

INTERNATIONAL UNIVERSITY
SCHOOL OF BIOMEDICAL ENGINEERING

Guidelines for Medical Design

Final Project

Project Information

Medical instrumentations are a tool or devices used for a specific purpose in the diagnosis, treatment, or prevention of a medical condition. There are many different types of medical instruments, ranging from simple tools such as stethoscopes and tongue depressors to complex devices such as MRI machines and surgical instruments. Medical instruments play a critical role in healthcare and are used by healthcare professionals to diagnose, treat, and monitor patients

A syringe pump is a type of medical device used to deliver precise amounts of fluids, such as medications or nutrients, into a patient's body. It operates by pushing the plunger of a syringe at a controlled rate, ensuring accurate and consistent flow of the fluid. Syringe pumps are commonly used in various medical settings, including hospitals, clinics, and research laboratories.

Key features of syringe pumps include:

- **Precision and Control:** They allow for the accurate delivery of very small to large volumes of fluid, which is essential for administering medications that require precise dosing.
- **Programmable Settings:** Most modern syringe pumps are programmable, enabling healthcare providers to set the rate and volume of fluid delivery according to the patient's needs.
- **Safety Features:** They often include alarms and safety mechanisms to detect issues such as occlusions (blockages), empty syringes, or incorrect settings, thereby ensuring patient safety.

- **Versatility:** Syringe pumps can be used for a wide range of applications, including intravenous (IV) therapy, administering anesthesia, chemotherapy, and delivering nutrients in critical care settings.
- **Portability:** Many syringe pumps are compact and portable, making them suitable for use in various environments, including during patient transport and in-home care settings.

Project objective:

The objective of this project is to design and build a functional prototype of a syringe pump, a medical device used to deliver precise amounts of fluids, such as medications or nutrients, into a patient's body. This project aims to provide students with hands-on experience in engineering, electronics, programming, and medical device design.

In this project, students will work in teams to create a syringe pump prototype that can accurately control the flow rate of fluids. The project will involve designing the mechanical and electronic components, programming the control system, and ensuring the device meets safety and accuracy standards.

This final project will be graded through a poster presentation (with demonstration of the prototype) and a final report.

- **Poster Presentation:** Create a detailed and visually appealing poster summarizing the project, including design, methodology, and results. The poster should effectively communicate the project's purpose and findings. The poster guidelines will be provided through BlackBoard system.
- **Final Report:** Submit a comprehensive project report detailing the design process, challenges faced, solutions implemented, test results, and conclusions. The report should be well-organized and thorough. The report template will be provided through BlackBoard system.

Grading Rubric

The following is the grading rubrics. Keep yourself alert and make sure your project satisfies all the grading rubric requirements.

Table 1. Poster presentation grading rubric

No.	Items	Max pts	
1	Poster content	25	
2	Poster presentation	25	
3	Demonstration of the prototype	25	
4	Question and answer	25	
	Total	100	

Table 2. Project report grading rubric

No.	Items	Max points	
1	Problem & Related works	10	
2	Objective & Initial requirements	5 (ABET)	
3	Design specifications	10 (ABET)	
4	Block diagram	10	
5	Materials	5	
6	Electrical Schematic	10	
7	Mechanical Design	10	
8	Firmware & Software	10	
9	Testing	10	
10	Cost analysis	5	
11	Conclusion & Limitation & Future works	10	
12	Task division & timeline	5 (ABET)	
	Total	100	