments)
- Equilibrium
- Load Distribution
- Internal Forces
- Reaction Forces
- Centroid
- Moment of Inertia

Biomechanical Applications:

- Human Locomotion (e.g. walking, running)
- Injury Prevention (e.g. neuromuscular training)
- Rehabilitation (e.g. physical therapy)
- Devices (e.g. orthopedic implants, braces, helmets)
- Diseases and Injuries (e.g. osteoporosis, osteoarthritis, sports injuries)
- Athletic Performance (e.g. workout, athletic training)

Your report must be professionally prepared. At a minimum this means it must be NEAT (easy to read) and CLEAR (logically organized and easy to follow). Your report must be single spaced in 12-point font and must contain the following elements:

- Cover page (1 page)
- Background of the selected biomechanical topic (2 pages)
- Detailed discussion of the mechanical concepts often used in the selected biomechanical application (1-2 pages)
- Review of at least 5 studies (research journal papers) focused on using these mechanical concepts in selected biomechanical application (minimum 5 pages).
 - *For example, using mechanical concepts of kinematics and kinetics to study human movement with utility in injury prevention or rehabilitation. Another example is using concepts of kinetics and centroids to develop an artificial joint replacement.*
- Summary (1 page)
- References (at least 10 references). All references should be cited in the report using the IEEE citation format.