



Guidelines for BIOMEDE 590 Directed Research Experiences

The following guidelines are also available at: bme.umich.edu/forms

(1) Project Selection: Whereas a student goes to a particular faculty member presumably to learn more about the faculty member's area of research interest, generally it will be the faculty member who presents the student with a choice of possible research projects rather than the other way around. In certain cases the student may suggest possible projects that may be acceptable to the project director.

Projects may consist of one or more of the following: (i) an in-depth library search of an area, (ii) the design and/or construction of hardware, (iii) the collection and/or analysis of experimental data, (iv) the generation of computer software. Projects should have a clear relevance to biomedical engineering and include an experimental and/or analytical engineering component.

The project should require some creativity and/or independent work by the student. The faculty member should not expect the student to be a free helper and consequently the project should not require excessive menial work.

The student and advising faculty member should agree on the scope of the project, learning objectives, and the amount of effort expected per credit hour. It is strongly recommended that the faculty adviser provide a "syllabus" for the directed research experience that includes a description of the grading scheme. A sample template for such a syllabus is available on the BME website at bme.umich.edu/forms. Faculty are encouraged to copy this template to create a project-specific syllabus.

(2) Academic Credit: Once a project has been agreed upon, the faculty member and student should establish the credit to be received. Typically, three to four hours per week of actual "work" time is expected for each credit hour given in a normal term. The "work" time should include the library-search time, the laboratory time, and the final report writing time. Typically, a directed research project is for two (2) to four (4) credit hours per term. Students can count up to six (6) letter-graded credits of BIOMEDE 590 toward the MS degree. Students who count four (4) or more credits, either in a single or multiple terms, are required to complete a MS thesis and defense. PhD students can also count the MS Thesis and defense as the BME Qualifying Exam. All directed research credit is to be granted under BIOMEDE 590.

(3) Final Report: A final report must be written by the student to complete the project. If the course is taken for only one term, a written report must be prepared by the end of the term. If the course is taken for more than one term, a written report is due at the end of each term. The report format is at the discretion of the BIOMEDE 590 adviser. It is recommended that the report be in the form of a scientific manuscript or grant application (in the case that the report will be used as the Qualifying Exam document for PhD students). The report should include an introduction to the research, materials and methods, results, discussion of the findings, and appropriate figures and references. It should also explicitly describe the relevance of the research to biomedical engineering and the engineering components of the project. This report will become a part of the student's file. In addition the standard report form supplied in Appendix A is to be briefly completed to provide uniformity. The project adviser (or surrogate) should not issue a grade until the final report has been submitted to the appropriate student counselor.

(4) Course Grade: BIOMEDE 590 is letter graded. The grade should be based on elements agreed to by the student and faculty adviser at the beginning of the project. Therefore it is strongly recommended that the faculty adviser provide a "syllabus" for the directed research experience at the beginning of the term

that includes a description of the grading scheme. A sample template for such a syllabus is available on the BME website at bme.umich.edu/forms.

It is important that faculty are rigorous and fair in their grading to ensure consistency across research experiences and across the Department. Example grading criteria are included in the sample syllabus template. The project adviser (or surrogate) should not issue a grade until the final report has been submitted to the appropriate student counselor.

(5) Report Form Access: The information contained in the written report is intended for use by: (1) members of the Biomedical Engineering faculty who want information about a student's research experience and ability; (2) the Graduate Education Committee for student evaluation; and (3) faculty members asked to write letters of recommendation for students. The student will receive a copy of this report.

(6) Financial Remuneration: Directed research credit will not ordinarily be given for work done for financial remuneration.

(7) Non-Faculty and Non- Biomedical Engineering Faculty Project Director: Students may wish to work with project directors who do not hold a faculty appointment (e.g., research associates and research scientists) or with a non-Biomedical Engineering faculty member. In order for proper credit to be given, however, the student must present the Graduate Education Committee with a petition (see Appendix B for suggested format) detailing the project to be done and with whom it is to be done. The petition must include the name of a Biomedical Engineering faculty member who will serve as surrogate and issue the grade. The surrogate will read the report and receive the grade that should be issued from the project director.

(8) The final report must be returned to the appropriate student coordinator (Susan Graeber for SUGS students, and Maria Steele for MS and PhD) upon completion of the project. A student will not be granted a Master's degree without a copy of the report in said student's file. Note: Not all students who register for four (4) to six (6) credits of BIOMEDE 590 have to write the Master's Thesis. Only those who wish to apply the four (4) to six (6) credits of research toward the minimum 30 credit requirement in place of graduate engineering coursework must write the Master's Thesis.