

## Area of Focus Discussion Template

### CURRICULUM AND TEACHING DESIGN

**Curriculum and Teaching Design** analyzes currency of modalities, articulation, and industry needs. It includes content review, currency and relevance, accessibility, and equitable practices. Sample activities include the following:

**Possible topics:**

- Review courses and programs through an equity lens to assess access and success.
- Review prerequisites, corequisites, and advisories, and limitations on enrollment, modality, articulation and transfer, and units and time to completion. Is there disproportionate impact within certain demographic groups?
- Assess teaching practices, equipment, supplies, and materials, and technology (like homework, syllabus, text, videos, classroom technology, etc.)
- Assess and integrate program learning outcomes (PLO).

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

**We have been assessing the laboratory equipment, lab manuals, and courses that do not currently articulate to C-ID Descriptors, or where new courses can be offered to reduce the length of the student pipeline.**

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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?

**a. Lab equipment**

- **ENGR 162 Materials Lab (M-212)** – the lab equipment is generally adequate, however two experiments need upgrading to ensure a successful student experience: (1) Impact testing lab, and (2) Additive Manufacturing (3D printing) lab. Since the M-100/200 building was built, we have not had access to the impact tester (it was stored and may or may not even be in the college's possession). Students also need exposure to some basic manufacturing activities and how they relate to materials. We have an injection molder, and sand casting equipment, but 3D printing is ubiquitous. 3D printers may also be used create experimental samples, and demos for Materials Science lecture and for other lecture courses. To ensure efficient learning, at least three 3D printers are needed, if not more.
- **ENGR 171 Circuits Lab (M-433)** – the lab equipment has been updated and standardized in recent years. Tools and accessories (instructional materials) require a detailed inventory to ensure lab experiments can be done with little-to-no troubleshooting/temporary fixes of AHC resources during lab experiments.

**b. Lab Manuals/Short course manuals**

- **ENGR 162 Materials Lab** – this lab manual (by Dom Dal Bello) has not be updated in about 5 years, however, it is sufficient for the labs currently performed. Some minor updating is required to existing labs. Two new labs would need to be written for (1) Fatigue Tests, and (2) 3D printing.
- **ENGR 171 Circuits Lab** – this lab manual (by Dom Dal Bello) has not been updated in about 5 years. It is in need of significant update as the equipment (power supply, digital multimeter, function generator, oscilloscope) are all upgrades from those described in the manual, which makes it difficult for students to complete and understand labs effectively. New AC (alternating current) experiments need to be created.
- **ENGR 124 Excel in Science/Engineering (1.0-unit short course)** – this manual (by Dom Dal Bello) needs updating to ensure it is line with the current version of Excel, and to introduce modules that cover new Excel features.
- **ENGR 126 MATLAB for Science/Engineering (1.0-unit short course)** this manual (by Dom Dal Bello) needs updating to catch up to new features in MATLAB (including features that have changed). Some are out of date. Additional chapters that use more of MATLAB’s advanced features need to be included.

**c. Engineering courses without C-ID Articulation, and New Courses**

- ENGR 100 *Introduction to Engineering*, and ENGR 126 *MATLAB in Science/Engineering*, are 1-unit courses. The C-IDs descriptors for these courses are 2 and 3 units, respectively, and thus do not satisfy C-ID descriptors. Both descriptors are required for the recently authorized Engineering Transfer Certificate.
- Many Introduction to Engineering courses at community colleges are 2 or 3 units, and have a significant hands-on component (e.g., 1-hour lecture, 3-hours lab). Such a 2- or 3-unit course would help motivate and prepare AHC students for their future work.
- MATLAB is also becoming the primary computer language for many engineering majors (in place of traditional programming languages), so increasing the unit count on this course to match the C-ID descriptor will become increasingly important.
- Three AHC classes, ET 100, 140 and 145 are needed for Mechanical Engineering transfers to satisfy a single class which is both on Cal Poly’s Transfer Selection Criteria’s Desired list and a Cal Poly graduation requirement. This is inefficient and students could be better served. ET 100 by itself currently articulates to UCSB’s ME10 (Engineering Graphics:Sketching, CAD and Conceptual Design).

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

**a. Lab equipment**

- **ENGR 162**
  - Purchase three 3D printers (Bambu Lab X1-Cabron Combo 3D Printer, or equivalent).
  - Purchase table-top impact tester for M-212, or locate AHC’s existing tester and install in Building O.
  - Inventor the lab and order required materials and surplus out-of-date materials.
- **ENGR 171**
  - Inventory tools and accessories, ordering new and surplus old.

**b. Lab Manuals/Short course manuals**

- ENGR 162 – update manual as described.
- ENGR 171 - Hire part-time faculty (extra assignment) to significantly update manual
- ENGR 124 – update manual
- ENGR 126 – update manual

**c. Create new courses:**

- An ENGR 101 Intro to Engineering and Design (working title). 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 would match the CI-D descriptor.
- ENGR 127 or 128 MATLAB and Engineering Problem Solving (working title) may be proposed to match the relevant C-ID descriptor.  
OR: ENGR 120 Introduction to Programming Concepts and Methodologies for Engineers (4 units, C-ID ENGR 120).
- ENGR 142 Computer Aided Design for Engineers (working title) would allow a more efficient path for engineering students. This course would be developed in cooperation with Engineering Technology.
- ALL three of these courses would allow AHC Engineering program to match all of the courses in at least one of the Engineering Certificate of Transfer paths, created via the Transfer Model Curriculum, C-ID program.

**Resources**

- *Time* is needed to develop the three courses, either as reassigned time or a sabbatical. Professional development may be necessary for faculty to develop expertise in computer programs.
- *Load*: Introducing these courses would increase the Engineering faculty load (potentially by at least 15 hours per year under the present number of offerings). A second full-time faculty member or more part-time faculty will need to be hired.
- *Licenses*: Up-to-date MATLAB licenses, and Computer Aided Design licenses, will be need to be purchased and maintained. AHC has a Community and Technical College License with MathWorks for MATLAB.
- *Equipment and instructional supplies* to the support the hands-on component of the Introduction to Engineering design class (projects, etc.) will necessitate an increase in the Engineering Program budget

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

**a. Lab equipment**

- ENGR 162
  - Three new 3D printers are purchased and implemented into labs and the creation of engineering instructional tools.
  - New impact tester is installed and labs run.
- ENGR 171
  - Every lab station has the same set-up, including tools, components, test leads, etc.

**b. Lab manuals**

- Each lab manual is updated.

**c. New Courses**

- Courses created and offered.

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5. What practices are used in your program's DE courses that support or demonstrate regular and substantive interaction?

**N/A. We do not have DE courses.**

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**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)

**N/A**

2. Are there specific recommendations regarding the core topic responses from the validation team?

**N/A**

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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.***

<b>New Program Planning Initiative</b>	
<b>Title:</b>	3D Printers for Materials Science Lab / printing industrial materials.
<b>Planning years:</b>	2023-2024

**Description:**

**Bambu Lab X1-Carbon Combo 3D Printer**

ENGR 162 Materials Science Lab includes manufacturing experiments. What is missing is an Additive Manufacturing (3D printing) component. Engineering students need exposure to some basic manufacturing activities and how they relate to materials. We have an injection molder, and sand casting equipment, but 3D printing is ubiquitous. 3D printers may also be used create experimental samples, and demos for Materials Science lecture and for other lecture courses. To ensure efficient learning, at least three 3D printers are needed, if not more.

**The printers will be installed in M-212, and be under the care of the Engineering Program – Engineering Faculty and Engineering Instructional Assistant.**

**Resources:**

**Priority Level:** Low Medium High

**Resource Type:** Equipment Staff Faculty Supplies and Materials

**Quantity:** 3

**Per Item Price:** \$1,449.00 each

**Price with taxes/shipping, etc:** \$1,610.79  
(\$4,832.37 total)

**Description:**

**Bambu Lab X1-Carbon Combo 3D Printer**

**Product Features:** Multi Color & Multi Material Capability, High quality printing with 7 µm Lidar Resolution, High speed CoreXY with 20000 mm/s<sup>2</sup> Acceleration, Dual Auto Bed Leveling

<https://us.store.bambulab.com/products/x1-carbon-combo>

**New Program Planning Initiative**

**Title:** Table-top Impact Tester for Materials Science Lab

**Planning years:** 2023-2024

**Description:**

**Pendulum Impact Testing Machine**

Since the M-100/200 building was built, we have not had access to the impact tester (it was stored and may or may not even be in the college’s possession). A table top version is an reasonable alternative.

**Resources:**

**Priority Level:** Low Medium High

**Resource Type:** Equipment Staff Faculty Supplies and Materials

**Quantity:** 1

**Per Item Price:** \$4,499.00

**Price with taxes/shipping, etc:** \$4,992.66

**Description:**

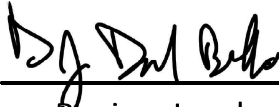
**Pendulum Impact Testing Machine**

The Instron CEAST 9050 impact pendulum enables to determine the impact resilience of plastics and composites, easily and safely. The Instron CEAST 9050 impact pendulum tests comply with all the main ISO and ASTM impact testing methods, ranging from 0.5 - 50J and including Charpy, Izod and Tensile Impact.


[https://www.instron.com/en/products/testing-systems/impact-systems/pendulums/9050-pendulum?utm\\_term=charpy%20pendulum%20impact%20test&utm\\_campaign=Pendulum+Impact+Testing\\_EN&utm\\_source=adwords&utm\\_medium=ppc&hsa\\_acc=5680038307&hsa\\_cam=19723107307&hsa\\_grp=146666420375&hsa\\_ad=648889481037&hsa\\_src=g&hsa\\_tgt=kwd-297730502131&hsa\\_kw=charpy%20pendulum%20impact%20test&hsa\\_mt=b&hsa\\_net=adwords&hsa\\_ver=3&clid=CjwKCAjw1YCKBhAOEiwA5aN4AaJNfJz8dvzil1C0g\\_8UrZpKWYc1pZ1nsOq6EOE8XVJ0mK7YldzgRhoCZMMQAvD\\_BwE](https://www.instron.com/en/products/testing-systems/impact-systems/pendulums/9050-pendulum?utm_term=charpy%20pendulum%20impact%20test&utm_campaign=Pendulum+Impact+Testing_EN&utm_source=adwords&utm_medium=ppc&hsa_acc=5680038307&hsa_cam=19723107307&hsa_grp=146666420375&hsa_ad=648889481037&hsa_src=g&hsa_tgt=kwd-297730502131&hsa_kw=charpy%20pendulum%20impact%20test&hsa_mt=b&hsa_net=adwords&hsa_ver=3&clid=CjwKCAjw1YCKBhAOEiwA5aN4AaJNfJz8dvzil1C0g_8UrZpKWYc1pZ1nsOq6EOE8XVJ0mK7YldzgRhoCZMMQAvD_BwE)

<b>New Program Planning Initiative</b>	
<b>Title:</b>	Circuits Lab Manual Update
<b>Planning years:</b>	2023-2024
<b>Description:</b>	
<p><b>Update ENGR 171 Circuits Lab Manual</b></p> <p>The lab manual (by Dom Dal Bello) has not been updated in about 5 years. It is in need of significant update as the equipment (power supply, digital multimeter, function generator, oscilloscope) are all upgrades from those described in the manual, which makes it difficult for students to complete and understand labs effectively. Several new AC (alternating current) experiments need to be created.</p>	
<b>Resources:</b>	
<p><b>Priority Level:</b> Low Medium <b>High</b></p> <p><b>Resource Type:</b> Equipment Staff <b>Faculty</b> Supplies and Materials</p> <p><b>Quantity:</b> 50 hrs @ PT rate ~ \$50/hr</p> <p><b>Per Item Price:</b> \$2,500.00                      <b>Price with taxes/shipping, etc:</b> \$2,500.00</p>	
<b>Description:</b>	
<p><b>Extra Assignment for PT Faculty</b></p> <p><b>Update ENGR 171 Circuits Lab Manual</b></p> <p>The lab manual (by Dom Dal Bello) has not been updated in about 5 years. It is in need of significant update as the equipment (power supply, digital multimeter, function generator, oscilloscope) are all upgrades from those described in the manual, which makes it difficult for students to complete and understand labs effectively. Several new AC (alternating current) experiments need to be created.</p>	

Program Review Signature Page:

  
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Program Review Lead

6/7/2023  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Program Dean

6/8/2023  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Vice President, Academic Affairs

\_\_\_\_\_  
Date






# Engineering 2022-23 Yearly Planning and Curriculum and Teaching Design Discussion

Final Audit Report

2023-07-21

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