Proposal for Undergraduate Research by Engineering Students

This Proposal for Undergraduate Research (Proposal) must be submitted to the Engineering Undergraduate Office in Room 123 SEO to ensure that undergraduate research credits (392; or CS 398) are accepted and posted to your Degree Audit. All majors, with the exception of those in the MIE Department, must submit an approved Modification of Major form along with this Proposal and the final report. The undergraduate research credits will not be posted to your Degree Audit until the Engineering Undergraduate Office has an approved Modification of Major form, Proposal, and final report in the student's file, and the grade is submitted properly.

Two copies of the Final Report for the Undergraduate Research Project are required; submit one to the Departmental Undergraduate Office for your major, and another to the Engineering Undergraduate Office in Room 123 SEO.

Student Name ___________________________     UIN __________________________________________
Major ___________________________     Research Department ___________________________
Term ___________________________     CRN ___________     Credit     Hours ________________

Research Project Advisor __________________________________________
Research Topic __________________________________________
Describe any design content (required for CHE 392) __________________________________________
Brief description and scope of research project (see instructions attached)
________________________________________________________________________________________________
________________________________________________________________________________________________
________________________________________________________________________________________________
________________________________________________________________________________________________
Research Project Advisor Signature (required) ___________________________     Date _________________
Department Head or DUGS Signature (required) ___________________________     Date _________________
Participation in laboratory research is an important part of the undergraduate experience, especially for those who anticipate continuing to graduate school and careers in research. The guidelines below will help you through the process. Please see the FAQ's at the end of this document for further information.

**BioE 398 - Undergraduate Research**

1 TO 5 hours. Research under the close supervision of a faculty member. May be repeated. Students may register in more than one section per term. **Prerequisite(s):** Consent of the instructor.

**Procedure for Participating in BioE 398:**

1. Identify a laboratory, research mentor, and project (see FAQ's for more information).
2. Fill out the **Proposal for Undergraduate Research by Engineering Students** form (available under **Forms** on the BioE web site), including a **Project Description** (see below). This should be done the semester before you begin your research, but will be accepted up until the last day of registration (end of 2nd week of semester).
3. Submit the form to the Director of Undergraduate Studies (DUGS, currently Dr. John Hetling).
4. Register for BioE 398 using the call number for the mentor you will be working with. If there is no call number for the person you want to work with, contact the DUGS for assistance.
5. At the end of the semester, submit two copies of your **Final Report** to the DUGS (see format guidelines below). The credit hours earned will not be applied toward your degree until the Final Report has been approved by the Department and a copy received by the College.

**Project Description Guidelines (submit with proposal form):**

**Length:** 1-2 pages, single spaced, 10-point Arial font. The Project Description needs to illustrate that the project is indeed Bioengineering, and that the scope of the project is appropriate for the number of credit hours that you wish to register for. Use a formal style and language, including words such as *design*, *fabricate*, *measure*, *analyze*, etc., as appropriate. Specify the living system involved, if it is not obvious. Include a list of general **goals or aims** for the project (these can be research goals, or learning goals).* List any specific instruments or techniques that you will be using for the project. You are strongly encouraged to discuss the Project Description with your mentor before submitting it.

* Keep in mind that your Project Description is not a contract; it is common for research goals to evolve as a project develops. However, it is important for you to articulate a reasonable research plan before you begin.

**Final Report Guidelines (submit at end of semester):**

**Length:** 3-5 pages, single spaced, 10-point Arial font. Small figures may be embedded in the text; large figures or appendices should appear on separate sheets and do not count toward the page limit. It is appropriate (and encouraged) to have your mentor read the report and provide feedback before submitting it to the DUGS. The report **must** have the following sections or it will be returned for revision.

- **Project Goals** (or Project Aims) – In **bullet-point** format, list the main goals or aims of the project. Include design criteria / constraints if appropriate. If these are different from the Goals / Aims listed on your Project Proposal form, explain why in a paragraph below the bullet points.
• **Background / Motivation** – Place your project in a broader context. Why did this work need to be done? Who might benefit from this work?

• **Methods** – Describe the instruments, software or techniques you used during the project to design, fabricate, measure or analyze. Describe the design of experiments, if appropriate (including independent and dependent variables, controls, and relevant statistics).

• **Results** – Describe the main results of your research, which might include data, a program, a process, a design, or a prototype. Include interpretation of results, including statistical analysis, as appropriate. A significant part of your results may be experience gained with a new tool or technique, but this should be described in the context of an application of that skill.

• **Summary** – Concisely summarize the main outcomes of the research project (what you learned, what you accomplished), and what the impact of the work is on the field. Describe any future work that was motivated or enabled by your efforts.

**Frequently Asked Questions:**

**How do I find an UG Research position?** Unfortunately, there is no central database or list of faculty looking for undergraduates to work in their labs. You need to approach individual members of the faculty who are doing work that you find interesting, and ask if you can join his or her lab. Start by scanning the faculty list on the BioE web site, including the long list of adjunct faculty.

**How can I get a busy researcher to meet with me and allow me join his or her lab?** These positions are competitive, simply because there are many students looking for a limited number of openings. The best thing you can do is invest an hour or two learning about what the faculty member does (look at their lab web page, read papers they have written, talk to their graduate students), and then be persistent with polite, carefully-written emails. Ask for a meeting to discuss his/her research program. Let him or her know that you have looked at their work. Ask a few prepared questions. Suggest a potential research project. These actions demonstrate maturity, commitment, and initiative, which is what everyone wants in their lab members.

**When am I ready for BioE 398?** Now. Some members of the faculty may be looking someone with particular skills for a specific project, and so may be looking for someone who did well in a particular course, but many will be open to anyone demonstrating the qualities described in the previous answer.

**Can I register for BioE 398 more than once?** Yes! It is usually very beneficial (to you and the project mentor) to continue a project over two or more semesters. There is no limit to the number of times you can register for BioE 398.

**How many hours of BioE 398 can I use toward my degree?** Three (3) hours may be applied toward your Concentration Area Electives. Additional hours of BioE 398 will appear on your transcript, but are not applied toward the degree requirements.

**Why should I do undergraduate research?** When you apply for your next position, whether graduate school or industry, your experience will be worth at least as much as your GPA, courses taken, or degree earned. Employers / supervisors want to see that you have demonstrated an ability to solve problems, have experience in communicating in the scientific community, and have applied your knowledge in a practical manner (even if it is unrelated to the position you are applying for). In addition to your resume and application, employers or admissions committees rely heavily on letters of recommendation, and the strongest letters come from people who know you the best. Your undergraduate research mentor will be an important reference for you.

**How can undergrad research help me earn my Masters degree?** If your research mentor agrees, it is possible to continue your undergraduate research project as your Master’s thesis research project. This has benefits for you and your mentor, as you already have experience with the lab techniques, may have pilot data, and your mentor doesn’t have to hire (and train) someone new to continue the work. See the BioE web site for further details about the Accelerated BS/MS Track.