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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 create an electronic sign-up sheet or contact the Science Division Office for sheets to post on your door. Beth Schoone_Jongen will print them on request in a 15, 20, or 30 minute template for you to post on your door.

If you have questions about how to e-mail your advisees you should check your e-mail for communication from Dana Hebreard. This changes frequently and is communicated directly to faculty with e-mails from the Registrar’s Office. The most recent information that the Engineering Department Office was given is to use this address template: advising-[prof username]@list.calvin.edu (i.e. advising-bror@list.calvin.edu)

1.1.1 How Advising Assignments are made

Advising assignments are initially made by the Registrar’s Office when a student notifies the college that he or she is interested in engineering. All faculty are expected to be able to advice first-year and sophomore engineering students. When a student officially declares their concentration in the spring of their sophomore year, all advising assignments are reviewed. The Engineering Office along with the Director of Advising will review advising loads and student interests and reassign students to the appropriate advisor. Students will be notified of these changes when they receive their letter of admission to the program. Faculty are not to contact the Registrar’s Office to request advising changes for any reason. If you have concerns about your advising load, please talk to the Engr. Depart. Chair.

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). A long blank link indicates a requirement yet to be fulfilled, like the blank after “Group 3” in the example to the right.

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/](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/Current/Advising/](http://www.calvin.edu/academic/engineering/students/Current/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/Current/Advising/](http://www.calvin.edu/academic/engineering/students/Current/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/Current/Advising/](http://www.calvin.edu/academic/engineering/students/Current/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 **Technical Electives in Purple**

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/Current/Advising/](http://www.calvin.edu/academic/engineering/students/Current/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.
1.2.6 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 be 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 (ENGR 295) 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.

1.2.7 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.

1.2.8 295 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.
1.2.9 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:

<table>
<thead>
<tr>
<th></th>
<th>“analysis”</th>
<th>“design”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental</td>
<td>ENGR 306(F)</td>
<td>ENGR 308(S)</td>
</tr>
<tr>
<td>Hydraulics</td>
<td>ENGR 320(S)</td>
<td>ENGR 321(F)</td>
</tr>
<tr>
<td>Structural</td>
<td>ENGR 326(S)</td>
<td>ENGR 327(F)</td>
</tr>
<tr>
<td></td>
<td>Must take all 3 of courses</td>
<td>Must take a min. of 2 of courses</td>
</tr>
</tbody>
</table>

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, Engineering Elective, or Technical 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.

1.2.10 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 the Portal. Be very sure to login to Portal and electronically verify that your advisee’s schedule is approved.

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 four to six faculty available for each of the three 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 the student they can change to MATH172 at the registrar’s office once the test scores arrive.
Model Sequence for students ahead in Math is:

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 172</td>
<td>Math 231</td>
<td>Math 270 + CS104</td>
<td>Math 241</td>
</tr>
</tbody>
</table>

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

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 first two years of the model program (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 (undeclared) students who attempt to register for 300-level courses (disregarding the stated policy of the department) are blocked from registering and class rosters are reviewed every semester.

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.

Faculty or students are to look at the college catalog for the specific list of courses required for admission. All Engineering classes and cognates require a minimum grade of C- for admission to the program.

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.

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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/Current/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.

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.

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.

8.4 Academic Evaluation Report (AER)

As an advisor, you can access the AER for any of your advisees through the Portal and prior to Academic Advising the Registrars’ Office will provide you with a printed copy of all your Advisee’s AER’s. 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.

9 Adding a Second major or a minor

Adding a major or minor will usually require students to stay more than 4 years. 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 160 + 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. Please refer to highlighted section on page 4 of this document on how to properly record this substitution on a student’s AER.

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.

11 Group Majors

There are times when students begin the Engineering program but for a variety of reasons may opt to switch to an IDIS - Group major that includes some courses for Engineering. ie. Business/ENGR Group or Math/ENGR Group. These majors are constructed on a case by case basis. Students interested in a group major should contact the Director of Advising in the Registrar’s Office on how to get this major approved. Group majors are not ABET accredited and are a Bachelor of Science Degree or a Bachelor of Arts Degree. Both a BS and BA require that students follow the requirements of the traditional Calvin core (not the revised core of the BSE).
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 an 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 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.

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://www.calvin.edu/academic/engineering/students/Current/Advising/. You can also use the registrar’s web site (http://www.calvin.edu/academic/services/) 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.
Appendix A: Prerequisite Diagrams

Please note that the all 300-level engineering course have a prerequisite of being admitted to the Engineering program as well as the noted course prerequisites. Admission to ENGR339/340 requires senior class-level status, completion of DCM, Biblical/Theological Foundations and Philosophy 153.
Calvin Engineering - Electrical/Computer Concentration

First Year

Fall | Spring
---|---
Engr101 | Engr 106
Chem103 | Math171

Second Year

Fall | Spring
---|---
CS104 | Math241
Engr 209 | Math270

Third Year

Fall | Spring
---|---
Engr 311 | Math231
Engr 307 | Engr 325

Fourth Year

Fall | Spring
---|---
Engr 339 | Engr 340
Senior Standing | Engr 394 Seminar

Legend:
- Prerequisite
- Co-requisite
- Prerequisite for Application to Concentration. Content assumed for Engr3xx.
- Not all required depending on elective choices. See program sheet.
Appendix B: Relationship of Core and Engineering Curriculum

Core Curriculum
- The Arts
- Philosophy
- Religion & DCM
- PE
- History
- Literature

Defined By
- Registrar

Defined By
- Adviser

Visual Rhetoric
IDIS 102 or 103
Econ 151 or 221
Social Structures in NA

Engaging Student
- Physical World

Defined By
- Engr. Dept.

Bus 357, Engr 101, 106, 202, 204, 209, etc.

Defined By
- Engr. Dept.

Physics & Chemistry

Defined By
- Engr. Dept.

Oral Rhetoric

Defined By
- Engr. Dept.

ABET

Defined By
- Engr. Dept.

CEAC

Defined By
- Engr. Dept.

The Arts

Philosophy

Religion & DCM

PE

History

Literature

Physical World

Social Structures in NA

Visual Rhetoric

Econ 151 or 221

IDIS 102 or 103
Appendix C: 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:

<table>
<thead>
<tr>
<th>FALL</th>
<th>SPRING</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 115</td>
<td>ASTR 211 – Planetary &amp; Stellar Astronomy (alt. years)</td>
</tr>
<tr>
<td>BIOL 141</td>
<td>ASTR 212 - Galactic Astr. &amp; Cosmology (alt. years)</td>
</tr>
<tr>
<td>BIOL 364</td>
<td>BIOL 115 - Human Biology &amp; Lab</td>
</tr>
<tr>
<td></td>
<td>BIOL 141 - Cell Biology and Genetics</td>
</tr>
<tr>
<td>CHEM 201</td>
<td>BIOL 141 - Cell Biology and Genetics</td>
</tr>
<tr>
<td>CHEM 253</td>
<td>GEOL 151 - Introduction to Geology</td>
</tr>
<tr>
<td>CHEM 261</td>
<td>GEOL 152 - Historical Geology</td>
</tr>
<tr>
<td>GEOL 120</td>
<td>PHYS 134 - Matter, Space &amp; Energy</td>
</tr>
<tr>
<td>GEOL 151</td>
<td>PHYS 246 - Waves, Optics &amp; Optical Technology</td>
</tr>
<tr>
<td>PHYS 345</td>
<td>PHYS 306 - Intro to Quantum Mechanics</td>
</tr>
<tr>
<td>PHYS 335</td>
<td>CHEM 262 - Organic Chemistry</td>
</tr>
</tbody>
</table>

**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:

<table>
<thead>
<tr>
<th>FALL</th>
<th>SPRING</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 312 – Logic, Computability &amp; Complexity</td>
<td>MATH 335 - Numerical Analysis (odd years)</td>
</tr>
<tr>
<td>MATH 333 - Partial Differential Equations</td>
<td>MATH 344 - Mathematical Statistics (need 343)</td>
</tr>
<tr>
<td>MATH 343 - Probability and Statistics</td>
<td>MATH 355 - Advanced Linear Algebra (odd years)</td>
</tr>
<tr>
<td></td>
<td>MATH 365 - Complex Variables</td>
</tr>
</tbody>
</table>

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 ADV. 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

5) **Technical Elective**

**FALL**
- CS 212 - Data Structures and Algorithms
- CS 232 - Operating Systems and Networking
- GEOG 261 - Geographic Information Systems and Cartography

**SPRING**
- CS 214 - Programming Language Concepts
- GEOG 261 - Geographic Information Systems and Cartography
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