Course Description

The design process; establishing objectives; preliminary design; planning; scheduling; decision matrices; modeling tools; economic impact; optimization methods; reliability; safety; sustainability demonstrated by a term project conducted by small teams of students.
Three lecture slots, two tutorials slots, two lab slots weekly; both terms.
Prerequisite: Registration in Level IV Electrical and Biomedical Engineering. Anti-requisite: COMP ENG 4OI4, 4OI5, ELEC ENG 4BI4, 4B15, 4OI4, 4OI5

Objectives

To develop a working knowledge of the basic principles of the engineering design process and apply this knowledge to the selection and analysis of a biomedical problem and to propose, design, construct and test a solution. Biomedical engineering areas: medical instrumentation (hardware and/or software) and devices, medical imaging, medical robotics; etc.

Sustainability

All projects must address some aspect of sustainability (environmental and/or financial). For example your device might contain a solar power source. Furthermore, the appropriate tools and metrics available to evaluate the environmental and/or financial impact of the project must be used and discussed. Remember, health care innovation, whether for the personal or professional sector, usually has a small environmental impact (e.g. disposables) but carries a cost to the public health care budget or personal finances. Is there a market for your development? Does it provide a cheaper solution to current technology or methodology?, etc.

Resources

There are no textbooks needed to be purchased. Student groups will be required to purchase materials for their projects. Groups may be provided with some financial support or materials. However, this will be at the discretion of the department and faculty supervisors assisting with the project.

Format: Full class sessions once per week, or more frequently as required, for 4 weeks to give basic concepts and tutorials in design, followed by independent work and consultation during design and implementation of major term project.

Evaluation

Work Item	**Due Date**	**Value**
Project Proposal	October 15th, 2014	20%
Bronze Level Presentation	December 5th, 2014	10%
Silver Level Demo	February 26th, 2015	10%
Gold Level Demo+Poster Day	April 6th, 2015	50%
Biweekly Meetings		10%

Course Mark	Total =	100%

Each semester students will evaluate each other's contribution to the group project. This will prevent all the work being done by one person. Furthermore, groups will submit a joint proposal (not individual ones) and will present group presentations (i.e. each member of the group presents on a specific component of the work).

A satisfactory final report must be submitted, else a grade of F will be awarded.
In a case where the component weight cannot be fulfilled as a result of unforeseen and/or uncontrollable circumstance(s) in the course operation or execution, the grades assigned to that component may be pro-rated.

Academic Integrity Policy

Policy Reminders

"The Faculty of Engineering is concerned with ensuring an environment that is free of all adverse discrimination. If there is a problem, that cannot be resolved by discussion among the persons concerned, individuals are reminded they should contact the Departmental Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible."
"Students are reminded that they should read and comply with the Statement on Academic Ethics and the Senate Resolutions on Academic Dishonesty as found in the Senate Policy Statements distributed at registration and available at the senate office."
"Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at http://www.mcmaster.ca/senate/academic/ac_integrity.htm
The following illustrates only three forms of academic dishonesty:
1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained
2. Improper collaboration in group work. (E.g., using previous year's lab reports).
3. Copying or using unauthorized aids in tests and examinations.

Health and Safety

Information for Laboratory Safety and Important Contacts

All users of ECE instructional laboratories in the Information Technology Building must read this part. It is expected that revisions and updates to these instructions will be done continually.
A McMaster University lab manual is also available to read in every laboratory.

General Health and Safety Principles

Good laboratory practice requires that every laboratory worker and supervisor observe the following:
1. Food and beverages are not permitted in the instructional laboratories.
2. A Laboratory Information Sheet on each lab door identifying potential hazards and emergency contact names should be known.
3. Laboratory equipment should only be used for its designed purpose.

4. Proper and safe use of lab equipment should be known before using it.
5. The course TA leading the lab should be informed of any unsafe condition.
6. The location and correct use of all available safety equipment should be known.
7. Potential hazards and appropriate safety precautions should be determined, and sufficiency of existing safety equipment should be confirmed before beginning new operations.
8. Proper waste disposal procedures should be followed.

Location of Safety Equipment

Fire Extinguisher	First Aid Kit
On walls in halls outside of labs	ITB A111, or dial “88” after 4:30 p.m.
Telephone	Fire Alarm Pulls
On the wall of every lab near the door	Near all building exit doors on all floors

In Case of a Fire (Dial 88)

When calling to report a fire, give name, exact location, and building.
1. Immediately vacate the building via the nearest Exit Route. Do not use elevators!
2. Everyone is responsible for knowing the location of the nearest fire extinguisher, the fire alarm, and the nearest fire escape.
3. The safety of all people in the vicinity of a fire is of foremost importance. But do not endanger yourself!
4. In the event of a fire in your work area shout “Fire!" and pull the nearest fire alarm.
5. Do not attempt to extinguish a fire unless you are confident it can be done in a prompt and safe manner utilizing a hand-held fire extinguisher. Use the appropriate fire extinguisher for the specific type of fire. Most labs are equipped with Class A, B, and C extinguishers. Do not attempt to extinguish Class D fires which involve combustible metals such as magnesium, titanium, sodium, potassium, zirconium, lithium, and any other finely divided metals which are oxidizable. Use a fire sand bucket for Class D fires.
6. Do not attempt to fight a major fire on your own.
7. If possible, make sure the room is evacuated; close but do not lock the door and safely exit the building.

Clothing on Fire

Do not use a fire extinguisher on people
1. Douse with water from safety shower immediately or
2. Roll on floor and scream for help or
3. Wrap with fire blanket to smother flame (a coat or other nonflammable fiber may be used if blanket is unavailable). Do not wrap a standing person; rather, lay the victim down to extinguish the fire. The blanket should be removed once the fire is out to disperse the heat.

Equipment Failure or Hazard

Failure of equipment may be indicative of a safety hazard - You must report all incidents.
Should you observe excessive heat, excessive noise, damage, and/or abnormal behaviour of the lab equipment:
1. Immediately discontinue use of the equipment.
2. In Power Lab, press wall-mounted emergency shut-off button.

3. Inform your TA of the problem.
4. Wait for further instructions from your TA.
5. TA must file an incident report.

Protocol For Safe Laboratory Practice

Leave equipment in a safe state for the next person - if you're not sure, ask!
In general, leave equipment in a safe state when you finish with it. When in doubt, consult the course TA.

Defined Roles

TA	The first point of contact for lab supervision
ECE Lab Supervisor	Steve Spencer- ITB 147 steve@mail.ece.mcmaster.ca
ECE Chair	Tim Davidson- ITB A111 davidson@mcmaster.ca
ECE Administrator	Kerri Hastings- ITB A111 hastings@mcmaster.ca
ECE Course Instructor	Please contact your specific course instructor directly