A - New Course Proposal V. 7.2022 : Entry # 3094

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?

Spring 2028

Information for the Registrar

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Choose the department designator from the list below.

MME

Proposed Course Number?

4200

Is this course cross listed?

No

Does this course replace a current course?

No

What is the title of the new course?

Internal Combustion Engines

Write the catalog description of your proposed course:

Analysis and design of various types of engines used in transportation systems. Topics include advances in energy efficiency and emissions in automotive applications.

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?

Spring semester

Does your course have any prerequisites?

Yes

Please list all prerequisites this course requires:

MME3100 Thermodynamics and MME3150 Heat Transfer

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

Majors:
Mechanical Engineering
General Engineering

Submitted by:

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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

Elective: Mechanical/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.

Outcome 1: To teach students the operating characteristics and thermodynamic analysis of common internal combustion engine cycles.
1. Students will demonstrate knowledge of the operating characteristics of common IC engines.
2. Students will demonstrate the ability to perform a thermodynamic analysis of Otto, Diesel, and Dual cycle models.
Outcome 2: To teach students to analyze the combustion process of common fuels.
1. Students will demonstrate knowledge of the characteristics of common liquid and gaseous fuels.
2. Students will demonstrate the ability to perform a combustion analysis of these fuels in the basic cycles.
3. Students will demonstrate an understanding of the generation of undesirable exhaust emissions and methods used to reduce them.
Outcome 3: To make students aware of the roles of fluid flow and heat transfer in engine operation.

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1. Students will demonstrate an understanding of the air and fuel induction processes.
2. Students will demonstrate an understanding of fluid flow in the combustion chamber and exhaust system.
3. Students will demonstrate an understanding of the various heat transfer mechanisms in the engine.

Outcome 4: To teach students methods to mitigate engine vibration, friction, and wear.

1. Students will demonstrate the ability to analyze engine vibration and balancing mechanisms.
2. Students will demonstrate an understanding the role of lubrication in reducing friction and wear.

Outcome 5: To teach students the environmental, social, and technological issues related to the future widespread use of internal combustion engines

1. Students will demonstrate an understanding of environment impacts of wide-spread use of internal combustion engines.
2. Students will demonstrate an understanding of technological, environmental, and social impacts of alternative fuels.

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

1. Introduction
2. Operating characteristics
3. Engine cycles and analysis
4. Thermochemistry and fuels
5. Air and fuel induction
6. Combustion chamber fluid flow
7. Combustion
8. Exhaust flow
9. Emissions
10. Heat transfer
11. Engine dynamics
12. Friction, lubrication, and wear

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

- MME4200-Internal-Combustion-Engines.pdf