

CALVIN

College



Engineering Faculty Advising Handbook

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1 Academic Advising Meetings

Students are asked to meet with academic advisors once each semester during two days of Academic Advising (during which no classes are held). You can find the dates for Academic Advising on the Academic Calendar published by the Provost (<http://www.calvin.edu/admin/registrar/calendar>). This Advising Handbook is a tool to help students and advisors. However, please note that if any discrepancies with the college catalog occur, the catalog is the official source of information and takes precedence in interpreting policies and implementing procedures.

There are also general reminders for academic advising:

- Send any requests for course substitutions to the Registrar's secure e-mail alias, substitutions@calvin.edu.
- Please remember to send any academic or course attendance concerns to attendance@calvin.edu.

1.1 Preparing for Academic Advising Appointments

You should place a sign-up sheet on your door a week or so before Academic Advising. You can find an example instruction sheet to place next to your sign-up on your door in Appendix A: Advising Sign-up Instructions”.

Email your advisees to let them know the sign-up is available. You can use KnightVision to send email to all your advisees. Look under “My Calvin” for a section called “My Organizations”. You should see “Advising for Jane Calvin” (except your name instead of “Jane Calvin”). Click on this link, then choose “Control Panel” > “Send Email” > “All Users”.

You may want the latest program sheets handy for reference. You can find them on the web at <http://www.calvin.edu/academic/engineering/students/advising/> or grab a color printed copy from the racks in the hall just outside the engineering office.

1.2 During Academic Advising Appointments

Some professors start each academic appointment with prayer. Others welcome the student and introduce themselves to any new advisees. It is good to explain the purpose of advising to new students.

Review course selections with the student, following the engineering program sheets and their Academic Evaluation Report (AER), which you can access in KnightVision. A long blank link indicates a requirement yet to be fulfilled, like the blank after “Group 3” in the example to the right.

D: SECOND YEAR FALL			
> 1.	Engineering 209		
> 2.	Mathematics 231		
> 3.	Economics 151		
> 4.	Physics 235		
> 5.	Computer Science 104		
Credits: 16			
Group 1			
	ENGR-209.....	06/FA	B+ 4
Group 2			
	MATH-231.....	06/SP	A 4
Group 3			
			1 course needed

For students who are following the model program precisely, you can simply point the student to the courses listed on the program sheet. For students who are not following the model program precisely, be sure to check prerequisites carefully before suggesting a course.

If you are uncertain on any issue, ask the department chair (phone for quick advice).

1.2.1 Core Curriculum Courses in Pink

The courses listed in pink on the program sheet are core curriculum courses that can be taken in any order. The alternatives for core curriculum are found on the CORE requirements list available at <http://www.calvin.edu/academic/engineering/students/advising/>. There are, however, a few guidelines:

- Take ENGL101 as early as possible, as this course improves the student's writing ability, which will help with all other courses.
- Take religion (either 121 or 131) during the first two years, at the request of the religion department.
- If possible, take the first PE course (100-110) before the other two.
- When there are choices, have the student pick a particular course, because this helps emphasize that they must choose a course from the specified list. For example, "The Arts" category does not allow any art course, but only those listed (which includes music and other areas that the student might not realize).
- Econ Elective: 151 or 221 Choose 221 if student plans to pursue Business minor.

1.2.2 Advanced Math Electives in Red

Advanced math electives are listed in red on the program sheet. The alternatives for advanced math are found on the elective options list available at <http://www.calvin.edu/academic/engineering/students/advising/> or in the racks outside the engineering office. These are the suggested options – students can take any 300-level math course that has MATH172 as a prerequisite (either directly or indirectly).

1.2.3 Basic Science Electives in Green

Basic science electives are listed in green on the program sheet. The alternatives for basic science are found on the elective options list available at <http://www.calvin.edu/academic/engineering/students/advising/> or in the racks outside the engineering office. These are the suggested options – students can take any natural science course (biology, chemistry, geology, physics) that is part of the major for that discipline and which includes a lab.

1.2.4 Engineering Electives in Blue

Engineering electives are listed in blue on the program sheet. The alternatives for the engineering elective are found on the elective options list available at <http://www.calvin.edu/academic/engineering/students/advising/> or in the racks outside the engineering office. Please note that ENGR 338, Traffic Design, is an elective option for students in the Civil & Environmental Concentration only.

1.2.5 Broader Advising

Besides detailed course advising, try to discuss broader issues with the students if there is time. You may want to cover the following topics depending on the student's year. Note that the registrar declares the student's year based on credits. Because engineering students take a high number of credits each semester, the registrar's classification is sometimes "ahead". For example, a student in the spring of their sophomore year of engineering may be considered a junior by the registrar.

First-year: Explain academic support services such as tutoring. Note that most technical courses have a minimum grade of C- to gain departmental admission. Explain how to read the AER. Be sure to make it clear it is the student's responsibility to ensure they take the right courses. You are there to help, but it is their responsibility in the end. Check if the student needs to take foreign language (if they had less than

two years in high school), because this will probably require summer school for two core courses, so look at this their first year. Talk about engineering as a vocation and calling.

Sophomore: Explain departmental admission. Ask if they have submitted their application form yet (electronically as an attachment to EngrApplication@calvin.edu). Warn the student they may not take 300-level engineering courses without admission. Discuss internships. Warn the student that they must take the internship seminar course for departmental admission.

Juniors: Discuss internships. If student is thinking about graduate school, advise them to select the schools over the summer before their senior year so that they can start applying in the fall.

Seniors: Discuss the job hunt and/or graduate school. Talk about engineering as a profession and vocation.

At the end of the appointment, be sure to ask if the student has any questions or concerns.

1.2.6 Engineering Seminar 294/394 (0 credit)

A seminar devoted to an exploration of topics in engineering. Seminars will cover areas such as the practice of engineering design, non-technical issues in engineering practice, engineering graduate studies, and aspects of engineering analysis. Students will receive transcript recognition for Engineering 294 if they attend eight (8) seminars before being admitted and will receive transcript recognition for Engineering 394 if they attend eight (8) seminars after being admitted to a BSE concentration. Plant tours and technical society meetings may be substituted for seminars upon approval. Engr. 294 is NOT a prerequisite for Engr. 394. Students can find out the number of seminars by contacting the Engineering Department Office or asking their advisor during Academic Advising. Honors students admitted for the fall of 2008 or earlier are required to have transcript recognition for either Engr. 294 or 394.

Students admitted to the program for the fall 2009 or later, Engineering 394 is required for graduation. Beginning with students entering as FTIACs in Fall 2009 or later, Engineering 294 is required for admission to the program.

1.2.7 295 Internship Workshop (0) F

A four session workshop intended to prepare freshman/sophomore level engineering students to successfully obtain a summer internship and to be a responsible employee. The workshop topics include: Calvin’s engineering internship program, finding an internship, writing a resume, interviewing, and on-the-job behavior. Completion of the workshop is a requirement for admission to a concentration in the engineering program.

1.2.8 Civil/Environmental Issues

All civil/Environmental concentration students must take the following “common” courses: Engr 305, 319, 339/340, 394. Along with the “common” courses there are three tracks in the civil/environmental concentration:

	“analysis”	“design”
Environmental	ENGR 306(F)	ENGR 308(S)
Hydraulics	ENGR 320(S)	ENGR 321(F)
Structural	ENGR 326(S)	ENGR 327(F)
	Must take all 3 of courses	Must take a min. of 2 of courses

We also have two “civil” electives that are offered alternating years:

- ENGR318 – Soils Mechanics & Foundation Design (Spring of odd years)
- ENGR338 – Traffic Engineering (Spring of even years)

A student in the civil concentration needs to take the following beyond the “common” courses:

1. The 3 “analysis” courses (306, 320, 326)
2. Two of the “design” courses (308, 321, 327)
3. An Engineering elective
4. One Basic Science, Math, or Engineering Elective
5. One Basic Science or Math Elective (not an engineering course)

The engineering elective of item 3 and 4 may be any of the elective options including the third “design” course, 318, 338 or any of the ones listed in the engineering elective options worksheet.

1.2.9 Chemical Engineering Issues

From time to time, some students in the Chemical concentration struggle with balancing their course load requirements. Students and advisors are encouraged to evaluate alternative solutions. For some students this might mean taking Organic Chemistry during the sophomore year and delaying Engr. 204 and/or Engr. 202 until the junior year. This involves advising the student toward conditional admission rather than full admission to the program at the end of the sophomore year. This is an acceptable plan as long as the requirements for conditional admission are met. Students may not be advised to seek an exception to conditional admission. The following courses fulfill the chemistry elective in the chemical concentration program: Chem 201, 230, 303, 323, 271, 325, 330, 318 Biol 123, 141

1.3 After Academic Advising Appointments

Except for seniors, all students are prevented from registering for courses until their academic advisor checks them off in KnightVision. So be very sure to login to KnightVision, go under the “Resources” tab and then click on the “Verification/sign-off” link under the “Resources: Faculty - Courses and Advising” section.

2 Passport Advising

A special version of advising, called Passport, is done for incoming first-year students in the summer before they start. Not all faculty advise during Passport –we usually need between one and four faculty available for each of the four different sessions spread throughout the summer. You receive a small stipend for advising during passport.

2.1 Preparing for Passport

A few days before a Passport session, you will receive a notice of an advisor’s meeting that will be held the morning of the session. Be sure to go to the advisor’s meeting, because there you will receive your advising folders for the day and a schedule of your advising appointments. The meeting includes a short training session and any last-minute announcements. Be sure that during this meeting the leader tells all the advisors to send any engineering students to an engineering advisor. If they don’t say this, please raise the issue yourself so that other advisors hear this important point. (All engineering students are supposed to be assigned an engineering advisor, but occasionally one slips through the cracks.)

2.2 During Passport Advising

Some professors start each academic appointment with prayer. Others simply welcome the student and introduce themselves. It is good to explain the purpose of advising for these new students. You may also want to note that you may not be their permanent advisor, but they are free to contact you with questions until permanent advisors are assigned in the fall.

Verify the student has a calculus placement test result in their folder. Follow the recommendation! This is a very reliable measure of the student's ability. Do not let the student talk you into taking MATH171 if MATH169 is recommended.

On the (typically purple) course selection sheet that comes in the student's folder, fill out each section as directed. For most students, under the "must take" courses section, put:

CHEM103, ENGR101 ENGR181, MATH171, IDIS149

and under the "could take" course section, put:

ENGL101 (preferred) or HIST151/152 or REL121/131.

Indicate the student's preference between HIST151 (pre-renaissance) or HIST151 (post-renaissance). Indicate the student's preference between REL121 (Biblical) or REL131 (Theological). Add a note to be sure the student is given at 15-16 semester hours total.

Ask about language. If a student didn't take 2 years of high school foreign language they will need to fit in two semesters at Calvin. One option to meet the foreign language requirement is the Summer Program in Germany.

Wrap up by discussing academic support. Tell the student about tutoring services.

2.2.1 Exceptions

2.2.1.1 Behind in Math

There should be a calculus-readiness placement test in the student's folder. Follow the recommendation! This is a very reliable measure of the student's ability. Do not let the student talk you into MATH171 if MATH169 is recommended.

If they do not have a placement test result, ask them why not. If the student did not take pre-calculus in high school or did poorly, they must take MATH169 in the fall.

Students taking MATH169 instead of MATH171 will then take MATH170 during the interim (pushing DCM to sophomore year). The combination of MATH169/170 is equivalent to MATH171, getting them back on track by spring.

2.2.1.2 Ahead in Math

If the student has AP credit for MATH171, this will be noted on their AER. Then recommend MATH172 for the fall. Do NOT place a student in MATH172 unless the registrar has recognized their AP credit on the AER. If the student says the test scores are still coming, then register them for MATH171 and tell them they can change to MATH172 at the registrar's office once the test scores arrive.

2.2.1.3 Math Curriculum revision issues

A few years ago the Math Dept. changed some of their courses which now affects some engineering majors. Please review the following when advising students who began their math courses under the old sequence:

OLD	NEW
Math 161	Math 171
Math 162	Math 172
Math 232	Math 270 + Math 241
Math 231	Math 231

2.2.1.4 Ahead in Chemistry

CHEM103

Currently our program has CHEM103 as a required course for graduation. This is due to two factors: first it is a prerequisite for ENGR106, and second it counts as a course in "college level math and basic sciences" to satisfy our ABET requirements (minimum of 32 SH).

A student can come in with some options related to CHEM103. They can take an exemption exam and get either an exemption or credit for CHEM103. If the student gets credit for CHEM103 then it meets both requirements that we have for the course: the prerequisites for ENGR106 AND it counts as a math/science course.

If the student gets an exemption only for CHEM103 (not credit) then it only meets the requirement for a prerequisite for ENGR106. The student should be advised to take an additional math/science course to guarantee that they meet the minimum ABET requirement of 32 SH in math/science (typically, Calvin's engineering program requirements include a minimum of 35 SH of Math/Science).

If the student chooses to use the CHEM103 exemption only, the student and his/her advisor are responsible for keeping records of this.

It may be possible for the student to take PHYS133 in the fall if they already have credit for CHEM103. They must also have AP credit for MATH171 so that they are taking MATH172 concurrently. There is a possibility to take PHYS133 concurrently with MATH171, but only by permission of the instructor.

Note that the credit for CHEM103 must be clearly noted on the AER. If the student says the test scores are still coming, then register them for CHEM103 and tell them they can change it later at the registrar's office once the test scores arrive.

2.2.2 Undecided Students

Choosing between Engineering or Physics

First semester, take ENGR101, ENGR181, MATH171/172, CHEM103 and PHYS133. (defer core courses until spring). If in MATH171, the student will need permission of the PHYS133 instructor to take concurrently. Students and faculty are also encouraged to review the resources on the web at http://www.calvin.edu/academic/engineering/academics/engr_physics.htm.

3 Departmental Admission

Students apply for admission to the department during the semester in which they are completing the model first two years (and have a GPA of at least 2.30). They can apply for conditional admission if they do not have more than 10 semester hours of course deficiencies and only if their cumulative grade point average is no less than 2.20.

Students may not take 300-level engineering courses without admission to the department. Unadmitted students who attempt to register for 300-level courses (disregarding the stated policy of the department)

are removed from the class during the first week of the semester (yes – we check the rosters for this issue).

For students who reach the end of their second year and cannot apply even for conditional admission, advise them to focus on taking care of the missing courses, and then fill in the rest of their schedule by taking the remaining core curriculum courses they need as well as the basic science elective courses.

4 Extra Curricular Activities

Engineering is a challenging, professional program. Even academically strong students must carefully organize their time in order to succeed. Stress the following guidelines with students:

- Do not work more than 10-15 hours a week during the school year. When accepting a job, discuss this with your supervisor so that expectations are clear.
- Do not pursue more than one extra-curricular activity such as athletics or drama or music per semester.
- If your grades start to suffer, cut back on the other activities or schedule a lighter load by taking summer courses or going to a five year plan.

5 Other Engineering Disciplines

If students are interested in transferring after a few years at Calvin or interested in graduate school, here are some things to keep in mind. If they are interested in adding another major or minor, see section 9 below.

5.1 Biomedical, Bioengineering

Take biology courses for basic science electives. Choose Electrical & Computer concentration if interested in instrumentation and devices. Choose Mechanical concentration if interested in devices or prosthetics. Choose Chemical concentration if interested in pharmaceuticals.

5.2 Aerospace Engineering

If interested in avionics, choose the Electrical & Computer concentration. If interested in design of aircraft, choose the Mechanical concentration.

5.3 Acoustical Engineering

Take Mechanical concentration and choose ENGR307 as the Engr. Elective.

6 Catching Up

If a student drops a course or gets a grade below the minimum necessary (C- in engineering and technical cognates), there are a couple ways to make room in order to the student to catch up:

- Take a core curriculum course during the summer to make room during the semester
- Take IDIS 103 in the interim rather than IDIS102 during the semester
- Take CCE during the interim, as an independent study, or during the summer
- Use the free elective slot

- Spread out their program to four and a half or five years [This is the recommended approach to catch-up for most students.]

Pay special attention to technical courses that are prerequisites for other courses, scheduling these as early as possible.

Students in the sophomore year that must drop or delay a 200-level engineering course should select the one that is NOT needed as a prerequisite to courses in their concentration.

ENGR202: Needed for the Civil & Environmental concentration and the Mechanical concentration.

ENGR204: Needed for the Electrical & Computer concentration. Also needed for ENGR382 in the Mechanical concentration.

ENGR209: Needed for the Chemical concentration, Civil & Environmental concentration, and Mechanical concentration.

6.1 Summer Courses

6.1.1 At Calvin

Very few technical courses are offered at Calvin during the summer. You can sometimes find some of the MATH171/172 or CHEM103 courses. The core curriculum courses are much more common in the summer. The Summer Program in Germany allows students the option to take Engr. 202.

6.1.2 Not at Calvin

If students are considering taking a course elsewhere (or if you think they might consider it later because they have courses to make up), be sure they get the pre-approval form signed by Calvin's registrar beforehand. This can avoid a lot of trouble later! They can only transfer courses if they get a C or better.

Up to 70 hours of Community College credit are accepted by the Registrar.

6.2 Five-Year Program

If students want to take a lighter load each semester, they can arrange the program into five years, taking less each semester. (Taking summer courses can also help.) Some students wish to add another major or minor, which may require a five-year plan. Students sometimes benefit from downloading the MS Word format of the engineering program sheets (<http://www.calvin.edu/academic/engineering/students/advising/>) and modifying it to lay out their customized program.

7 Transfer Students

The department chair should advise transfer students for the first couple semesters after they arrive at Calvin. This chart is specific to Grand Rapids Community College. More information can be found online at: <http://www.calvin.edu/academic/engineering/students/Prospective/transfer.html>.

Transfer Model Program					
	GRCC Equivalent Courses	Calvin Student Requirements			
First Year	Fall (17)	CM 103	<input type="checkbox"/> 4 Chemistry 103 <input type="checkbox"/> 2 Engineering 101 <input type="checkbox"/> 2 Engineering 181	General Chemistry (F) Intro to Engineering Design (F) Graphical Communication Lab (F)	
		EG 110	<input type="checkbox"/> 4 Mathematics 171	Calculus I (F,S)	
		MA 133	<input type="checkbox"/> 4 Physics 133	Introductory Physics, Mechanics and Gravity (F,S)	
		PH 245	<input type="checkbox"/> 1 Interdisciplinary 149	First Year Prelude	
			<input type="checkbox"/> 3 <i>Interdisciplinary 150</i>	<i>Developing the Christian Mind</i>	
	Spring (17)	MA 134	<input type="checkbox"/> 4 Engineering 106 <input type="checkbox"/> 4 Mathematics 172 <input type="checkbox"/> 4 Physics 134 <input type="checkbox"/> 4 <i>History 151 or 152</i> <input type="checkbox"/> 1 <i>Health and Fitness</i>	Engineering Chemistry and Materials Science (S) Calculus II (F,S) Matter, Space, and Energy (S) <i>History of the West and the World</i> <i>(PER 101-112)</i>	
		Fall (16)	EG 208 & 212	<input type="checkbox"/> 4 Engineering 202 <input type="checkbox"/> 3 Mathematics 270	Statics and Dynamics (F,S) Multivariable Calculus (F,S)
			PH 246	<input type="checkbox"/> 4 Physics 235 <input type="checkbox"/> 2 <i>Mathematics 241</i> <input type="checkbox"/> 3 <i>Religion 121 or 131</i> <input type="checkbox"/> 0 Engineering 295	Introductory Physics: Electricity and Magnetism (F) <i>Engineering Statistics (F)</i>
				<input type="checkbox"/> 3 Free Elective (or consider taking <i>CAS 101 here in place of IDIS 102</i> later)	Internship Workshop
				<input type="checkbox"/>	Must decide between Engineering and Physics prior to spring of Sophomore year
Spring	<input type="checkbox"/>	<input type="checkbox"/>			

This worksheet is for students who have not decided between Engineering and Physics

8 Forms You should Know About

8.1 Concentration Program Sheets

These forms are produced by the engineering office. They are available on the web at <http://www.calvin.edu/academic/engineering/students/advising/> and also printed in color in the racks outside the engineering office. Students who have unusual schedules (such as adding a major, taking 5 years, etc.) sometimes benefit from downloading the MS Word format of the program sheet and modifying it to lay out their customized program.

ELECTRICAL & COMPUTER CONCENTRATION - BSE PROGRAM (For Students Entering Fall 2002 or After)			
First Year	Fall	Has	Needs Substitute
			4 Chemistry 103 - General Chemistry (F)
			2 Engineering 101 - Intro to Engineering Design (F)
			2 Engineering 181 - Graphical Communication Lab (F)
			4 Mathematics 161 - Calculus I (F,S)
			3 English 101 - Written Rhetoric
			(1) Interdisciplinary 149 - First-Year Prelude
	Interim		3 Interdisciplinary W50 - Developing the Christian Mind
	Spring		4 Engineering 106 - Engineering Chemistry and Materials Science (S)
			4 Mathematics 162 - Calculus II (F,S)
			4 Physics 133 - Introductory Physics: Mechanics and Gravity (F,S)
			4 History 151 or 152 - History of the West and the World
	Second Year		
	Fall		4 Engineering 209 - Intro. to the Laws of Conservation & Thermodynamics
			4 Mathematics 231 - Differential Equations with Linear Algebra (F,S)
			4 Physics 235 - Introductory Physics: Electricity and Magnetism (F,S)
			2 Computer Science 104 - Applied C++ (F)
			3 Economics 151 - Principles of Economics
	Spring		4 Engineering 202 - Statics and Dynamics (F,S)
			4 Engineering 204 - Intro. to Circuit Analysis and Electronics with Lab (S)
			4 Mathematics 232 - Engineering Mathematics (F,S)

8.2 Major Declaration Form

This is a form from the registrar's office. This is NOT used by the engineering department. You should NEVER sign one as an advisor, because we do our students as a group as part of the admission process. Signing one of these forms will confuse the Registrar and our Engineering Office.

Declaration of Major and/or Minor

Instructions (PLEASE READ BEFORE COMPLETING):

1. Either student or advisor will initiate the completion of this form when the student is ready!
2. New major advisor must sign the form in the appropriate place (minor advisor signatures except for minors declared by education students). Please also print name on form & comp
3. The new advisor or the student will submit the form to the Registrar's Office.
4. The Registrar's Office will process the form & email student when complete. Forms are due two weeks.
5. The student and/or advisor may check the accuracy of the Academic Evaluation Report on I
6. If either the student or advisor has questions, he/she should contact the Registrar's office.

Student's Name: _____ Student Number: _____
 Calvin E-mail: _____ Today's Date: _____

8.3 Application for Departmental Admission

When students are completing the last semester of the model first two years (normally spring of sophomore year), they should complete this admission form electronically and send it to EngrApplication@calvin.edu. This is very important, as they cannot take 300-level engineering courses without admission. When advising sophomores, ask if they have submitted their electronic application. Announcements are made in the 200-level engineering courses in the spring to remind students to complete the application.

**CALVIN COLLEGE APPLICATION FOR ADMISSION
CONCENTRATION IN THE ENGINEERING PROGRAM**

Student ID: _____ Calvin user ID: _____
First Name: _____ Last Name: _____
Permanent/Home Address: Street: _____ City: _____ State: _____ Zip: _____
Home Phone: _____ Cell Phone: _____
Summer 2007 Address: (if known & different than home) Street: _____ City: _____

I want my correspondence sent to my Home address Summer Address
For many students the Department Home address is the same as the parent's. It is the student's name

8.4 Academic Evaluation Report (AER)

As an advisor, you can access the AER for any of your advisees through KnightVision. Login to KV and click on “My Advisees - AERs & transcripts” under the Resources tab.

After choosing the semester (normally the current semester), select “Evaluate Program” next to the student of interest and click “Submit. The report is listed in chronological order by semester. A long blank line indicates a course that still needs to be taken. If a course is filled in but has “*IP” listed after it, then this course is currently In Progress.

Courses that the student has taken that do not apparently fit any required categories are listed at the very end of the report. If you believe a course is listed in the wrong place on the AER, please see the department chair for instructions on how to have it corrected. You may not allow any substitutions or variations from the required courses without the approval of the department chair.

03/31/07 Calvin College Academic Evaluation Page 1

Student: ~~XXXXXXXXXXXX~~
Program: BSE Electrical Engineering (BSE. ENGR+ELEC) Catalog: 2003
Current Status: Declared
Class: Senior Enrollment Status: Honors Student
Email Address: ~~xxxxxx@calvin.edu~~
Addnl Major:
Addnl Minors:
Addnl Specs:
High School GPA: 4.000
ACT Composite: 29 ACT English: 26 ACT Math: 31
ACT Reading: 32 ACT Science: 26

Advisors: S. Vander Leest (Primary Adv) (ext. 526-6559)

The B.S.E. degree requires completion of 28 hours of engineering courses common to all concentrations, 34 hours of technical cognates (mathematics, science, and business), 36 hours of liberal arts courses and 38 to 42 hours of courses specific to each concentration.

9 Adding a Second major or a minor

Adding a major or minor will usually require more than 4 years to complete. The Engineering course schedule is carefully constructed to allow completion of the BSE in four years. Class times cannot be shifted to accommodate additional majors/minors.

9.1 Chemistry Major

This is not a Chemistry degree (all the technical courses for a Chemistry degree will be completed, but not all the core courses). This major has four requirements:

- Complete the model program for the chemical concentration.
- Take CHEM201, 203 + 303 or 323 as the advanced chemical elective in the chemical concentration.
- Take CHEM295 four times. This is a series of seminars

9.2 Chemistry Minor

There are two requirements for this minor

- Complete the model program for the chemical concentration.
- Take CHEM201 as the advanced chemical elective in the chemical concentration

9.3 Math Minor

The math minor requires 6 courses, 4 of which are required as cognates in engineering (MATH171, 172, 231, 232). Students can take the fifth and sixth course as their Advanced Math elective. Be sure the final two courses are selected from the list for the minor listed in the catalog under Mathematics. Students and Advisors should note that MATH343/344 are taught as a pair. Although a student may take MATH343 alone, there are a number of topics that are taught in a sequence and some important concepts are left until MATH344.

9.4 Business Minor

The business minor requires 6 courses. The first of these can be an engineering cognate but the student must choose to take ECON221 (which counts towards the minor) rather than ECON151 (which does not). This minor cannot normally be finished within four years when pursuing an engineering degree.

Students interested in the business minor or in simply expanding their business background can substitute Business 170 + Business 203 for the 2 s.h. Business 357 requirement.

Advisors that wish to allow this substitution should send an e-mail to the Registrar allowing this to be entered on the AER of his or her advisee. Because of software constraints and the fact that the Engineering Department AER is written in a semester by semester format rather than major/minor format this does not automatically happen. Approval of the department chair is NOT required for this substitution.

10 Engineering Minor

At Calvin, students may minor rather than major in engineering by taking six classes including one of two 100-level courses, at least two of three 200-level courses and at least two 300-level courses from a selected list. While a minor is a consideration for some students, please be aware that it is not ABET accredited. For more information on an engineering minor, see the Engineering section of the College Catalog or direct your questions toward the Engineering Dept. Chair.

Appendix A: Advising Sign-up Instructions

Advising sign-up sheets are available from Beth in the Science Division Office. Beth often sends an e-mail with the information. Faculty are also encouraged to do electronic sign-up sheets in Moodle.

Advising Appointments

Am I required to meet with my advisor?

Yes! You will not be able to register until you have met with your advisor. Only seniors are exempt from this requirement (seniors are still very welcome to sign up!). Your advisor can work with you to make sure you are taking the right courses each semester and to help ensure you do not miss any courses required for graduation.

How long do I sign up for?

Sign up for a 15-minute appointment. Write it into your calendar right now so you don't forget.

What forms should I bring with me?

Fill out an engineering curriculum program sheet (a checklist), which shows all the classes you should take for 4 years. You can download it off the web (<http://enr.calvin.edu/student/advising>) or grab a color printed copy from the racks in the hall just outside the engineering office. Be sure to get the correct form for your year and concentration. Check off which classes you have taken or are taking. Note any substitutions or missing courses.

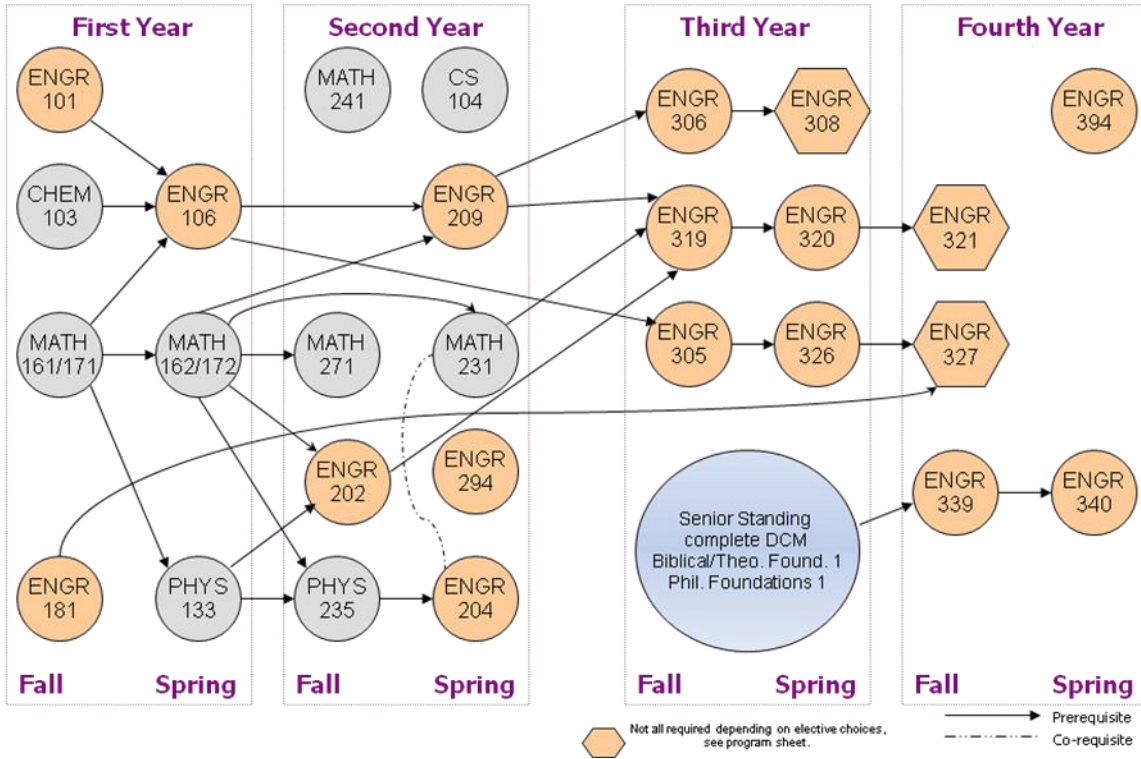
ELECTRICAL & COMPUTER CONCENTRATION - BSE PROGRAM (For Students Entering Fall 2002 or After)		
First Year Fall		
Has	Needs	Substitute
_____	_____	4 Chemistry 103 - General Chemistry (F)
_____	_____	2 Engineering 101 - Intro to Engineering Design (F)
_____	_____	2 Engineering 181 - Graphical Communication Lab (F)
_____	_____	4 Mathematics 161 - Calculus I (F,S)
_____	_____	3 English 101 - <i>Western Heritage</i>
_____	_____	(1) Interdisciplinary 149 - First-Year Prelude
Interim		
_____	_____	3 Interdisciplinary W50 - Developing the Christian Mind
Spring		
_____	_____	4 Engineering 106 - Engineering Chemistry and Materials Science (S)
_____	_____	4 Mathematics 162 - Calculus II (F,S)
_____	_____	4 Physics 133 - Introductory Physics: Mechanics and Gravity (F,S)
_____	_____	4 History 151 or 152 - History of the West and the World
Second Year		
Fall		
_____	_____	4 Engineering 209 - Intro. to the Laws of Conservation & Thermodynamic
_____	_____	4 Mathematics 231 - Differential Equations with Linear Algebra (F,S)
_____	_____	4 Physics 225 - Introductory Physics: Electricity and Magnetism (F,S)
_____	_____	2 Computer Science 104 - Applied C++ (F)
_____	_____	3 Economics 151 - Principles of Economics
Spring		
_____	_____	4 Engineering 202 - Statics and Dynamics (F,S)
_____	_____	4 Engineering 204 - Intro. to Circuit Analysis and Electronics with Lab (S)
_____	_____	4 Mathematics 232 - Engineering Mathematics (F,S)

What choices do I need to make?

Look over your program sheet. Where you have electives, please **look over your choices ahead of time**. There are guidelines available on-line, <http://enr.calvin.edu/student/advising>. You can also use the registrar's web site (<http://www.calvin.edu/admin/registrar>) to help with advising questions. Do you have all your PE requirements taken care of? If not, come with some appropriate choices. You must have one PE course from each of the three categories. Do you need a basic science or advanced math elective? If so, come with some appropriate choices (a list of approved courses is provided on the web, <http://enr.calvin.edu/student/advising>).

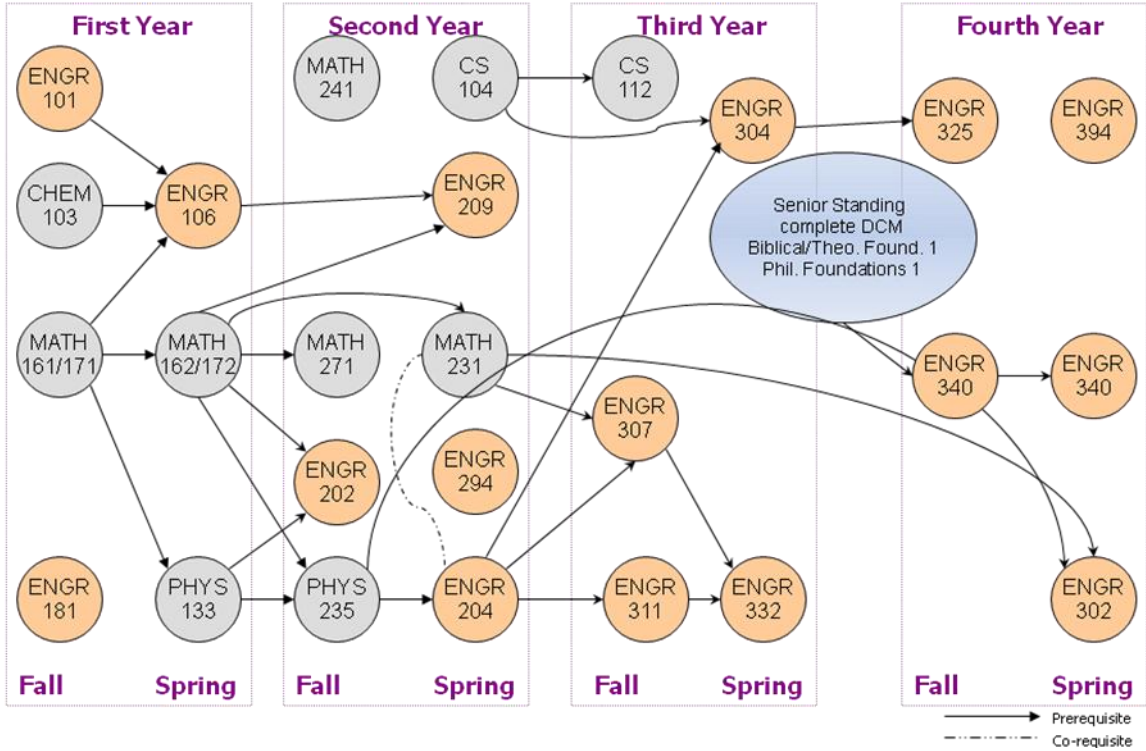
This document is meant to be a visual aid only. If there are inconsistencies with the college catalog, the catalog guidelines must be followed.

Calvin Engineering—BSE Civil/Environmental Concentration Basic Science/Engineering Course Requirements For Students Entering Fall 2009



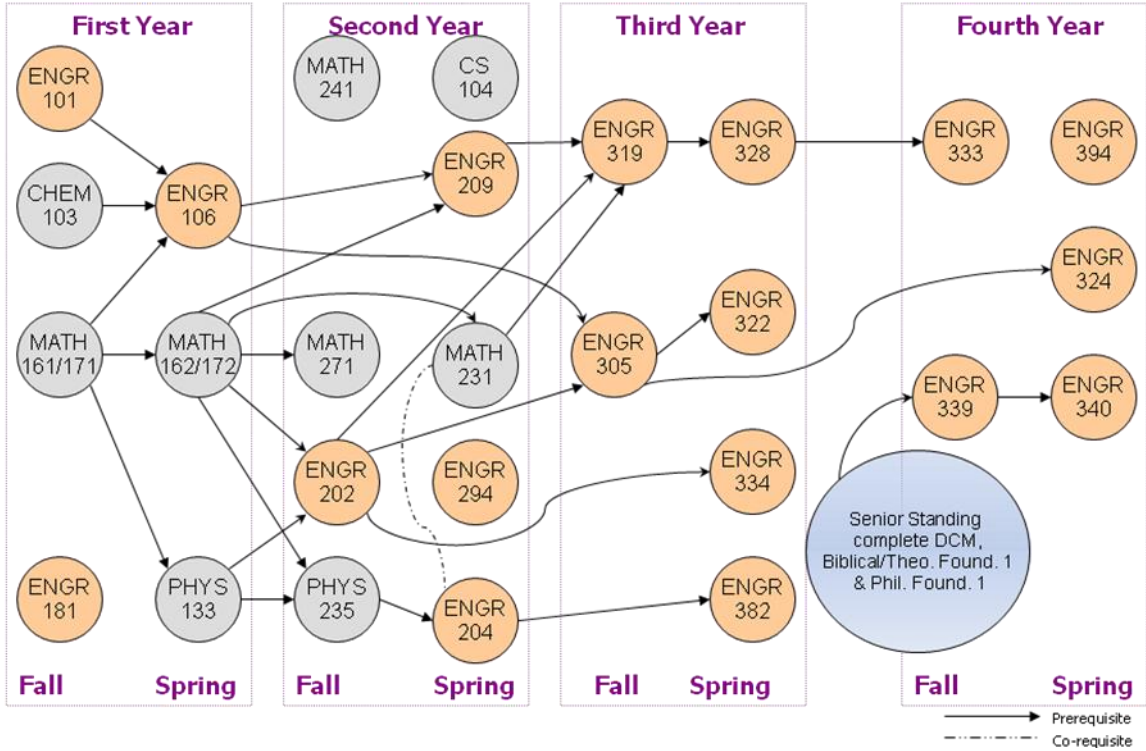
This document is meant to be a visual aid only. If there are inconsistencies with the college catalog, the catalog guidelines must be followed.

Calvin Engineering—BSE Electrical/Computer Concentration Basic Science/Engineering Course Requirements For Students Entering Fall 2009

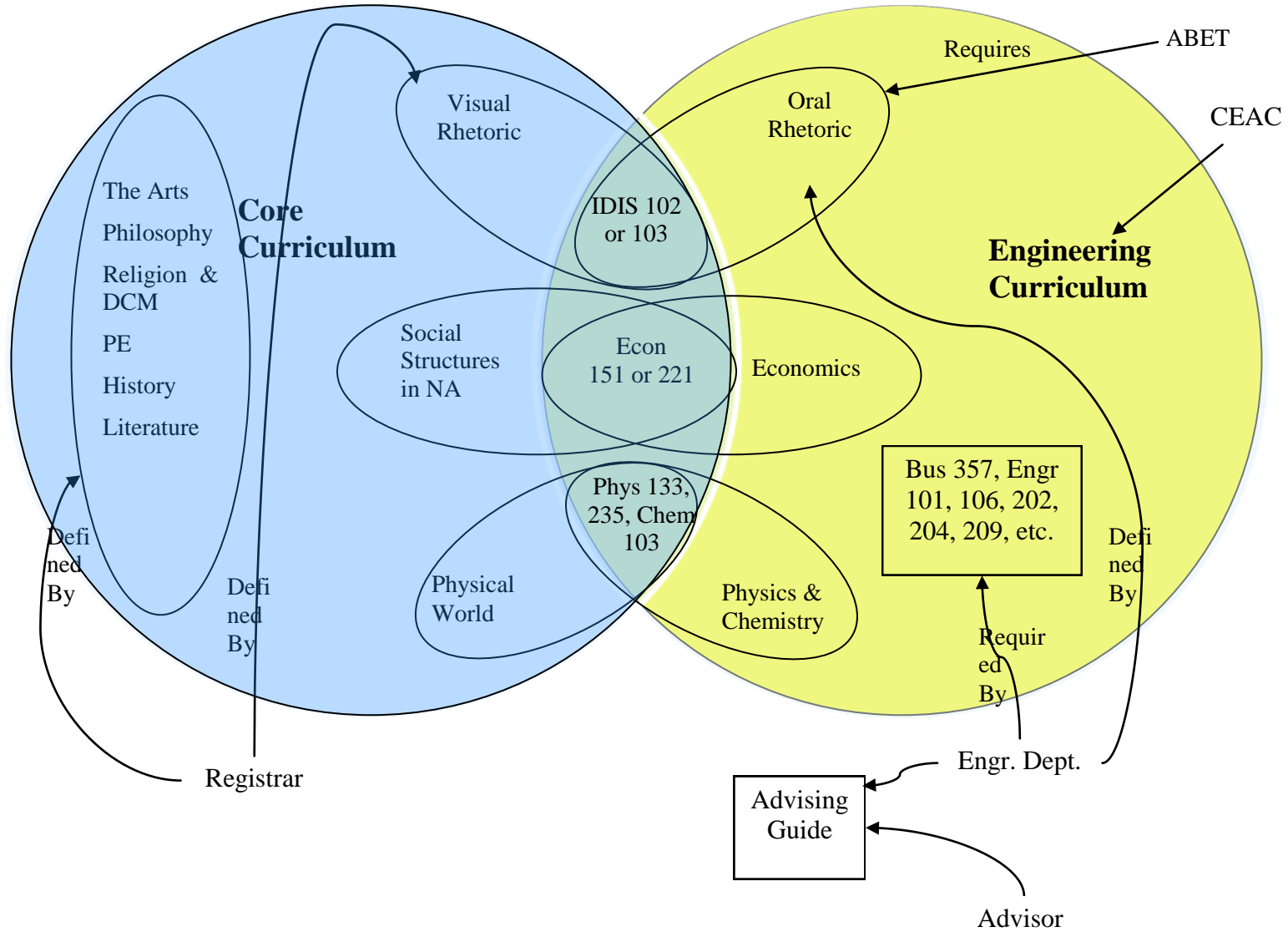


This document is meant to be a visual aid only. If there are inconsistencies with the college catalog, the catalog guidelines must be followed.

Calvin Engineering—BSE Mechanical Concentration Basic Science/Engineering Course Requirements For Students Entering Fall 2009



Appendix C: Relationship of Core and Engineering Curriculum



Appendix D: Elective Options for BSE Program

See the Model Program Sheet of your concentration or your advisor for specific elective requirements.

- 1) The Basic Science elective can be any appropriate course in the major program of concentration in Chemistry, Geology, and Physics. The typically** selected basic science courses are the following:

FALL

BIOL 111 - Biological Science
 BIOL 115 - Human Biology & Lab
 BIOL 141 - Cell Biology and Genetics
 CHEM 201 - Quantitative Analysis
 CHEM 253 - Fundamentals of Organic Chemistry
 CHEM 261 - Organic Chemistry
 GEOL 120 - Earth Systems
 GEOL 151 - Introduction to Geology
 PHYS 345 – Electromagnetism (alternate years)

SPRING

ASTR 211 – Planetary & Stellar Astronomy (alt. years)
 ASTR 212 - Galactic Astr. & Cosmology (alt. years)
 BIOL 111 - Biological Science
 BIOL 115 - Human Biology & Lab
 BIOL 141 - Cell Biology and Genetics
 CHEM 262 - Organic Chemistry
 GEOL 151 - Introduction to Geology
 GEOL 152 - Historical Geology
 PHYS 134 - Matter, Space & Energy
 PHYS 246 - Waves, Optics & Optical Technology
 PHYS 306 - Intro to Quantum Mechanics

**Chemical concentration students have an advanced chemistry elective. It can be met by one of the following: Chem. 201, 230, 271, 303, 318, 323, 325, 330 or Biology 123, 141.

- 2) The advanced mathematics course chosen must have at least Math 162 as a prerequisite. Recommended courses:

FALL

MATH 312 – Logic, Computability & Complexity
 MATH 333 - Partial Differential Equations
 MATH 343 - Probability and Statistics

SPRING

MATH 335 - Numerical Analysis (odd years)
 MATH 344 - Mathematical Statistics (need 343)
 MATH 355 - Advanced Linear Algebra (odd years)
 MATH 365 - Complex Variables

For students wishing to obtain a mathematics minor the following mathematics courses are required: 161/171, 162/172 , 231, 232/271 and two 300 level courses. Approval must be obtained from the Math Dept.

- 3) Statistics Elective - There are four options for meeting the Statistics Requirement

AP Statistics (from High School)

MATH 241 – Statistics for Engineers

MATH 243 - Statistics

MATH 343 and MATH 344

(see advanced Math Electives)

- 4) Courses **suggested** for the Engineering Elective are the following (min. 3 cr. hr. course). Consult the catalog for prerequisites that may be needed for these courses:

Electrical & Computer Engineering Concentration:

FALL

ENGR 303 - Chem Engr Fund. & Thermo.
 ENGR 305 - Mechanics of Materials
 ENGR 306 - Environmental Engineering
 ENGR 315 - Control Systems
 ENGR 319 - Intro to Thermal/Fluid Sciences

SPRING

ENGR 308 - Environmental Engineering Design
 ENGR 314 - Vibrations
 ENGR 318 - Soil Mech. & Foundation Design (odd years)
 ENGR 334 - Dynamics of Machinery
 ENGR 342 - Process Control

Civil & Environmental Engineering Concentration:

FALL

ENGR 220 - Intro to Computer Architecture
 ENGR 303 - Chem Engr Fund. & Thermo.
 ENGR 307 - Network Analysis
 ENGR 315 - Control Systems
 ENGR 321 - Hydraulic Engineering Design
 ENGR 327 - Structural Design

SPRING

ENGR 304 - Digital Systems
 ENGR 308 - Environmental Engineering Design
 ENGR 314 - Vibrations
 ENGR 318 - Soil Mech. & Foundation Design (odd years)
 ENGR 322 - Machine Design
 ENGR 328 - Intermediate. Thermal Fluid Sciences
 ENGR 334 - Dynamics of Machinery
 ENGR 338 - Traffic Engineering (even yrs)
 ENGR 342 - Process Control

Mechanical Engineering Concentration:

FALL

ENGR 220 - Intro to Computer Architecture
 ENGR 303 - Chem Engr Fund. & Thermo.
 ENGR 306 - Environmental Engineering
 ENGR 307 - Network Analysis
 ENGR 315 - Control Systems

SPRING

ENGR 304 - Digital Systems
 ENGR 308 - Environmental Engineering Design
 ENGR 314 - Vibrations
 ENGR 318 - Soil Mech. & Foundation Design (odd years)
 ENGR 320 - Hydraulic Engineering
 ENGR 326 - Structural Analysis
 ENGR 342 - Process Control

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