YEARLY PLANNING DISCUSSION TEMPLATE
General Questions
Program Name _ENGINEERING_Academic Year __2023-2024__

1. Has your program mission or primary function changed in the last year?

No. The mission and function remain the same.

Program Mission Statement
The educational mission of the AHC Engineering Program is as follows:

1. To prepare students to transfer to, and succeed at, a four-year undergraduate engineering program.
2. To provide courses that enable students to complete lower division engineering requirements for transfer to a four-year university, and/or to complete an Associate Degree in Engineering.

The program seeks to produce transfer-ready students who are technically competent in sophomore level engineering subjects, who can communicate and work effectively in diverse teams, and who are responsible citizens. The program also seeks to promote student interaction with faculty, industry, student organizations and professional societies.

The Engineering Program at AHC produces graduates/transfer students who:

1. will succeed academically in, and graduate from, a four-year engineering program;
2. can apply the fundamental principles of mathematics, science, and engineering to solve basic engineering and scientific problems;
3. can work effectively as individuals and in diverse teams;
4. are effective communicators;
5. conduct themselves ethically and professionally, and exhibit personal integrity and responsibility in their actions;
6. continue to engage in life-long learning, including professional, academic and personal development.

The program directly supports the AHC mission of providing "quality educational opportunities that enhance student learning and the creative, intellectual, cultural, and economic vitality of our diverse community."

Program Description
The associate degree in engineering provides lower-division coursework that can serve as the basis for a bachelor's degree offered by a four-year college or university. Students who intend to transfer should check the lower-division requirements in the catalog of the college or university to which they intend to transfer, create a Student Educational Plan with an academic counselor, visit www.assist.org, and consult the engineering faculty. The engineering program provides a general background suitable for a variety of engineering fields including mechanical, civil, aerospace, electrical, computer and biomedical engineering.

2. Were there any noteworthy changes to the program over the past year? (e.g., new courses, degrees, certificates, articulation agreements)

No.

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3. Is your two-year program map in place and were there any challenges maintaining the planned schedule?

Yes. Please see https://www.hancockcollege.edu/pathways/sciences-technologies/engineering.php

There is a 2-year map for the local Associate of Arts degree in Engineering.

However, engineering is a high-unit major, so there is no AST/ADT degree in the state. Many engineering students require more than two years of work to complete all the STEM courses required to transfer. In addition, some must take courses such a MATH 141 (Precalculus), CHEM 120 (Introductory Chemistry) and PHYS 110 (Introductory Physics), to meet the prerequisites of MATH 181 (Calculus 1), CHEM 150 (General Chemistry), and PHYS 161 (Engineering Physics 1). Thus, we (Christine Reed and Angelica Eulloqui, AHC STEM Counselors, with input from Dom Dal Bello, Engineering Professor), have created fourteen 3-year program maps for "Engineering for Transfer".

The fourteen 3-year program maps for "Engineering for Transfer" are:

1. Aerospace Engineering
2. Architectural Engineering
3. Biomedical Engineering
4. BioResource and Agricultural Engineering
5. Chemical Engineering
6. Civil Engineering
7. Computer Engineering
8. Electrical Engineering
9. Environmental Engineering
10. Industrial Engineering
11. Manufacturing Engineering
12. Materials Engineering
13. Mechanical Engineering
14. Software Engineering

4. Were there any staffing changes?

No.

5. What were your program successes in your area of focus last year?

Learning Outcomes Assessment

a. Please summarize key results from this year's assessment.

Assessment of Learning Outcomes focused on ENGR 152 Statics. For PLO 1 ENGR1- "Apply fundamental concepts of mathematics (through calculus), science and engineering." The assessment was found to be 71.4%, slightly above "standard" 70%.

b. Please summarize your reflections, analysis, and interpretation of the learning outcome assessment and data.

A "score" of 71% is not bad, but there definitely room for improvement.

The PLOs for Engineering were modelled after the Outcomes for the Accreditation Board for Engineering and Technology (ABET). The AHC ENGR PLOs

1 - ENGR1- Apply fundamental concepts of mathematics (through calculus), science and engineering.
2 - ENGR2- Communicate effectively both orally and in writing, using symbols, graphics and numbers.
3 - ENGR3- Conduct experiments and analyze and interpret data.
4 - ENGR4- Function professionally and ethically as an individual and within diverse teams.
5 - ENGR5- Identify, formulate and solve basic engineering problems.
6 - ENGR6- Make basic design decisions concerning appropriate-level engineering problems.
7 - ENGR7- Recognize the need for, and an ability to engage in, lifelong learning.
8 - ENGR8- Use techniques, skills and modern engineering tools necessary in engineering education and practice.

While they are linked to specific courses, the connection between a specific assessment and its intended PLOs may not be enough to completely assess the broad PLO. It is also too easy to simply link a general score (overall score, exam score) to a outcome, although they often seem to correlate.

c. Please summarize recommendations and/or accolades that were made within the program/department.

N/A

d. Please review and attach any *changes* to planning documentation, including PLO rubrics, associations, and cycles planning.
While the PLOs are good, some time should be spent over the next year reevaluating the PLOs, with a goal of reducing their number. This can be done by identifying overlaps/commonalities which allow PLOs to be combined or eliminated. Having too many PLOs, along with a single full-time faculty monitoring about 10 courses means some PLOs will not get assessed.

Distance Education (DE) Modality Course Design Peer Review Update (Please attach documentation extracted from the *Rubric for Assessing Regular and Substantive Interaction in Distance Education Courses*)

a. Which courses were reviewed for regular and substantive interactions (RSI)?

N/A – AHC has no DE sections.

b. What were some key findings regarding RSI?

N/A – AHC has no DE sections.

- Some strengths:
- Some areas of possible improvement:

c. What is the plan for improvement?

N/A – AHC has no DE sections.

CTE two-year review of labor market data and pre-requisite review

a. Does the program meet documented labor market demand?

N/A. Not a CTE program.

b. How does the program address needs that are not met by similar programs?

N/A. Not a CTE program.

c. Does the employment, completion, and success data of students indicate program effectiveness and vitality? Please, explain.

N/A. Not a CTE program.

d. Has the program met the Title 5 requirements to review course prerequisites, and advisories within the prescribed cycle of every 2 year for CTE programs and every 5 years for all others?

N/A. Not a CTE program.

e. Have recommendations from the previous report been addressed?

N/A. Not a CTE program.

Use the tables below to fill in **NEW** resources and planning initiatives that **do not apply directly to core topics.** ***This section is only used if there are new planning initiatives and resources requested.***

New Program Planning Initiative (Objective) – Yearly Planning Only	
Title (including number:	Extensometer Repair
Planning years:	*2024-2025*
Description: In Fall 2023, the only extensometer for the tensile tester in ENGR 162 (Materials Science Lab) failed. The extensometer was replaced, but the service representative recommended that the broken extensometer may be repaired. Repairing the broken 12+ year old device to serve as a back-up will ensure the experiment will not be canceled if a repeat of Fall 2023 occurs. Estimated repair cost ~ $2,500.00 Ed Master Plan: E.2 Invest in cutting-edge relevant industry technology to prepare students for the workforce. C.5 Ensure existing classroom and campus spaces encourage student engagement and reflects multicultural and multi-ethnic backgrounds.	
What college plans are associated with this Objective? (Please select from the list below): ☒ **Ed Master Plan** ☐ **Student Equity Plan** ☐ **Guided Pathways** ☐ **AB 705/1705** ☐ **Technology Plan** ☐ **Facilities Plan** ☐ **Strong Workforce** ☐ **Equal Employment Opp.** ☐ **Title V**	

New Program Planning Initiative (Objective) – Yearly Planning Only	
Title (including number:	MATLAB ONLINE Licenses
Planning years:	*2024-2025*

Description:

Ongoing request.

ENGR 126 MATLAB for Science and Engineering, uses MATLAB, by the Mathworks (mathworks.com). The campus uses MATLAB Online licenses, 40 seats.

Estimated cost for 40 seats @$45/seats per year: $1,800/yr, ongoing.

Ed Master Plan:
E.2 Invest in cutting-edge relevant industry technology to prepare students for the workforce.
C.5 Ensure existing classroom and campus spaces encourage student engagement and reflects multicultural and multi-ethnic backgrounds.

What college plans are associated with this Objective? (Please select from the list below):

[x] **Ed Master Plan** [ ] **Student Equity Plan** [ ] **Guided Pathways** [ ] **AB 705/1705**

[ ] **Technology Plan** [ ] **Facilities Plan** [ ] **Strong Workforce** [ ] **Equal Employment Opp.**

[ ] **Title V**

Area of Focus Discussion Template
INNOVATIVE SCHEDULING

Innovative Scheduling embraces mapping, scheduling, and student outcomes. This focus includes a review of modalities, times, days, and sequence of courses. It supports areas of interest. It is based on student success, retention, and completion/graduation data. Sample activities include the following:

Possible topics:

- Review scheduling matrices – program map alignment, successes, and challenges.
- Collaborate with guided pathways success teams to assess scheduling conflicts and bottlenecks within and across disciplines that impact student completion.
- Assess mix of teaching modalities – mornings-afternoons-evenings; weekends; face-to-face, hybrid, and distance learning. NOTE: Hybrid is the combined use of various teaching modalities.
- Address scheduling conflicts or dependencies across disciplines or general education areas.
- Student access – cultivate majors, support cohorts and interdisciplinary connections.
- Review units and time to course and program completion.

1. What data were analyzed and what were the main conclusions?

   We have reviewed the 2-year AA degree, as well as the 3-year plans that have been created for engineering students intending to transfer.

   The 3-year plans were developed to ensure students complete the courses they must have to be competitive in transferring to Cal Poly San Luis Obispo per CPSLO's Transfer Selection Criteria. Just as engineering cannot fit into the 60-unit ADT, an engineering student preparing for transfer to any university will not be transfer-ready in two years (with rare exceptions).

   The fourteen 3-year program maps for "Engineering for Transfer" are:

   1. Aerospace Engineering
   2. Architectural Engineering
   3. Biomedical Engineering
   4. BioResource and Agricultural Engineering
   5. Chemical Engineering
   6. Civil Engineering
   7. Computer Engineering
   8. Electrical Engineering
   9. Environmental Engineering

10. Industrial Engineering
11. Manufacturing Engineering
12. Materials Engineering
13. Mechanical Engineering
14. Software Engineering

In addition, the days/times when engineering courses were offered each semester – and how they may interact with other STEM course – were reviewed.

Traditionally:

- calculus math courses have been scheduled in the morning time blocks (8 am and 930 am), and in the evening time blocks (MW eves, and recently TR eves for MATH 181 and 182).
- Physics (161,162,163) has been scheduled in the late morning (11am) and late afternoon (4pm, 430pm, etc.), time blocks. Physics 162 and 163 will flip time blocks with Physics 161 every other year to accommodate students who work in the day.
- Physics and Engineering labs are Tuesday/Thursdays 11:00am-2:05pm and 2:15pm-5:20pm (PHYS 163 must be opposite days from ENGR 162, and PHYS 162 must be opposite days from ENGR 171).
- Computer Science is TR afternoons.
- Engineering is left with the following time blocks:
    - MW 11 am (even fall, odd spring: ENGR 152, 156)
    - MW 2:15-3:35pm (fall and spring: ENGR 161, 170)
    - MW eves (odd fall, even spring: ENGR 152, 156), to accommodate students who work in the day.
    - ENGR 154 (spring) floats … sometimes MW at 4pm, sometimes TR morning or afternoon.

Note that sophomore level engineer courses cannot have a time conflict with MATH 183 and 184, PHYS 162 and 163, and CHEM 180 and 181.

Conclusions:

a. The AA degree and recommended 3-year transfer pathways were validated. Unless there is a significant shift in engineering requirements, we do not see these changing.
b. That being said, Cal Poly SLO is going through a significant curriculum change – a quarter-to-semester (Q2S) transition – effective Fall 2026. The AHC engineering faculty had some input into the general engineering courses being developed. The final details of the new curricula have yet to be determined/announced, such will no doubt affect the 3-year pathways in general, if not individual courses in particular. For example, a Cal Poly 2-quarter sequence (which currently articulates to an AHC 2-semester sequence) may be reduced to a one-semester course, making an AHC 2-semester sequence unnecessary.

c. The annual/semester schedules remain fairly tight. Moving out of the standard time blocks will conflict with other courses that engineering students must take; Physics 162 and 163 and Chem 181 and 182 are only offered once per year.

2. Based on the data analysis and looking through a lens of equity, what do you perceive as *challenges* with student success or access in your area of focus?

Like other small-to-medium sized community colleges, the number of offerings per year is a challenge to students making their way through the engineering curriculum in a timely manner.

The following are offered only once per year:

- PHYS 162 (spring)
- PHYS 163 (fall)
- ENGR 152 Statics (fall)
- ENGR 161/162 Materials Science + Lab (fall)
- ENGR 154 Dynamics (spring)
- ENGR 156 Strength of Materials (spring)
- ENGR 170/171 Electric Circuits + Lab (spring)

The prerequisite pathway is such that most engineering students reach PHYS 162 and PHYS 163 the year before transfer. Since PHYS 163 is a prerequisite to ENGR 170/171, it must be taken in fall, with ENGR 170/171 in spring. Several years ago, PHYS 163 was in spring (PHYS 162 and 163 flipped fall-spring; this was a past innovation). ENGR 152 is the prerequisite to both ENGR 154 and ENGR 156, which is a natural fall-spring sequence.

MATH 181 and 182 (Calculus 1 and 2)

- In Santa Maria: MATH 181 and 182 are offered face-to-face (F2F) year-round, throughout the day (MATH 182 is being offered F2F the first time in Summer 2024).
- At LVC: MATH 181 is offered in fall, and MATH 182 in spring, always in the evening.
- ONLINE: MATH 181 is offered fall, spring and summer. Math 182 is offered in summer.

MATH 183 and MATH 184

- Two sections offered fall and spring only, Santa Maria, both F2F.

CHEM 150, 151

The CHEM 150-151 sequence is typically waitlisted, resulting is some (not many) students taking chemistry later in their AHC careers. For engineering students, this can significantly impact their ability to fit the full range of courses

to make them transfer-ready. Someone trying to take CHEM 151 (3 lecture + 6 lab hours), PHYS 163 (4 lecture + 3 lab hours) and ENGR 152 (4 lecture hours) and ENGR 161 162 (3 lecture + 3 lab hours) just won't have the time.

ENGR 100 Introduction to Engineering.

ENGR 100 gives a general overview of the engineering professions and different branches, and provides resources and knowledge on being a successful STEM student. However, unlike other Introduction to Engineering courses at other colleges, ENGR 100 does not have a strong hands-on design component. As few students who take ENGR 100 actually make it to the sophomore-level engineering courses, a more robust ENGR 100 courses may be needed. This added material would include introductory design topics, and connect how math students have learned and will be learning connect to

3. What are your plans for change or *innovation*?

   a. Course conflicts.
      As noted above, the course offerings are fairly locked in their place. Engineering is committed to <u>continue</u> working with other disciplines, especially in STEM, to reduce course conflicts. These disciplines include, but are not limited to, Chemistry, Computer Science, Geology and Physics.

   b. Expand Math offerings
      Work with the Math program and administration to consider offering MATH 182 online at least one fall-spring semester, and explore a F2F Math 183 in the summer.

   c. ENGR 100
      Expand ENGR 100 to at least two units (e.g., add 3 lab hours, or create a new course, ENGR 101), in line with other community colleges and matching the 2-unit minimum C-ID for Introduction to Engineering. Creating this course was actually a plan from last years' Focus*: Curriculum and Teach Design*. However, expanding hours would also mean determining how to fit this new lab experience into the existing college-wide schedule. By beefing up ENGR 100, more students may be motivated to stick with engineering, which will increase enrollments in the advanced engineering courses.

4. How will you *measure* the results of your plans to determine if they are successful?

Validation for Program Planning Process: If you have chosen to do the Validation this year, please explain your process and the findings.

1. Who have you identified to validate your findings? (Could include Guided Pathway Success Teams, Advisory Committee Members, related faculty, industry partners or higher education partners)
2. Are there specific recommendations regarding the core topic responses from the validation team?

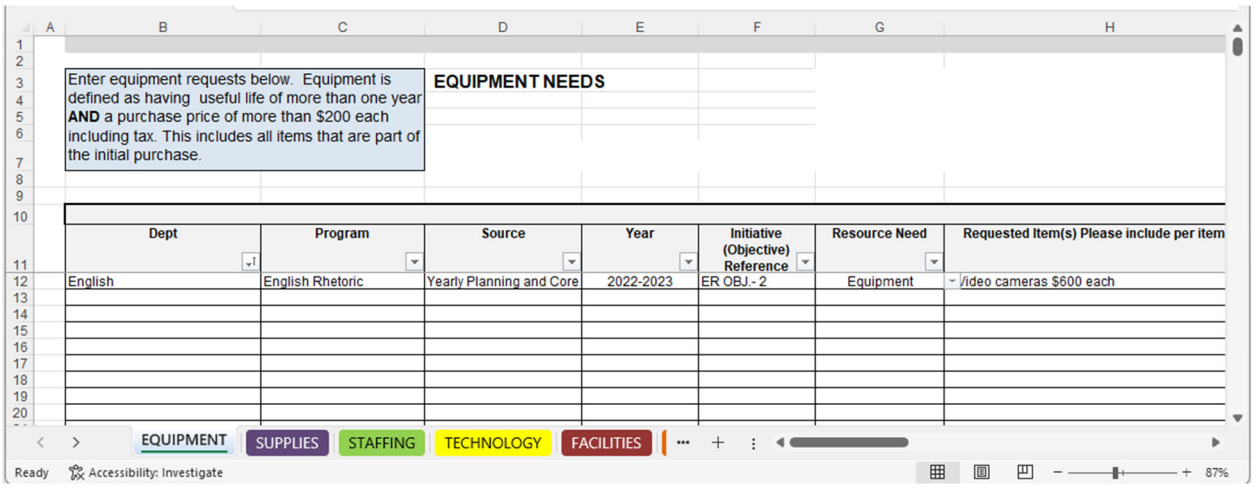
No validation team has been identified.

Based on the narratives for the prompts above, what are some program planning initiatives and resources needed for the upcoming years? Use the tables below to fill in **NEW** resources and planning initiatives. ***This section is only used if there are new planning initiatives and resources requested that pertain to the Core Topic only.***

Sample:

New Program Planning Initiative (Objective) – Core Topic Only	
Title (including number:	*ER Obj-2 Video Speeches for Student Learning and enhancement*
Planning years:	*(The academic years this will take to complete)* 2021-22 to 2024-25
Description: *(A more detailed version of initiative. Please include a description of the initiative, why it is needed, who will be responsible, and actions that need to happen, so it is completed.)* The success levels of our courses have indicated that students need to be able to review their own speeches. Videotaping the student's speech provides a very constructive approach to review and improve their oratory skills.	
What college plans are associated with this Objective? (Please select from the list below): ☐ **Ed Master Plan** ☐ **Student Equity Plan** ☐ **Guided Pathways** ☐ **AB 705** ☐ **Technology Plan** ☒ **Facilities Plan** ☐ **Strong Workforce** ☐ **Equal Employment Opp.** ☐ **Title V**	

Resource Requests: Please use the Resource Request Excel template located on the Program Review web page to enter resource requests for equipment, supplies, staffing, facilities, and misc. resources needed. Send completed excel document along with completed program view core topic for signature.



Enter equipment requests below. Equipment is defined as having useful life of more than one year **AND** a purchase price of more than $200 each including tax. This includes all items that are part of the initial purchase.

EQUIPMENT NEEDS

Dept	Program	Source	Year	Initiative (Objective) Reference	Resource Need	Requested Item(s) Please include per item
English	English Rhetoric	Yearly Planning and Core	2022-2023	ER OBJ.- 2	Equipment	/ideo cameras $600 each

EQUIPMENT | SUPPLIES | STAFFING | TECHNOLOGY | FACILITIES

Ready | Accessibility: Investigate | 87%

New Program Planning Initiative (Objective) – Core Topic Only	
Title (including number:	ENGR 101 Introduction to Engineering and Design
Planning years:	*2024-2026*

Description:

An ENGR 101 Intro to Engineering and Design (working title) is to be created. This course could be a 1-unit course to complement ENGR 100, or a 2-unit course that would include ENGR 100 material. The 2-unit experience (ENGR 100 + ENGR 101, or an equivalent 2-unit course) would match the CI-D descriptor for Introduction to Engineering.

Resources: Time

What college plans are associated with this Objective? (Please select from the list below):

☐ **Ed Master Plan** ☐ **Student Equity Plan** ☒ **Guided Pathways** ☐ **AB 705/1705**

☐ **Technology Plan** ☐ **Facilities Plan** ☐ **Strong Workforce** ☐ **Equal Employment Opp.**

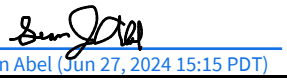
☐ **Title V**

Program Review Signature Page:

Program Review Lead

06/12/2024

Date



Sean Abel (Jun 27, 2024 15:15 PDT)

Program Dean

Date

Vice President, Academic Affairs

Date

Engineering Innovative Scheduling 2023-24

Final Audit Report 2024-07-22

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