

Advanced Concepts in Energy



COURSE DESCRIPTION

Energy is needed to do most anything, but how does my car move or electricity come out of the wall? We will discuss what energy is, where it comes from, how to store it, and how to use it. We will consider chemistry and physics topics in relation to energy. This class will address the pros and cons of renewable (wind, solar, etc.) and non-renewable (hydrocarbon, nuclear, etc.) sources of energy, and in turn how humans should be using energy on the small and large scales. Assessments will include class participation, math/physics/chemistry worksheets, presentations on energy generation/storage, unit quizzes, a paper on how to use energy, and a final exam. We may include an experiment(s) or a field trip. This class offers a study of applied science for those wanting to continue in science/engineering in college. For those not pursuing science/engineering, this class will help unravel the technical side of energy and help prepare for public policy or technical law applications.

REQUIRED READING

Students will be provided with readings from college textbooks that align with the concepts discussed in class. While periodic quizzes will assess understanding of the classroom material, the readings are not mandatory. Advanced Physics follows a college-style structure, requiring students to take ownership of their learning style and utilize the supplemental resources to reinforce the material as needed. There will be a choice of books to read towards the end of class to prepare a formal paper.

SUPPLIES

In addition to the items mentioned below, please also consult the grade level supply list.

- Engineering paper is nice, but not required if the student is neat in their work. There are a substantial amount of graphs and force diagrams throughout the course, and engineering paper can make these easy. Please try to get some, but again, if the student shows their work neatly (including graphs) is it not necessary.
- A basic calculator with trig functions; not a calculator on the student's phone. A graphing calculator will be useful for some sections but is not essential.

GRADING

- Contribution: 30%
- Homework: 30%
- Tests: 20%
- Labs: 20%

Contribution grades will be entered weekly and reflect a student's class engagement, preparedness and respect.

Mastery is achieved by obtaining an 85% overall percentage in the class. Mastery Qualifying (MQ) is achieved by obtaining a 92.5% average for the first semester. Mastery with Honors (MH) is achieved by maintaining this 92.5% average in the second semester and completing a Mastery with Honors project of at least twenty hours.

REVISIONS

All homework and tests may be revised for a higher grade no later than four weeks from its assigned date. A student is never required to revise anything! Any corrected homework or tests will receive 70% of the points lost. Point deductions may be taken for late assignments and any late point losses may not be made up. If a student does not achieve a score of 70% or higher on a test, no revision points are entered into the grade book until the following process occurs:

- 1) The student must revise the test and arrange for a time to sit down one-on-one with the tutor to go over these revisions to ensure understanding. The second test will be given only after this process has occurred. The student must initiate this one-on-one tutoring session at the tutor's convenience.
- 2) At the tutor's discretion, if sufficient understanding cannot be demonstrated, the student may be required to revise certain homework problems that are creating difficulty, then review these problems as well as the test revisions with the tutor in a one-on-one session at the tutor's convenience.
- 3) The student must pass a second (usually more difficult!) version of the test with a score of greater than 70% or the process repeats.
- 4) On the last retaken test, no revision points will be allowed.

If the student never retakes the test, their initial score will stand. From this process, it should be obvious to the student that it is MUCH easier to understand a problem the first time it is turned in for homework, study all their homework problems prior to taking the first test, and pass the test the first time with a score above 70% so that they can freely revise for an even higher score. If this is not done, the student usually falls so far behind the general class that it becomes difficult to pass the course with a grade of 85%.

COURSE SCHEDULE

Class will cover four major units concerning energy. We will have a couple of labs to explore some of the scientific concepts behind energy production and usage. Towards the end of the semester, each student will choose a topic from two options and write a paper concerning that topic, utilizing knowledge from class, class texts, and personal research.

TURNITIN POLICY

Turnitin is an internet-based service and tool that promotes academic integrity and original thought from students. Turnitin screens for similarity (plagiarism) and detects unauthorized A.I. usage in writing.

To better ensure academic integrity and original thought, tutors may ask students to either submit their classwork through Turnitin directly or to email them a digital copy of their classwork, for the tutor to upload through Turnitin screenings.

Tutors may use the feedback Turnitin provides to help them make a more informed determination about the integrity and originality of the student's work.

MCA Schoolwide Policies

MCA ATTENDANCE POLICY

Absence: Parents must inform the school if their student will be absent for any reason. Call the Front Office or email attendance@mcaknights.org prior to the absence or on the morning of the absence. If a student is absent without prior notification by a parent, the school will call the parent to determine the validity of the absence. Call the office, 432-694-0995, or email attendance@mcaknights.org.

In the event an Upper School student is absent for more than one-fourth (1/4) of the class sessions during a semester, the student's parents must meet with the tutor and Head Administrator to determine whether the student will receive credit for the class. Additional and/or make-up work may be required.

Tardy Policy: Tardies will be marked at the discretion of the individual tutors. Students or parents should contact the individual tutors to report reasons for tardies as soon as possible.

Missed Assignment Due Date Guidelines: In the event of an absence, a due date extension will be given. The extension will not exceed the number of school days missed during the absence. Due dates will be established by the teacher or class tutor. Students must complete all work assigned during their absence. However, the teachers or tutors may, at their discretion, excuse the students from any portion of the assignments missed. Students will receive full credit for submitting assigned work. Note: It is the **student's responsibility** to find out what work was assigned. In the case of extended illness, it is recommended that the student or parents contact the tutors directly to find out what assignments were or will be missed.

MCA HONESTY POLICY

All students are assumed to be exhibiting the godly fruit of self-control. We anticipate working with students who are characterized by joy, honesty, and diligence. For this reason, upon enrollment, we require that each student affirm that he or she will maintain the highest standards of honesty and behavior in all work done for Midland Classical Academy. All students will be asked to sign the following.

Pledge of Academic Honesty

I have read and understand the Midland Classical Academy Code of Conduct. I pledge my honor, with God as my witness, to commit myself to the practice and preservation of these standards of academic honesty as long as I am a student of the academy.

As such, the following actions are considered serious violations of our Honesty Policy.

1. Directly copying someone else's work visually, orally, electronically or otherwise.
2. Use of disallowed devices on assignments such as notes, smartphones, books, etc.
3. Getting test questions or essential information from another student who has already completed an assignment that will later be taken, such as a test or quiz.
4. Any other activity that the tutor has explicitly described as cheating.

MCA MASTERY WITH HONORS (MH)

Midland Classical Academy offers honors credit, referred to as "Mastery with Honor", but we offer no "honors" classes.

Mastery with Honor credit for a class is given to those students who

- receive a minimum grade of 92.5 at the end of each semester
- receive a minimum participation grade of 85 at the end of each semester
- demonstrate character befitting an honor student (1 Corinthians 10:31)
- complete a tutor-approved, 20+ hour project that advances the student's knowledge or skills in the subject while serving either the school or the community in some capacity.

As a student fulfills these requirements in a class at MCA they receive a Mastery with Honor designated by an "MH" for the class. Mastery with Honor applications and a nominal fee are due at the end of October. The projects themselves are due at the end of March with two scheduled check-points in between the application and final deadline.

ARTIFICIAL INTELLIGENCE (A.I.) POLICY

Artificial Intelligence programs are tools that can be used beneficially or harmfully. To the extent that MCA uses these A.I. tools, we desire to use them and instruct our students to use them beneficially. It requires the classical virtue of "Wisdom" to discern the difference between what is beneficial and what is harmful.

Among MCA's core values is "Engaging Minds". Everything we do, including our use of A.I. needs to be in harmony with this value and to cultivate within students the skill of being able to "think for themselves".

MCA offers the following principles for tutors & students to follow as they navigate A.I. in their academic domains. MCA tutors will create and clearly communicate their own instructions for A.I. usage in their classrooms and for their assignments. Students should practice integrity, honesty, and humility in their use of A.I. as in all their work.

Principle 1: *Why to use A.I.* - A.I. should only be used by a student to equip them to better understand the material and to learn in a way that facilitates their critical thinking skills.

Principle 2: *When to use A.I.* - Tutors will explicitly and clearly communicate which assignments a student may or may not use A.I. tools to assist in their learning.

Principle 3: *How to use A.I.* - Tutors will explicitly and clearly communicate the method in which it is acceptable and not acceptable for the student to use A.I. tools.