

| Version No. | Description | Active as of: |
| --- | --- | --- |
| 1 | Things in Version:   * Draft | [date] |

[PROJECT PLAN]

[Smart Biosleeve]

[Ryan Hossain, Luis Rodriguez, etc.]

Release Version: #

Release Date:

Project Lead: [Name]

[email]

Program Director: [Name]  
Email: [email]

# **Acronym List:**

*CAD* = Computer Aided Design

*GUI* = Graphical User Interface

*IDE =* Integrated Development Environment

Purpose of this Document:

This document serves as a template for project plans. This document contains basic sections that should be filled out prior to the start of any project.

This document should provide any reader, regardless of their role, an understanding of what the goal of the project, who will be involved, what the milestones of the project are, and how information will be shared.

**Table of Contents:**

[**Project Plan Title Page 2**](#_gjdgxs)

[**I.**](#_30j0zll) **Acronym List: 3**

[**II.**](#_1fob9te) **General Project Information 4**

[**III.**](#_3znysh7) **Work Breakdown Schedule 4**

[**VI.**](#_2et92p0) **Project Budget by Phase 4**

[**VII.**](#_tyjcwt) **Communication Plan 4**

[**VIII.**](#_3dy6vkm) **Extra Elements 4**

1. General Project Information

| Project Title: | Smart Biosleeve |
| --- | --- |

| Description: | What is the purpose of the project?  The purpose of this project is to create a compression smart sleeve that is able to allow for activity tracking and medical monitoring of its human user, in addition to tracking the user’s movements and displaying the movements in real-time on a third-party motion capture system. It will be able to monitor activities including but not limited to:   * body temperature * heart rate * O2 Saturation * Muscle movements (i.e. flexion, extension, adduction, abduction, rotation |
| --- | --- |

| Vision: | Why does the group think this project is important, interesting, or fun?  This project is interesting because it will allow users to test several features of their body in real-time such as heart rate, saturation, and muscle contractions among other features. The device will also allow motion tracking. It can be scalable to other projects and it has the possibility of being applied to several fields such as physical therapy and animation.  We also thought the project is important because it will give students experience in creating a device related to biomedical engineering and provide students with more insight into the field. We believe that biomedical engineering is an exciting field that needs more exposure at UCF. This project incorporates the topics of biomechanics and programming into a project that also brings exposure to areas connected with human health, such as physical therapy. |
| --- | --- |
| Parallel Goals: | Will this project help any other activities directly or indirectly?  This project will bring more awareness and exposure to the study of biomedical engineering and help members gain experience in programming in connection to topics such as physical therapy, biosensors, and motion-tracking. Indirectly, this project aims to assist with learning more about motion capture projects occurring at the Florida Interactive Entertainment Academy at UCF and bring a low-cost approach to said projects. Another indirect activity where this project may help is with the research of changes in the human body when exposed to unique situations and environments. |

| Milestones | Success Criteria | Dependencies/Risks | Due Dates |
| --- | --- | --- | --- |
| Complete the design prototype of the sleeve | Create a CAD model of the design |  | TBD |
| Gather sensors and additional materials | Make a list of parts needed and ensure the list falls within project budget  Assemble sensors and other materials into the sleeve | Need to ensure materials are within device budget | TBD |
| Create the GUI | Create a basic interface in MATLAB or Python that allows user to select what sensor or feature to test |  | TBD |
| Test sensors and additional electronics with the GUI | Program sensors and other electronics to track the desired activity  Connect sleeve to motion tracking system |  | TBD |
| Finish build | Test sleeve and interface on human arm; ensure all sensors are working properly |  | 02/28/2023 |

| Project Constraints: | What are the limitations of the project?  The dimensions of the sleeve may be a limitation since the extent to which the sleeve can be stretched and the length of the sleeve need to be considered. This is because human arm sizes can vary in size and length. To solve this problem, we may need to incorporate an adjustable strap system to the sleeve, enabling it to fit more users and users with limited mobility. |
| --- | --- |

1. **Work Breakdown Schedule**

This section should provide a breakdown of key tasks that will need to be completed to finish the project.

1. **Create a design of the sleeve:**
   1. Research similar products and investigate their design
   2. Discuss plans and ideas for the design with team
      1. Type of material
      2. Dimensions
      3. Additional features of the sleeve
         1. i.e. adjustable velcro strap
      4. Locations for sensors in the sleeve
   3. Create a digital model of the sleeve with predicted locations of all electronics
2. **Buy and assemble materials:**
   1. Create a list of parts
   2. Manage list to fit within the budget
   3. Construct the sleeve
   4. Assemble sensors and additional materials into sleeve
   5. Ensure all sensors work as intended
3. **Program all electronics:**
   1. Create the graphical user interface (GUI)
      1. Use MATLAB or Python to create the interface
      2. Ensure the UI incorporates all sleeve functions and allows users to select any function to test
   2. Link sensors and other electronics with the GUI
      1. Program all electronics to track the desired activity
      2. Link the sleeve with motion tracking software
      3. Test all sensors and the motion tracking system with human subject
4. **Project Budget by Phase**

The total budget of this project, in collaboration with the Biomedical Engineering Society at the University of Central Florida, will be $500.

1. **Communication Plan**

The project members will plan to meet weekly in person to progress through the project. Currently, there is no plan to use information for marketing purposes. However, we plan to discuss the applications of this device with the Florida Interactive Entertainment Academy at UCF for further feedback and research.

1. **Extra Elements**

This section should provide any additional information that the group wants to share related to the project.

**List of Materials (major components)**

* **Sensors**
  + Electromyography (EMG) sensors
  + Electrical heart rate sensor
  + Oximeter sensor (for O2 saturation sensing)
  + Inertial measurement device (IMU)
* **Other materials**
  + Cloth and other fabrics for sleeve
  + Microcontroller

**IDE for Python**

* **Python IDE: PyCharm**