A - New Course Proposal V. 7.2022 : Entry # 3076

DEAN Decision

Approved

Date

09/18/2023

Is this course intracollegiate or intercollegiate?

Intracollegiate

DEAN Comments

Introducing 3 new programs: Mechanical, Mechatronic and General Engineering.

SCHOOL EPC Decision

Approved

Date

10/03/2023

Begin Form

Today's Date

09/17/2023

Your Name:

Michael Oudshoorn

Your Email:

moudshoo@highpoint.edu

Are you a Department Chair?

Yes

By checking below, I certify that my department chair has seen and approved the new course that I am proposing.

Yes

Please select the appropriate school overseeing this proposal:

Engineering

Which semester is this course to be taught for the first time?

Fall 2026

Information for the Registrar

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Choose the department designator from the list below.

MME

Proposed Course Number?

3100

Is this course cross listed?

No

Does this course replace a current course?

No

What is the title of the new course?

Thermodynamics

Write the catalog description of your proposed course:

This course deals with the fundamentals of Thermodynamics including thermodynamic systems and properties, relationships among the thermos-physical properties, the laws of thermodynamics and applications of these basic laws in thermodynamic systems. This course will provide the essential tools required to study thermodynamic systems in Applied Thermodynamics

How many credit hours will this course be?

4

How will the course be graded?

Letter grade

Please select the course repeat option for this course:

Not repeatable for credit

What is the offering cycle for this course?

Fall semester

Does your course have any prerequisites?

Yes

Please list all prerequisites this course requires:

Course prerequisite
MME2100 Statics

Course corequisite
MME2200 Dynamics

Is this new course being proposed because of a new or revised major or minor proposal?

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Majors:
Mechanical Engineering
Mechatronic Engineering
General Engineering

Submitted by:
Michael Oudshoorn

Submission date:
9/17/2023

Gen Ed and Academic Programs

Is this course part of Gen Ed?

- No

Does this course count towards a major or a minor?

Yes

Please list the Major / Minor and if it is Required or Elective

Required: Mechanical/Mechatronic Engineering; Elective: General Engineering

Is this course part of an academic program?

- This course does not fulfill academic program requirements

Does this course include any community engagement?

No

Does this course participate in the GoGlobal Program?

No

Information for Curriculum Review

Rationale and evidence for new course's consistency with departmental mission:

This course matches and supports the departmental/program mission by providing students with the necessary background in mechanical engineering in support of the newly proposed programs in Mechanical, Mechatronic and General Engineering. To achieve ABET accreditation for these programs, students must be exposed to breadth and depth within the discipline. All courses either provide foundational content upon which the depth will be built, or provide the depth by utilizing earlier courses. The courses provide students with in-demand skills and knowledge that will prepare them for the workforce.

List all student learning outcomes for this course.

After successful completion of this course the students will be able to:
1. Explain fundamental concepts relevant to thermodynamics.
2. Explain the concepts of work, power, and heat in thermodynamics; determine work and heat sign conventions; determine work involved with moving boundary systems (graphical and analytical methods).

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3. Explain the first law of thermodynamics for a closed system.
4. Perform energy analysis of refrigeration and heat pump thermodynamic cycles.
5. Determine thermodynamic properties of pure substances.
6. Apply the first law of thermodynamics for a control volume, including with turbines, compressors, nozzles, diffusers, heat exchangers, and throttling devices.
7. Explain the second law of thermodynamics, including why it is necessary, how it is defined (Kelvin-Planck and Clausius), the nature of irreversibility, and the Carnot cycle.
8. Explain the concept of entropy, including the Clausius Inequality, using thermodynamic tables, setting up entropy balances, and calculating isentropic efficiency of pumps, compressors, turbines, and heat exchangers.

List any units or content areas that will be required for all sections of this course.

Concepts and definitions
Evaluation of work and heat transfer
First law of thermodynamics for a control mass
Properties of a pure substance
Ideal and real gases
First law of thermodynamics for a control volume
First law of thermodynamics for various equipment
Carnot cycle
Second law of thermodynamics
Clausius inequality and entropy
Evaluation of entropy change and principle of increase of entropy
Second law of thermodynamics for a control volume

List any assignments, tests, or other assessments that will be required for all sections of this course.

May vary

List any readings or other materials that will be required for all sections of this course.

May vary

List any course policies that will be required for all sections of this course.

May vary

If you would like to specify how requirements for contact hours must be met for all sections of this course, please indicate below. (e.g., if any experiential learning activities will replace seat time)

3 hours of lecture per week
2 hours of lab per week

Sample Syllabus

- MME3100-Thermodynamics.pdf