Incoming Engineering Freshmen Guide

University of Hawaii at Manoa, College of Engineering AY 2021-2022

Welcome to the College of Engineering!
The following guide is intended to help you determine which courses you should start with in your first semester at UHM. It will help you navigate the placement exams and give you an overview of the other general education and engineering requirements you will need to take as an engineering student.

The College of Engineering (CoE) currently offers the following majors in the Bachelor of Science (BS):

- Pre-Engineering (PREN)
- Civil Engineering (CE)
- Construction Engineering (CNST)
- Computer Engineering (CENG)
- Electrical Engineering (EE)
- Engineering Science (ENGS)
- Mechanical Engineering (ME)

The curriculum for each major can be found on the CoE website:
https://www.eng.hawaii.edu/students/current-students/curriculum/.
Pre-Engineering students should use the curriculum of the engineering major they intend to declare. To declare their intended engineering major, Pre-Engineering students will need to complete the Eng 100, Math 241 and 242, Chem 161/161L and 162, and Phys 170/170L and have an overall gpa of 3.0.

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1. Placement Exams – Math and Chemistry

Math Placement Exam

Information about how to take the math placement exam can be found at the Math Department website.

https://math.hawaii.edu/wordpress/placement-exam/

Who needs to take the math placement exam?

Math is very important towards making good progress in any engineering degree. Ideally, engineering freshmen should be starting with Calculus I (MATH 241) or higher in their first semester. If not it may take longer to graduate. Math 241 is one of the most important pre-requisites to the rest of engineering curriculum. Passing Math 241 allows students to move forward into the physics and the first engineering courses. All engineering students will need to finish the entire calculus series (Math 241-244 or Math 251A-253A) and so should be working on math right away in their first semester. Students may place into their math course based on AP exam scores, early college credits, or by taking the math placement exam. ***Unless the student has or is expecting AP exam credits for Calculus as listed in the AP exam table below or has taken the equivalent of UHM's precalculus or calculus courses, they will need to take the Math placement exam***.

When should I take the math placement exam?

Before you register for your Math course. Registration begins in late May this year for incoming students so you would like to get it done by then. You will encounter a prerequisite error if you try to register for the Math course without either the proper AP/College credits or the placement exam results recognized in the registration system.

AP exam results do not release until later in the summer (~July) so if you are taking AP Calculus exam this year you may want to take the Math placement exam just in case you do not pass the AP exam with a high enough score for course credits. If you find later that your AP scores place you into a higher math course you can adjust your registration at that later time.

Which math course should I take?

AP Exam	Score	Course credit earned	Math course to register for
Calculus AB	4 or 5	Math 251A (equivalent to Math 241)	Math 242 or 252A. Student does do not need to take the math placement exam.
	3	none	Math 241. Student does not need to take the math placement to register for Math 241.
Calculus BC	4 or 5	Math 251A and 252A (equivalent to Math 241 and 242)	Math 243 or 253A. Student does do not need to take the math placement exam.
	3	Math 251A (equivalent to Math 241)	Math 242 or 252A. Student does do not need to take the math placement exam.

Math Placement Score	Math Course to register for
4	Math 241 or Math 251A
3	Math 241
1-2	Math 140*
0	Math 134*

***Pre-calculus courses: MATH 134 → Math 140 → start calculus series**
A student may start in pre-calculus if they do not place into calculus. If the student has not previously taken trigonometry or pre-calculus, they should start here to get a good foundation for calculus. A student must place into Math 140 either through the math placement exam (BMAT score of 1 or 2). Passing Math 140 allows the student to take Math 241 in the following semester. Math 134 does not require any placement exam (or BMAT score of 0), however, students are encouraged to try to place into Math 140 and take Math 134 if they do not place into Math 140.

Standard 4 semester calculus series: Math 241 → Math 242 → Math 243 → Math 244
Engineering students must successfully pass the full series of calculus as part of their curriculum. With a high enough score on the math placement (BMAT score of 3 or 4), SAT, ACT, or AP exams, students may start in one of the calculus courses. Students should not take any other calculus courses like business calculus (Math 203) or applied calculus (Math 215) as they do not count towards the engineering degree. Unless the student plans to do the accelerated/honors calculus series (Math 251A-253A), they should take/earn credit for Math 241-244.

Honors / Accelerated 3 semester calculus series: Math 251A → Math 252A → 253A
Students who are in the honors program and/or feel confident in their math skills may try for the accelerated calculus series, Math 251A-253A. This accelerated series completes calculus in 3 semesters instead of 4 semesters. Students will need to place into this series with high scores (BMAT score of 4) on the placement exam or may interview with the math department. To enroll in Math 251A, students should contact the Math Director of Undergraduate Studies at office@math.hawaii.edu.

Chemistry Placement Exam

The chemistry placement exam is offered online and can be taken anywhere that the student has access to a computer and reliable internet connection. The student has two chances to pass the chemistry placement exam per semester. If the student does not pass the exam on the first try, they must wait at least 24 hours before trying again. Taking it before the 24 hour period is up will result in voiding the second chance. Information about the chemistry placement exam can be found at the following website.

http://manoa.hawaii.edu/chem/academics/undergraduate/placement-exam/

Who needs to take the chemistry placement exam?

All engineering students are required to finish Chem 161/161L and Chem 162 **or** the accelerated one semester equivalent, Chem 171/171L.
Unless the student has or is expecting AP exam credits for Chemistry as listed in the AP exam table below or has taken the equivalent of UHM's general chemistry courses, they will need to take the Chemistry placement exam.

When should I take the chemistry placement exam?

Before you register for your Chem course. Registration begins in late May this year for incoming students so you would like to get it done by then. You will encounter a prerequisite error if you try to register for the Chem course without either the proper AP/College credits or the placement exam results recognized in the registration system.

AP exam results do not release until later in the summer (~July) so if you are taking AP Calculus exam this year you may want to take the Chem placement exam just in case you do not pass the AP exam with a high enough score for course credits. If you find later that your AP scores place you into a higher chem course you can adjust your registration at that later time.

Which chemistry course should I take?

Exam	Score	Course Credit Earned	Chem course to register for
AP Chemistry	5	Chem 161/161L and 162	None. Student has earned credit for all of the chem courses that are required for the engineering curriculum.
	4	Chem 161/161L	Chem 162. Student may register without the placement exam.

Waiver of the required Chem 161L lab is determined by chemistry department. Students should bring their AP chemistry lab notebook to the chemistry department for review.

Chem Placement Score	Chem Course to register for
20/25 or better	Chem 171/171L or Chem 161/161L
16/25 or better	Chem 161/161L
8/25 – 15/25	Chem 131
Below 8/25	none (retake placement)

Chem 171 and 171L are highly recommended for engineering students if they place into it (score of 20/25 or better). However, if the student is planning to go onto medical school they will need to take the Chem 161/16L and Chem 162/162L.

Chem 161 and 161L are recommended if the student scores 16/25 or better.

Chem 131 is recommended for students who score between a 8/25 - 15/25. Although Chem 131 is not required for the engineering degree, passing it with a C or better will allow the student to then take Chem 161/161L. Chem 131 does not have an associated lab.

Students who score lower than 8/25 will need to review their math skills before retaking the placement.

2. AP Exam Credits

The linked pdf below explains what the student may get credit for based on their AP exam scores. Math and Chemistry AP exam credits are explained in the previous placement exams sections. Students will need to have their official AP exam scores sent directly to UH Manoa from the College Board to have their credits entered on the UH Manoa student record in STAR.

https://manoa.hawaii.edu/admissions/pdf/AP.pdf

3. College Credits (Early College or Transfer Credits)

Transfer credit evaluations for college courses taken at other institutions/campuses are handled by our Office of Admissions. The student should have their previous college/university send the official transcript with final grades for all their previous college coursework directly to UH Manoa Office of Admissions. Once Admissions receives the official transcripts, they will work on having the appropriate departments evaluate equivalencies and enter the equivalent course credits onto the UH Manoa student record in STAR. Before that process is complete, students may also look up their transfer credits using the UH System Transfer Credit Database linked below. And if there have any questions contact an advisor.

https://www.hawaii.edu/transferdatabase/

4. UHM General Education Requirements:

There are four types of UHM general education requirements that are required for all students graduate.

1. Foundation
2. Diversification
3. Focus
4. Hawaiian or Second Language *(waived for engineering students)*

For more information of any of the general education requirements, please visit the catalog website.

https://manoa.hawaii.edu/catalog/undergrad/undergrad-requirements/

The following sections below describe the general requirements as they work with the different engineering curricula.

Foundation Requirements:

- **3 credits of Foundation Writing (FW):** To be fulfilled by ENG 100
- **3 credits of Foundation Quantitative Reasoning (FQ):** To be fulfilled by MATH 241, 251A, or 140
- **6 credits of Foundation Global and Multicultural Perspectives (FG):**
  To fulfill this requirement, students must take a total of six credits (2 courses); the 2 courses must come from different groups. These can be searched in the STAR GPS registration system by using the Global Multicultural Perspectives course. Otherwise, a list of the 3 different FG group courses may be found at the following website. **https://manoa.hawaii.edu/catalog/undergrad/undergrad-requirements/**

Diversification Requirements:

- **Social Sciences (DS): 6 credits**
  Students need 2 social science (DS) courses to graduate. The College of Engineering already requires engineering students to take any one of ECON 120, 130, or 131 which fulfills one of the DS requirements. The other DS course must be from a different subject which means a DS that is not another ECON course.
- **Arts, Humanities, and Literature (DA, DH, DL): 6 credits**
  Students must take two of the three different areas: Arts (DA), Humanities (DH), and Literatures (DL). The College of Engineering already requires engineering students to take COMG 251 which fulfills the DA. To fulfill the rest of the requirement, students will need to take either a DH or DL course.
- **Natural Sciences (DB, DP and DY): 7 credits**
  All engineering majors have enough required courses (physics, chemistry, etc.) that will fulfill the natural science requirements. The DB is not required for engineering students although the CE and CNST degrees require biological science electives that can **only** be fulfilled by approved courses as shown on their check sheets. (**https://www.eng.hawaii.edu/students/current-students/curriculum/**)

Focus Requirements:

- **Hawaiian, Asian, and Pacific Issues (H or HAP): 1 course**
  All engineering students must do an H focus course of their choice. Some popular options include:
  HWST 107 (H, DH)
  PACS 108 (H, DS)
  LING 150B (H, DS) or LING 150C (H, DS, W)

- **Contemporary Ethical Issues (E or ETH): 1 course, 300 or 400 lvl**
  All engineering students have an E focus course already required in their curriculum and will fulfill this requirement as they complete engineering courses needed for the degree.

- **Oral Communication (O or OC): 1 course, 300 or 400 lvl**
  All engineering students have an O focus course already required in their curriculum and will fulfill this requirement as they complete engineering courses needed for the degree.

- **Writing Intensive (W or WI): 5 courses, at least 2 at 300 or 400 lvl**
  Civil, Computer, and Mechanical engineering students have all 5 WI courses built into their curriculum and will fulfill this requirement as they complete the degree.
  Construction Engineering and Engineering Science students have 4 W courses built into their curriculum and should consider taking 1 WI course of their choice (can be lower division).
  Electrical engineering students have at least 2-3 W courses required in the curriculum. It is sometimes possible to get all 5 W courses out of the upper division courses but it is recommended that EE students consider doing 1 or 2 W courses of their choice (can be lower division).

Hawaiian or Second Language requirement (HSL) is waived for all engineering students.

All engineering students do not have to take a second language.

5. Which courses should you be taking in your first semester?

The College of Engineering has curriculum check sheets for each major to help track your progress through the engineering program. The entire curriculum including the general education is sequenced out into a 4 year plan (if starting in Math 241). If starting in Math 140 or Math 134, the time to graduation will be 4.5 – 5 year plan with potential to speed up with summer school in the first summer. The curriculum check sheets may be found on the college website. **https://www.eng.hawaii.edu/students/current-students/curriculum/**

Example of first semester freshman schedule		
Math course : (based on placement or AP/College credits)	Math 241	4
Chemistry course: (based on placement or AP/College credits)	Chem 161 Chem 161L	3 1
General Education course :	Eng 100*	3
General Education course:	Hist 151 (FG)	3
Engineering Freshman Seminar (optional):	Engr 100**	1
		15 credits

Students will need at least 12 credits to be considered fulltime. We recommend that incoming students prioritize taking the highest math and chem they placed into and then add the Eng 100 and/or the other general education courses to get to a total of 12-15 credits in their first semester so that they have time to adjust to college.

*Eng 100 – English 100 is only open to freshmen at UHM. Students must complete Eng 100 in the freshman year or they will need to take it during summer school or at a community college. If the classes fill up in the fall semester, students can take it in the spring semester of their freshmen year instead. Taking Eng 100 in the spring will not extend time to graduation.

*Engr 100 – Engineering 100 is an optional Engineering Freshmen Seminar course. It is a 1 credit, CR/NC (credit/no credit) course intended to familiarize incoming freshmen with college academic success, career preparation, and the engineering disciplines.

The following General Education courses are also good options (see above undergraduate general education section for more details):

- FG courses
- Comg 251 (DA)
- any one of Econ 120, 130, or 131 (DS)
- HAP/H focus course

6. More information on Pre-Engineering

Pre-Engineering major students are a part of the College of Engineering.

- Academic advising with an engineering advisor
- Notification of all engineering events/opportunities
- Access to the 100 and 200 lvl engineering courses for which they meet prereqs (all engineering 300 lvl and above are major restricted, ME 213 preference given to declared students)

Pre-Engineering majors work on taking all of the lower division (freshmen/sophomore lvl) coursework towards their intended engineering major. But they will need to be declared before they can take the 300 level and above engineering courses. Declaring their intended engineering major requires the successful completion of the following or equivalents:

- Eng 100
- Math 241 and 242
- Chem 161/161L and Chem 162 (or Chem 171/171L)
- Phys 170/170L
- overall GPA of 3.0 at UHM

AFTER successful completion of the above requirements, students can declare by filling out a transfer request form through the Student Academic Services Office by emailing engr@eng.hawaii.edu or jillkoba@hawaii.edu. (When campus reopens students would be able to stop by the office in Holmes Hall 250.)

If a pre-engineering student places into Math 241 and Chem 161/161L in their first semester it typically takes a year to finish the requirements to declare and the student will be on track for the 4 yr graduation plan.
If a student places into a lower math course or needs to retake courses before moving on it will take longer to declare and graduate. Students will meet with their advisor each semester to discuss their progress and pathway to declaring into their intended engineering major.