

**E - New or Revised Program/Degree/Major Revised
8/19 : Entry # 3046****Today's Date**

09/14/2023

Your Name

Michael Oudshoorn

Your Emailmoudshoo@highpoint.edu**Are you a department chair?**

Yes

By checking below, I certify that my department chair was notified and approved moving forward with this proposal.

Yes

Please select the appropriate school to oversee this proposal:

Engineering

When will this program / degree / major go into effect?

August 2024

Please choose a category for this proposal.

Program - New

Have you submitted a Pro Forma to the Provost?

Yes

Has the Pro Forma been approved?

Yes

Please provide a 200-word summary of the proposed school / program / degree / major.

Mechanical engineering is the application of the principles and problem-solving techniques of engineering from design to manufacturing to the marketplace for any object. Mechanical engineers analyze their work using the principles of motion, energy, and force—ensuring that designs function safely, efficiently, and reliably, all at a competitive cost.

Mechanical Engineering is the largest engineering discipline based on graduates produced and job vacancies. Mechanical engineers earn an average salary of \$95,300/year and 2% growth in the number of mechanical engineers needed is anticipated between 2021-31 (see <https://www.bls.gov/ooh/architecture-and-engineering/mechanical-engineers.htm>).

Mechanical engineering complements the existing electrical and computer engineering degrees, and its introduction also allows for the development of a mechatronics engineering degree (combination of mechanical engineering and electronic/computer engineering), and general engineering at almost no cost thereby increasing the number of students that can be recruited over and above what mechanical engineering would achieve alone.

List of Required Courses

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Course (Prefix and Number)	NEW or EXISTING?	Revisions needed for an existing course (if necessary)
MTH 1415	Existing	
MTH 1425	Existing	
MTH 2050	Existing	
MTH 2150	Existing	
PHY 2010	Existing	
PHY 2020	Existing	
CHM 1010	Existing	
CHM 1011	Existing	
ECO 2050	Existing	
MME 1005	New	
MME 1015	New	
MME 1010	New	
MME 2014	New	
MME 4900	New	
MME 4910	New	
MME 2100	New	
MME 2200	New	
MME 2300	New	
MME 3100	New	
MME 3200	New	
MME 3300	New	
MME 3400	New	
MME 3150	New	
MME 4100	New	
MME 4300	New	

List of Elective Courses

Course (Prefix and Number)	NEW or EXISTING?	Revisions needed for an existing course (if necessary)
MTH 2310	Existing	
STS 3005	Existing	

Overlap with existing school / program / degree / major?

The Mechanical Engineering program shares a substantially similar freshman year to Electrical and Computer Engineering which allows students to transfer between mechanical engineering, mechatronic engineering, electrical engineering, computer engineering, general engineering, computer science, mathematics with relative ease at the end of the freshman year.

What is the rationale for the new school / program / degree / major?

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The American society for Engineering Education produces a document, Engineering by the Numbers (<https://ira.asee.org/wp-content/uploads/2022/11/Engineering-and-Engineering-Technology-by-the-Numbers-2021.pdf>), which shows the number of students in each engineering discipline.

What academic divisions, University officers, programs, or other stakeholders are involved in, or affected by, this proposal?

Required courses are offered by:
 Department of Mathematical Sciences
 Department of Electrical and Computer Engineering
 Department of Physics
 Department of Chemistry
 School of Business

Please attach documentation showing support from key stakeholders, if any.

- [PSB-Support-of-New-Engineering-Programs-9.9.23.pdf](#)
- [Physics-support-letter.pdf](#)
- [Math-support.pdf](#)
- [Engineering-support-letter.pdf](#)
- [Chemistry-Support-Mechanical-Engineering.pdf](#)
- [09.13.23-To-B-Vescio-Engineering.pdf](#)

What types of students are expected to enroll in this program or pursue this degree/major? Please provide projected enrollment.

Students who pursue mechanical engineering are typically good at math and science, and enjoy solving complex problems.

They should also be analytical, logical, and imaginative thinkers. They should enjoy working with data and using creativity and innovation to solve problems. They should be leaders who can collaborate with others and communicate well.

The program is looking to achieve the following numbers:

Mechanical Engineering

Year 1 Year 2 Year 3 Year 4 Year 5 Year 6 Year 7 Year 8 Year 9 Year 10

Incoming Freshmen - Fall Semester 5 9 15 21 27 30 35 35 35 35

Incoming Freshmen - Spring Semester 5 9 15 21 27 30 35 35 35 35

Sophomore - Fall Semester 0 4 7 12 17 22 24 28 28 28

Sophomore - Spring Semester 0 4 7 12 17 22 24 28 28 28

Junior - Fall Semester 0 0 4 6 11 15 19 22 25 25

Junior - Spring Semester 0 0 4 6 11 15 19 22 25 25

Senior - Fall Semester 0 0 0 3 6 10 14 17 19 23

Senior - Spring Semester 0 0 0 3 6 10 14 17 19 23

The admission numbers above are based on the number of students graduated in various engineering disciplines and extrapolating from the number of electrical and computer engineering students we typically attract.

Consistency of Mission and Quality

Mission

The mission of the Webb School of Engineering is:

"The Webb School of Engineering is dedicated to providing an extraordinary education with accomplished faculty in engineering, computing, and mathematics through the delivery of an innovative, hands-on, and competitive curriculum that prepares graduates

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for a rewarding career or admission into graduate school. The Webb School of Engineering is committed to:

- Providing an academically rich environment that encourages intellectual curiosity.
- Developing technical competence within a Liberal Arts framework.
- Fostering independent thought and critical thinking to solve modern engineering, computing, and mathematical problems in an ethical, socially-responsible, and sustainable manner."

This proposal is consistent with that mission through the provision of a well -rounded curriculum that satisfies the requirements of the accrediting body, ABET. The ABET criteria form the foundation to the proposal.

Quality and rigor

The program describes a curriculum that is challenging and rigorous. It has a strong math foundation (5 courses = 20 credits) which is all at calculus I level or beyond, and a strong science foundation (3 courses = 12 credits) which is all calculus based. Combined there is a minimum of 32 credits of science and math that forms the foundation of the mechanical engineering degree. Compared to other programs across the country, this proposal compares favorably. Many institutions use 3 credit courses and deliver the minimum amount of content. The 4-credit course at HPU allow for a strong practical, hands-on component that distinguishes HPU from other programs and allows students to see the theory applied in a real-world sense.

Compare to similar programs at other institutions.

(Almost) all mechanical engineering programs across the country are similar (not identical) in terms of what is covered (ABET criteria). This proposal provides slightly greater depth and breadth.

Timeline

The program can be implemented immediately. The plan is to admit the first cohort for August 2024.

Assessment Strategy

An industry advisory board will be established to identify skills and characteristics of graduate 3-5 years after graduation. The program will need to prepare students to meet these program outcomes and employers and the industry advisory board will help determine if the program objectives have been met.

The student outcomes of the program are:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

ABET Accreditation requires that the level of attainment of each of these outcomes must be measured and a documented continuous improvement plan be documented and followed.

Accreditation demands that the curriculum must include the following:

- a) A minimum of 30 semester credit hours of a combination of college-level mathematics and basic sciences with experimental experience appropriate to the program
- b) A minimum of 45 semester credit hours of engineering topics appropriate to the program , consisting of engineering and

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- computer science and engineering design, utilizing modern engineering tools,
- c) A broad education component that complements the technical content of the curriculum and is consistent with the program educational objectives.
- d) A culminating major engineering design project that 1) incorporates appropriate engineering standards and multiple constraints, and 2) is based on the knowledge and skills acquired in earlier coursework.
- In preparation for professional practice, the curriculum must include:
- a) principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations);
- b) applications of these topics to modeling, analysis, design, and realization of physical systems, components or processes;
- c) coverage of both thermal and mechanical systems; and
- d) in-depth coverage of either thermal or mechanical systems.

To measure success, the program will seek ABET accreditation

ABET Accreditation Evaluation Is an 18-Month, Five-Step Process. ABET accreditation is the culmination of a practice of ongoing self-assessment and continuous improvement, which assures confidence that ABET-accredited programs are meeting the needs of their students, preparing graduates to enter their careers, and responsive to the needs of the professions and the world. This process has to be initiated by the institution.

The 18 Month Accreditation Process

Complete the Readiness Review by October 1

1 YEAR BEFORE YOUR ON-SITE VISIT

Collect samples of student work, syllabi, textbooks and sample assignments.

Complete your Readiness Review (if required) by October 1.

Submit your Request for Evaluation by January 31

YEAR OF YOUR ON-SITE VISIT

Submit your Request for Evaluation (RFE) by January 31 of the year of your program's On-Site Visit.

ABET will invoice the institution for the On-Site Visit, set a visit date and form a review team between April and May.

Complete and submit your Self-Study Report by July 1

YEAR OF YOUR ON-SITE VISIT

Complete and submit your Self-Study Report to us no later than July 1.

The review team assigned to your program begins reviewing your Self-Study Report.

Attend the Institutional Representatives Day at the July Commission Meeting. Your program's institutional representative is invited to meet your review team chair at this annual event.

The On-Site Visit takes place September – December

ON-SITE VISIT

Prepare for your On-Site Visit. Finalize the visit schedule, arrange student and faculty interviews, and, finally, set up rooms with display materials for the review team. You should begin planning and preparation months in advance.

Your On-Site Visit typically lasts three days (usually Sunday through Tuesday). It includes a review of your materials; interviews with students, faculty, staff, and administrators; and concludes with an exit meeting, when the team will convey its findings.

Due Process and the Accreditation Decision

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1 WEEK AFTER THE VISIT

Provide the review team with any errors of fact resulting from the exit meeting.

2-3 MONTHS AFTER THE VISIT

Your institution receives the Draft Statement, a formal communication of your review team's findings.

3-4 MONTHS AFTER THE VISIT

During the 30-Day Due Process period your institution responds to any shortcomings identified in the Draft Statement.

JULY

The ABET commissions meet to decide Accreditation Actions in July. At this meeting your program's accreditation is discussed and determined.

BY AUGUST 31

Your program is formally notified of the accreditation action via the Final Statement to the institution.

Please attach full proposal and any supporting documents/reports.

- [09.13.23-To-B-Vescio-Engineering1.pdf](#)
- [Mechanical-Proposal-Full.pdf](#)

For Deans:

Does this proposal connect solely to programs in your school (Intra-Collegiate), or does it have connections to broader university programs and requirements (Inter-Collegiate)? Note that all proposals connected to University Academic Programs or within the General Education should be considered Inter-Collegiate proposals.

Intra-collegiate

Is this proposal consistent with the school and university mission?

Yes

Comments justifying this determination?

Growing the number of Engineering programs and students is consistent with the university and school mission.

Are necessary resources available to support this proposal?

Yes

Comments justifying this determination?

Proforma approved for new program.

[DEAN] I approve/deny this proposal for further advancement

Approve

Today's Date (REQUIRED)

09/18/2023

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Yes

[SCHOOL EPC] I approve/deny this proposal for further advancement

Approve

Today's Date (REQUIRED)

10/03/2023

For APIRC:**Is this proposal consistent with the history and mission of the university?**

Yes

Does this proposal reflect a course that is rigorous, current, and reflects best practices and highest academic standards?

Yes

[APIRC] This committee approves/denies advancement of this proposal

Approve

Today's Date (REQUIRED)

10/20/2023