Description of Course:
ENGR 050/50L is a lower division engineering course required for engineering majors at most universities. ENGR 050 is a five-unit course which combines two courses: Graphics and Statics. Graphics is a course involving the principles of engineering drawing using both manual and computer-aided design (CAD) methods. Statics is a course involving the study of rigid bodies in 2- and 3-dimensional space.

At most universities, the courses are taught as two separate courses; however, at UCSC, the courses have been combined. In order to maximize experience with each topic, the lecture portion of the class will primarily deal with Statics while the lab will focus on Engineering Graphics. Students must be registered for both Engr 50 and Engr 50L.

Learner Outcomes
Engineering Graphics
1. You will be able to create two and three dimensional engineering drawings by hand or using CAD.
2. You will be able to create drawings using standard drawing conventions recognized in the engineering field.
3. You will be able to create drawings with sufficient detail such that your design could be constructed or manufactured.
4. You will use the design process to engineer solutions to problems following particular specifications.

Statics
1. You will be able to apply the principles of Statics to solve practical problems.
2. You will learn and practice formal methods for problem solving and documenting solutions, which will be necessary for future engineering work.
3. You will gain access to knowledge and skills that will allow you to develop a mathematical and intuitive understanding of engineering mechanics for rigid bodies in equilibrium.

This class will also provide opportunities for you to increase your skills in critical thinking, problem solving, design, teamwork, oral presentations, decision making, goal setting, planning and time management.

ENGR 50 will be divided into three components:

Part B: Graphics, Computer-Aided Design (CAD)
Part C: Statics

The lab time will primarily be devoted to Graphics, Parts A & B, while the lecture will be used for the Statics portion of the class, Part C.
Instructor:
Karen Groppi, P.E.
email: kgroppi@soe.ucsc.edu or kagroppi@cabrillo.edu
Office: 157A Baskin Engineering
Office Phone (no voicemail): (831) 459-1046
voice mail: (831) 477-3500

Office Hours:
Tu & Th: 12:00 pm – 1:00 pm
Other times on Tuesdays & Thursdays are possible by appointment.

Class Hours:
Lecture: Tuesdays & Thursdays 10:00-11:45 am Physical Sciences 140
Lab: Either Tues or Thurs 2:00-4:00 pm Baskin Engineering 104
You must obtain an access code to BE 104 by visiting Al McGuire in 399C between 1:00 and 3:00 pm. You may also get a code to access the BE building nights & weekends.

Textbooks:
Technical Graphics Communication 3rd ed. by Gary Bertoline & Eric Wiebe
ISBN: 0-07-365598-8
All texts are required. Please bring appropriate text to class meetings and lab.

Materials & Equipment Required:
Scientific Calculator (must have trigonometric functions and matrix operations)
Engineering Paper (bookstore)
Digital file storage media (thumb drive)
Drawing Instruments (bookstore, Palace Arts)
Soft eraser
Mechanical Pencil:
One Drafting pencil with thick leads, 2H, and HB, plus a sharpener
OR
One .9mm fixed lead size pencil and one .5mm fixed lead size pencil with soft and hard leads.
Small (6” to 8” size) triangles:
45 degree
30/60 degree

Scales: one of each
Engineer’s
Architect’s
Metric or metric ruler

Attendance
Much like a job in the engineering field, your presence during our meetings is essential to your own and your classmates’ progress. Therefore attendance is required. Failure to attend class or to arrive late or leave early, without prior notification may affect your grade. Prior notification means speaking with your instructor or leaving a voice or email message before the meeting time. If the instructor excuses the absence, late homework will be allowed and the absence will not be counted. See the grading policy below.
Homework:
Homework assigned is due on the date specified at the beginning of class. Homework turned in late will not be accepted unless it is late due to an excused absence.

Homework shall be completed in accordance with the General Criteria for Problem Solutions below. Grading will assess compliance with these requirements and not necessarily correctness of the solutions. It shall be the student’s responsibility to check their own solutions against those provided to determine the effectiveness of their studies.

Solutions for homework problems will be posted online.

Exams:
Because this course covers distinct topics; separate exams for manual drawing and Statics will be required. A final project will be assigned for the CAD portion of class. A 3” x 5” index card of notes and calculators may be brought into each exam. Bring engineering paper for the Statics exams. The exam schedule is as follows.

Exam No. 1: Graphics --- Manual Drafting Exam
Exam No. 2: Statics-- Components, Resultants, Moments, Distributed Loads, Equilibrium
Exam No. 3: Statics-- Friction, Trusses, Frames, V-M Diagrams, Centroids, Center of Mass, Moment of Inertia
Final Exam: Statics (cumulative)

All students are required to take the final examination.

Makeup exams will not be given except in the case of an emergency or an unusual circumstance with prior approval by the instructor. If an exam is missed and prior approval was not received, the student will receive a zero.

Final Grade:
The course emphasis is 60% Statics and 40% Graphics. In order to maintain this distribution, you will receive the same grade for both the lecture and the lab, or the Graphics score for the lab grade if it is higher than your Statics score. Evaluation of your work for this class will give the following weight to your submittals:

**Graphics**

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<tr>
<th>Manual Drawing</th>
<th>Homework</th>
<th>7.5%</th>
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<tbody>
<tr>
<td></td>
<td>Exam No. 1</td>
<td>10%</td>
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<tr>
<td></td>
<td>Individual Project</td>
<td>7.5%</td>
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<tr>
<th>CAD:</th>
<th>Homework</th>
<th>7.5%</th>
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<tr>
<td></td>
<td>Final Project</td>
<td>7.5%</td>
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<table>
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<tr>
<th>Statics:</th>
<th>Homework</th>
<th>10%</th>
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<tbody>
<tr>
<td></td>
<td>Exam No. 2</td>
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<tr>
<td></td>
<td>Exam No. 3</td>
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<tr>
<td></td>
<td>Final Exam</td>
<td>20%</td>
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Total: 60%
All of the above work will be graded on a percentage basis. If you choose to receive a letter grade at the end of the course, it will correspond to the weighted average of all scores as follows:

- 90 - 100% A
- 85 – 89% B+
- 80 – 85% B
- 75 – 79% C+
- 70 – 74% C
- 60 – 69% D
- 0 – 59% F

As mentioned above, class attendance is required and is necessary in addition to completion of the assigned work, and exams. The percent of class time attended will determine the highest possible grade according to the same distribution shown above.

For example, if a student’s course work average is 88% and the attendance average is 78%, the grade received for the course will be a C.

If you would like to know your final grade or receive a copy of your evaluation at the end of the course, provide an addressed, stamped envelope or your email address.

**Withdrawal:** If you plan to withdraw, you must drop officially.

**Disabilities:** If you qualify for classroom accommodations because of a disability, please get an Accommodation Authorization from the Disability Resource Center, (831-459-2089, or drc@ucsc.edu) and submit it to your instructor outside of class within the first two weeks of the quarter.

**Classroom Environment:**
In the interest of maintaining an optimum space for learning you are expected to treat each and all members of the class with respect.

Academic dishonesty will not be tolerated in any form. **Official University policy on Academic Integrity for Undergraduate Students** ([http://www.ucsc.edu/academics/academic_integrity/undergraduate_students/](http://www.ucsc.edu/academics/academic_integrity/undergraduate_students/)) defines Academic Dishonesty and prescribes consequences.
Statics

General Criteria for Problem Solutions (homework & tests)

1. The problem is defined. The following are shown:
   a. Given
   b. Required
   c. Assumptions if applicable

2. Sketch of members is shown if applicable.

3. Freebody diagram is shown including:
   a. Axis labeled
   b. Forces
   c. Angles
   d. Distances

4. General equation or formula is shown.

5. Formula or equation with problem specific values is shown.

6. Math steps are shown.

7. Directions of forces are indicated.

8. Work is legible, neat and easy to follow.

9. Checks are shown.

10. Solution is correct including:
    a. Solution required is shown in a box.
    b. Math is correct. (not required for homework)
    c. Significant digits are consistent with quantities given.
    d. Units are shown.
    e. Short explanation in words is given if applicable.

11. Assignment presentation is professional:
    a. On 8 1/2”x11” engineering paper
    b. One side only
    c. Stapled
    d. Name, date and assignment number appear on each page
    e. Pages are numbered: page no/total pages (i.e. 2/4 means this is page two of four pages.)

Homework Grading
Check plus = 3 points
All problems are complete and all criteria are met.

Check = 2 points
All problems are not complete and/or 3 or fewer of the criteria are not met

Check Minus = 1 point
All problems are not complete and/or 4 to 6 of the criteria are not met
Engineering Graphics

General Criteria for Problem Solutions
(for homework, exams & project drawings)

1. Each drawing has title block that shows the following:
   a. drafter
   b. drawing title, or problem and assignment number.
   c. date
   d. page number, if drawing is part of a set with multiple pages show page no/total pages (i.e. 2/4 means this is page two of four pages.)
   e. scale if applicable

2. Correct line weights are used for all lines including edge, hidden, leader, dimension etc.

3. Text is the correct height and style and is placed at the proper spacing. Guidelines are used for hand lettered text.

4. The scale is:
   a. shown in the correct form,
   b. matches the drawing
   c. is found on the appropriate ruler.

5. Assignment presentation is professional:
   a. on 8 1/2"x11" paper
   b. one side only
   c. stapled
   d. name, date and assignment number appear on each page
   e. pages are numbered as indicated above.

Engineering 50 Manual Drawing Homework Grading
Check plus = 3 points
All problems are complete and all criteria are met.

Check = 2 points
All problems are not complete and/or 3 or fewer of the criteria are not met

Check Minus = 1 point
All problems are not complete and/or 4 to 6 of the criteria are not met

Engineering 50 CAD Homework Grading
See grading criteria given with each assignment.