**Software Simulation of an Insulin/Glucagon Pump**

* **Requirements:**

The main objective of this project is to develop a means of simulating the input from the blood sugar sensor and simulating the exceptional conditions that can arise. It should work faster than real-time and the simulator displays should replicate the displays on the Insulin/Glucagon pump system. The project (Software Part) should adhere to following standards:

* **Design Model and Process Model ensuring Safety Critical System Development**

The design, architecture and the components of the System should be decided and designed considering safety criteria as it is highly Safety Critical Project. And the process model should be chosen such that it ensures Safety Critical Development along with normal development process. The team should strictly follow the process model to keep track of things and head in a correct direction.

* **Safety**

As it is a Safety Critical Project, the software must ensure Safety at any cost. It should not display wrong results anytime, because it may lead to Patient’s death. Any kind of similar defect is not allowed. Safety includes:

* **Fail Safe:** The Software to be developed should be fail safe i.e. it should never fail, irrespective of anything. It should always render accurate and precise results. All kinds of errors should be properly handled.
* **Redundancy**

The system should be redundant such that, if in any case, an implementation of a method fails, there must be an alternative of the same method implemented in a different way.

* **Security**

The System should be so secure and robust enough that any hacker (E.g. Man in the Middle Attack) should not hack it and render wrong results.

* **Behaviour**

The software should always be up and running. The performance of the system should not be affected irrespective of any number of simultaneous users or anything. It should always behave as expected.

* **Platform Independent**

The software should be able to run on any kind of hardware device, i.e. it should be platform independent. It should run across multiple platforms without affecting the functionality.

* **User Friendly**

The Graphical User Interface should be as simple as possible so that any kind of user should operate it efficiently. Also, it should be made User-Friendly using Alarms and Colours for rendering different states (Normal/Danger).

* **Medical Literature**

All the team members should read the literatures related to the Application field (Medical) so that everyone understands exact concepts and functioning in detail. Once they understand the System and its background, they can easily develop a correct Software.

* **Live Rendering of GUI**

The results should be rendered on the Display Screen as soon as the patient takes any kind of input (Food, Drink etc.) in the body. Respective changes in the body sugar level(increase/decrease) should be rendered immediately. Following factors should be considered implementing this functionality:

* Type and Quantity of Food Intake
* Time of Intake
* Patient’s Age and Medical History

The System should take care of Units and display the results accordingly with respective Units.

* **Hazard Analysis**

Hazard Analysis is a crucial step during any Project development, but especially in Safety Critical Systems it must be done. It recognizes hazards that may arise from a system. The team can refer to the “STAMP” book.

* **Project Report of 15 PDF pages using Latex**

After the complete development, a project report of 15 pages should be submitted in PDF format. Latex should be used for this purpose.