

GUIDE FOR MASTER'S STUDENTS

Biological Systems Engineering

University of California, Davis

GENERAL INFORMATION

1. Departmental

The Graduate Program in Biological Systems Engineering is based in the department of Biological and Agricultural Engineering. Graduate students share many of the privileges and responsibilities as regular departmental staff members, and are encouraged to participate in staff meetings, seminars, and departmental social functions.

Office and furniture (desk, chair, and file) are provided as long as space is available. Doctoral students generally have first priority for office space. At times, space limitations may allow desk assignments only to graduate students employed as teaching or research assistants or equivalent. Desk space for students who are not employed will be assigned on the basis of seniority. A key is issued that provides access to all research laboratory areas; access to the mechanical shop is available to graduate students who have special needs and are qualified to use the equipment. Students must meet training requirements before using shop and lab facilities. Each student is assigned a mailbox, which should be checked daily.

The technical services of shop and laboratory personnel are available to assist with the construction of any equipment and/or with the analysis required for thesis research. The **mechanical shop** provides assistance for the construction or fabrication of physical equipment. The **electrical shop** offers comparable service for electrical and electronic devices. Photographic equipment and services are also available for research. The **chemical laboratory** is available to assist in setting up or performing chemical analyses. **Computer facilities** are available in 1336 and 3026 Bainer Hall as well as at other locations.

2. Graduate Studies Procedures

The UC Davis catalog, College of Engineering publications and the quarterly class schedule contain most of the information needed regarding graduate requirements, courses offered, registration, etc. Special note should be taken of the calendar for deadlines that graduate students must meet.

The Biological Systems Engineering program is a departmentally based graduate program in the department of Biological and Agricultural Engineering. Each field of study offered at the University of California is permitted to refine the general University rules to meet its specific objectives. General rules for graduate programs in the College of Engineering are outlined in the College of Engineering Bulletin.

3. Advisers

a. Admissions Adviser

The Admissions Adviser of the Biological Systems Engineering program is responsible for all admissions-related details, such as correspondence with prospective graduate students and review of applications for admission.

b. Graduate Adviser

The Graduate Adviser of the Biological Systems Engineering Program is responsible for all graduate program details, such as assistance with preparation of study lists and approval of any Graduate Studies forms requiring the signature of a "Graduate Adviser".

c. Major Professor

The Major Professor is the faculty member who will assist in preparing a detailed study program and in conducting the research that precedes the preparation of the thesis, and will chair the thesis committee.

4. **Faculty Committees**

The chair of each of the committees listed below must be a member of the Biological Systems Engineering Graduate Program. Up to two committee members may be from other graduate groups or graduate programs in the College of Engineering. One member may be from a graduate group or graduate program outside the College of Engineering.

a. Guidance Committee

This committee of **three** consists of the Major Professor plus two additional members suggested by the student in consultation with the Major Professor and the Graduate Adviser. The principal function of this committee, selected at the beginning of the first quarter of residency, is to assist the student in planning a program of study.

b. Thesis Committee (M.S. students)

This committee of **three** is chosen to assist in planning the research program, to offer advice during the course of the research and to help in the preparation of a suitable manuscript. Each student is encouraged to solicit the participation of faculty members for this committee. The major professor serves as chair of this committee.

c. Comprehensive Examination Committee (M.E. students)

This committee of **three** is appointed to assist with the preparation of the engineering report and to administer a final examination at the time the engineering report is completed by the student.

MASTER'S DEGREES

Two Master's degrees are available to graduate students in Biological Systems Engineering. Programs for **Master of Science** emphasize the science or research features of engineering and are intended to provide the student with abilities to assist with furtherance of the fundamental knowledge of engineering. Programs for the **Master of Engineering** emphasize design, analysis, economics, management, and/or labor, and are intended to assist the student with training that is useful to the professional engineer.

1. **Residency Requirements**

Candidates for the Master's degree must be in residence at least three academic quarters. Two consecutive six-week summer sessions may be counted as the equivalent of one regular quarter for purposes of satisfying the residency requirement for the Master's degree.

2. **Transfer Credit**

Though ordinarily all work for the Master's degree is done in residence, some work taken elsewhere or through UC Davis Extension may be credited toward the degree. The normal limit for such transfers is six units provided the units were not used to satisfy the requirements of another degree. A higher limit may apply for courses transferred from another campus of the University of California. Up to 12 units may be transferred from courses taken through UC Davis Extension while at UC Davis.

- a. Units to be so counted must have been taken at an accredited institution.
- b. Units of work taken elsewhere than the University of California may not be used to reduce the minimum residence requirement **or the minimum requirement in the 200 series courses taken at the University.**
- c. Requests for transfer credit are usually done at the time of Advancement to Candidacy. The Graduate Adviser should make a request to the office of Graduate Studies specifying the units and courses involved.

3. Program Requirements for the Master of Science (Plan I) Degree

Thirty-six units of credit in graduate and upper division undergraduate courses, a thesis, a public presentation and a minimum of three quarters of academic residence are required for the Master of Science degree. Please refer to the attached figure. At least 21 units of upper-division and graduate technical coursework must be in courses other than research and seminar. At least 12 of the 21 units must be earned in **graduate engineering** courses (200 series) exclusive of research and seminar courses (EBS 200, 290, 290C, and 299). The remainder (at least 9 units) may be made up of upper division courses (100 series) not required for the bachelor's degree at the University of California in Biological Systems Engineering, or of other graduate courses exclusive of research and seminar courses, **but not restricted to engineering courses**. The 36 units must include 2 units earned in **EBS 200 “Research Methods in Biological Systems Engineering”**. The Master's thesis is based on at least three units of research carried out for credit under the 290C and 299 course numbers. Students whose academic preparation does not include any coursework in biological/life sciences during their undergraduate studies must take at least one course in life sciences.¹ The unit requirements stated above are minima. It may be necessary to add additional courses in order to achieve suitable academic preparation for the thesis research. The thesis must demonstrate the student's proficiency in research or scientific analysis.

4. Program Requirements for the Master of Engineering Degree

Thirty-six units of coursework, a comprehensive examination, an engineering report, and a minimum of three quarters of academic residence are required for the Master of Engineering degree. Please refer to the attached figure. At least 24 units of upper-division and graduate technical coursework must be in courses other than seminar and research, and at least 12 units of the 24 must be earned in **graduate engineering** courses (200 series) exclusive of research and seminar courses (EBS 200, 290, 290C, and 299). The 36 units must include 2 units earned in **EBS 200 “Research Methods in Biological Systems Engineering”**. The engineering report is based on at least three units of research carried out for credit under the 290C and 299 course numbers. The remainder (at least 12 units) is made up of upper division courses (100 series) not specifically required for the bachelor's degree at the University of California in Biological Systems Engineering or of graduate courses exclusive of research and seminar courses, **but not**

¹ These underlined requirements are applicable to students who are admitted to BSE graduate program starting with Fall 2005.

restricted to engineering courses. The unit requirements stated above are minima. It may be desirable or even necessary to include additional course work in the program.

The Master of Engineering program may include studies in areas such as economics, psychology, and the life sciences. Breadth of program is encouraged within reasonable limits, but it is recommended that courses be selected from no more than three distinct fields.

The Master of Engineering report is based on supervised study carried out for credit under the 290C and 299 course numbers. The study may comprise library, laboratory, or field work, and is directed toward the solution of a specific engineering problem. Examples of appropriate report activities are design of components or systems, critical studies of existing systems, model studies, and field surveys. The form and quality of the report must conform to generally accepted standards of the engineering profession.

5. Sequence of Events

Students are expected to manage their own programs. They are expected to take the initiative in identifying the courses to be included in their academic program, in suggesting members for the various required committees, and in selecting the subject of investigation for their thesis or engineering report.

a. Guidance Committee Selection

Upon arrival at Davis, the student should meet with the Graduate Adviser, who will help in the selection of a tentative major professor and two other members for a guidance committee. These individuals may be changed later if it is found that other professors are more appropriate.

b. Program of Study Development

The student is encouraged to identify a major area of interest and outline a tentative study program before selecting courses for the first quarter. During the first two quarters, the student should develop a detailed study program with the assistance and approval of the guidance committee. Once approved by the guidance committee, the program of study must be submitted for approval by the Executive Committee of the Graduate Program by the end of the student's second quarter in residence.

c. Research Topic Selection

Students are encouraged to explore research topics as early as possible and make a final decision on the membership of the thesis or engineering report committee. The initial 299 research units may be used for literature review, topic selection and preliminary planning.

d. Advancement to Candidacy

A thesis committee of **three** is proposed by the student as part of the candidacy application for the Master of Science degree after consultation with the major professor and the Graduate Adviser. The student is expected to contact prospective committee members and to secure their approval to serve. The committee chair should determine the wishes of the individual members regarding assistance with the research and thesis review at the time the thesis committee is formed. A thesis committee is not required for the Master of Engineering student. However, comprehensive examination committee is required for the Master of Engineering students.

e. Public Presentation of Thesis

The student submits a draft of the thesis to the committee. The student obtains a presentation form from the Graduate Adviser, then schedules, in agreement with the committee, a public presentation of the research. Following the presentation the committee meets to review the research. The student completes the final version of the thesis and obtains the signatures of the committee members.

f. Comprehensive Examination (Master of Engineering only)

At the time of filing the application for candidacy for the Master of Engineering degree, a comprehensive examination committee of **three** is appointed by the Graduate Adviser in consultation with the student. The date for the examination is determined by the student in consultation with the committee members. Normally the examination is held after the engineering report is available in draft form.

The purpose of the examination is to determine the student's ability to apply the information learned to the solution of professional engineering problems rather than to re-examine graduate course work. The recommended examining procedure is outlined below:

The student prepares a written document and submits it to the examining committee at least three days before the examination. The document should contain the following:

- a. A brief summary (three pages or less) of the Master of Engineering project.
- b. Answers to questions that may be submitted by the major professor or members of the committee relative to the project.
- c. A statement of the professional goals and the relationship of the project to the goals.

The one- to two-hour oral examination can include:

- a. Questions and discussion relative to the project report.
- b. General questions relative to the program of study.
- c. Questions that relate to the engineering profession.

Upon successful completion of the Engineering report and the examination, the Graduate Adviser reports the results to the Dean of Graduate Studies

Degree check list:

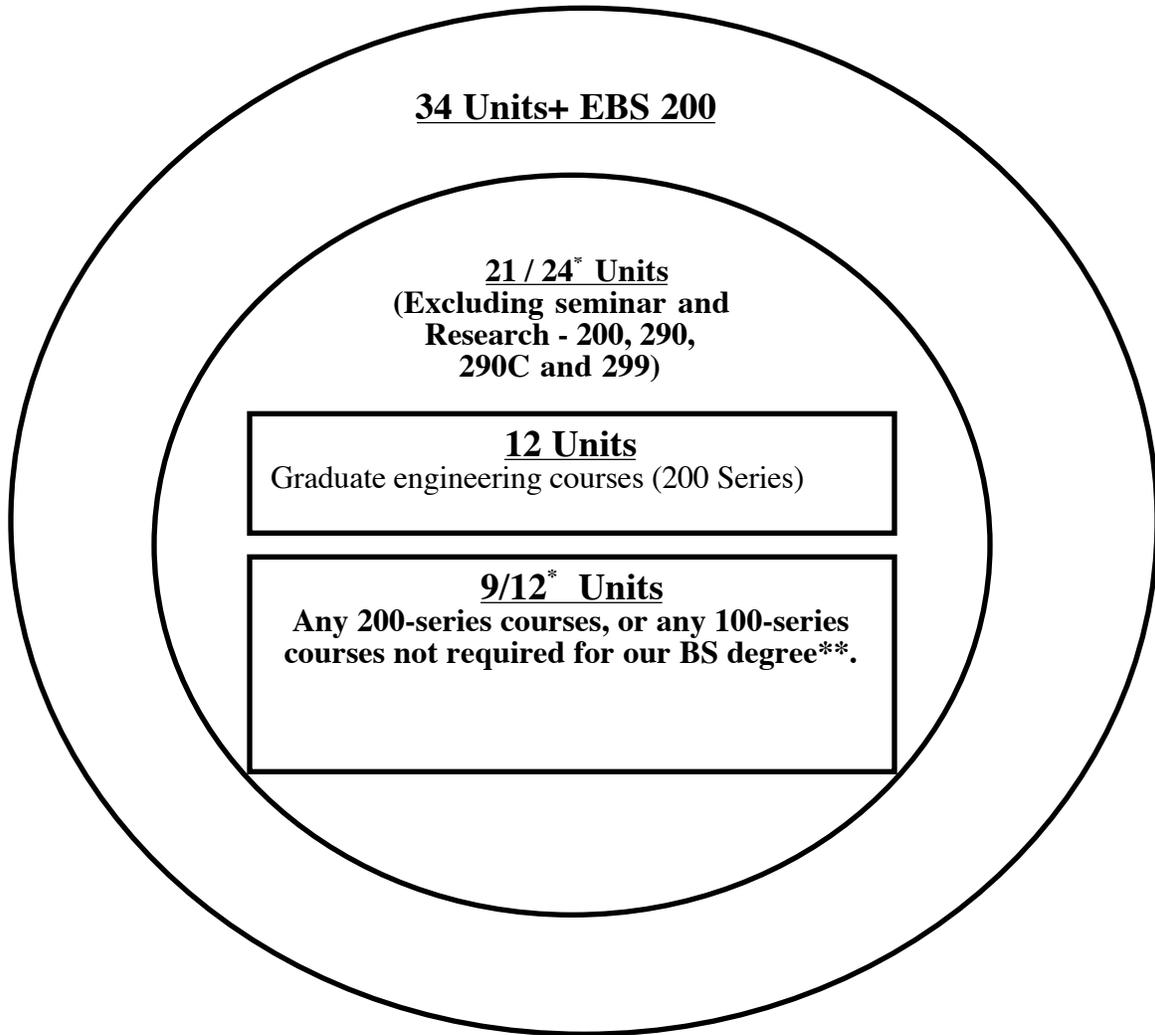
- ✓ Select a guidance committee and put together a program of study during your first quarter in residence. **This program of study should be submitted to the Executive Committee for approval by the end of second quarter in residence.**
- ✓ Upon completion of all courses on your program of study, complete the advancement to candidacy form and submit it to graduate studies. Master of Science students should select their thesis committee members at this time. *A thesis committee is not required for Master of Engineering candidates. However, a Master of Engineering candidate must select the comprehensive examination committee members at the time of filing for advancement to candidacy.*

➤ **Master of Science candidates only:**

- Upon completion of your research submit your rough draft to the thesis committee and **schedule your public presentation with the approval of the committee members.**
 - Following the public presentation obtain **signatures from the thesis committee members and submit the signed form to the Graduate Advisor.**
 - Submit the final version of the thesis to Graduate Studies!
- **Master of Engineering candidates only:**
- Prepare an engineering report and submit it to the comprehensive examination committee,
 - Pass the Comprehensive examination!

COMPLIANCE STATEMENT - In accordance with applicable State and Federal laws and University policy, the University of California does not discriminate in any of its policies, procedures, or practices on the basis of race, color, national origin, religion, sex, sexual orientation, handicap, age, veteran status, medical condition (as defined in Section 12926 of the California Government Code), ancestry, or marital status; nor does the University discriminate on the basis of citizenship, within the limits imposed by law or University policy. In conformance with applicable law and University policy, the University of California is an affirmative action/equal opportunity employer.

M.S. Program of Study:



*Master of Engineering students must take 24 units of courses other than seminars and research.

** Master of Science students who did not have life sciences background in their undergraduate studies must include at least one life science course.