

## Senior Design Project Data Sheet

Project #	Project Name	Project Track	Project Family
8001	Balance Training Bicycle	Assistive Devices and Bioengineering	Assistive Devices
Start Term	Team Guide	Project Sponsor	Doc. Revision
2007-2	DeBartolo	National Science Foundation	2

### Project Description

#### **Project Background:**

Design a device to act as an intermediate step between a stationary and traditional bicycle to emphasize balance training for recovering physical therapy patients in need of free care.

#### **Problem Statement:**

Patients with neurological disorders requiring physical therapy who train on stationary bicycles can have trouble transitioning to a traditional bicycle due to a difficulty in balancing.

#### **Objectives/Scope:**

1. Design a mechanical system that mimics the lateral movements of a traditional bicycle.
2. Design and implement a control system to enable variable resistances of the lean characteristics.
3. Provide feedback to the patient and PT regarding specific angles in which they should correct balance and/or indicate imminent tip over conditions.

#### **Deliverables:**

- Customer needs, specifications, and schedule
- Concept/system design
- Test and assembly plans
- Function and performance analysis
- Poster
- Technical paper
- 2-Page Summary
- Final design with material list
- Functional Prototype

#### **Expected Project Benefits:**

- Therapist and patient benefit by having one additional method toward balance training.
- Designers benefit by exposure to product development process from concept to prototype.

- Nazareth College benefits by providing better services to those in need.
- Strengthen the relationship between RIT and Nazareth as well as general public.
- Use Engineering for the greater good.

#### **Core Team Members:**

- Jennifer Zelasko
- Jonathan Bawas
- Jeffrey Tempest
- James Nardo
- Carl Mangelsdorf

### Strategy & Approach

#### **Assumptions & Constraints:**

1. Patients have one dominant leg (for pedaling)
2. Only one therapist per patient.
3. Have to simulate tilt without risk of falling
4. Therapist has strength to re-center patient to upright position.
5. Project grant limited to \$2000.
6. We will use a separate bike from the stationary bike used in the PT clinic.

#### **Issues & Risks:**

- Traditional bicycles tend to be easier to balance as pedal speed increases, simulating this may become troublesome.
- Patients may have limited use of one side of the body
- Faulty design may lead to serious injury or even death.
- Initial design may not suit all customer needs and then require redesign.
- Lack of exposure to broad range of typical patients seen at the clinic.