Module 1:

Topics 1 and 2.

This Matter and Energy course is designed in a flipped classroom format. This means that the students must be in charge of constructing their knowledge, and to achieve it, the students must study the topic at home before the class. To encourage the study at home you can apply quizzes or give a qualifying activity related to what they are expected to know. It is important that the students go over the resources as well as the bibliography assigned on each topic.

Once the students read and discussed the topic in class, explain in detail the concepts that aren't yet understood. For topic 1, it is recommended to perform simple experiments to illustrate the principles of density, pressure and Archimedes' principle. For topic 2, you can watch short videos and then discuss them with the group.

It is recommended for you to do the activity before taking the group to the laboratory, such that you can make any adjustments if necessary. It is important that you make sure the students will have access to the science's lab and the equipment needed. In case you don't have access, you can make adjustments in some other space. Every activity is designed considering the campus to have at least a chemistry lab.

The activity assigned for topics 1 and 2 has three simple experiments, thus it is suggested to be done in teams of four students. This way they can have an easier access to the material's list. Make sure the students read the activity prior to going to the lab, have the material's list and choose a team leader.

The day of the activity check the material is complete, explain the activity's goal and the instructions. During the activity go to each team to check their progress as well as to orient them if necessary. After the activity it is recommended to use class time to check on the learning and conclusions about the activity.

To get a better understanding of fluids at rest and fluid dynamics, the students need to do the assigned exercises. You can solve examples in class, going step by step and

allowing the students to make questions. You can have in-class examples that increase in difficulty. Invite your students to attempt a solution by themselves and then in the board with help from the rest of the class.

It is recommended to solve the exercises individually at class time, this way the student can ask questions to other students and to the instructor. In case you allow to work in teams, make sure the exercises are solved one by one by all of the team members. They can use a scientific calculator to solve the exercises, however all of the problems must have procedures.

Topics 3, 4 and 5

This Matter and Energy course is designed in a flipped classroom format. This means that the students must be in charge of constructing their knowledge, and to achieve it, the students must study the topic at home before the class. To encourage the study at home you can apply quizzes or give a qualifying activity related to what they are expected to know. It is important that the students go over the resources as well as the bibliography assigned on each topic.

Once the students read and discussed the topic in class, explain in detail the concepts that aren't yet understood. For topic 3, it is recommended to go over the characteristics of oscillations and simple harmonic motion. Also go over Hooke's law, motion equations and oscillations in terms of period and frequency. For topic 4, ask the students to identify the parts of a wave, types of mechanical waves as well as types of seismic waves. You can use videos or simple experiments to show the different types of mechanical waves. Also, explain the characteristics of standing waves and resonance phenomena. For topic 5 ask the students to draw a table of the propagation of sound in different media and pay special attention to the Doppler effect. You can use videos or experiments that help the student to fully understand the phenomenon.

It is recommended for you to do the activity before taking the group to the laboratory, such that you can make any adjustments if necessary. It is important that you make sure the students will have access to the computer lab. In case you don't have access, you

use the classroom and ask the students to bring a laptop (if they have one). The student must check at home the accessibility to the simulator and make any adjustments if necessary. If you don't have internet access in your classroom, the student should download the simulator at home.

The activity assigned for topics 3, 4 and 5 consist on working on a simulator, thus it is suggested to be done in pairs to avoid the work to be done by one person. Make sure the students read the activity and have a formulary for those topics.

The day of the activity check the material is complete, explain the activity's goal and the instructions. During the activity go to each team to check their progress as well as to orient them if necessary. After the activity it is recommended to use class time to check on the learning and conclusions about the activity.

To get a better understanding of vibration, waves and sound, the students need to do the assigned exercises. You can solve examples in class, going step by step and allowing the students to make questions. You can have in-class examples that increase in difficulty. Invite your students to attempt a solution by themselves and then in the board with help from the rest of the class.

It is recommended to solve the exercises individually at class time, this way the student can ask questions to other students and to the instructor. In case you allow to work in teams, make sure the exercises are solved one by one by all of the team members. They can use a scientific calculator to solve the exercises, however all of the problems must have procedures.

Module 2.

Topics 6 and 7.

This Matter and Energy course is designed in a flipped classroom format. This means that the students must be in charge of constructing their knowledge, and to achieve it, the students must study the topic at home before the class. To encourage the study at home you can apply quizzes or give a qualifying activity related to what they are expected to know. It is important that the students go over the resources as well as the bibliography assigned on each topic.

Once the students read and discussed the topic in class, explain in detail the concepts that aren't yet understood. For topic 6, it is recommended to perform simple experiments to illustrate the ways to charge a body electrically. Also, give a quick review of Coulomb's law. For topic 7, ask for the students to explain what an electric field is and add information if necessary.

It is recommended for you to do the activity before taking the group to the laboratory, such that you can make any adjustments if necessary. It is important that you make sure the students will have access to the science's lab and the equipment needed. In case you don't have access, you can make adjustments in some other space. Every activity is designed considering the campus to have at least a chemistry lab.

The activity assigned for topics 6 and 7 consists on building an electroscope, thus is recommended to form groups of three students. This way they can have an easier access to the material's list. Make sure the students read the activity prior to going to the lab, have the material's list and choose a team leader.

The day of the activity check the material is complete, explain the activity's goal and the instructions. During the activity go to each team to check their progress as well as to orient them if necessary. After the activity it is recommended to use class time to check on the learning and conclusions.

To get a better understanding of charge interactions and electric field, the students need to do the assigned exercises. You can solve examples in class, going step by step

and allowing the students to make questions. You can have in-class examples that increase in difficulty. Invite your students to attempt a solution by themselves and then in the board with help from the rest of the class.

It is recommended to solve the exercises individually at class time, this way the student can ask questions to other students and to the instructor. In case you allow to work in teams, make sure the exercises are solved one by one by all of the team members. They can use a scientific calculator to solve the exercises however, all of the problems must have procedures.

Topics 8, 9 and 10.

This matter and energy course has a flipped classroom format. Because of it, the students must be in charge of constructing their knowledge. To achieve it, the instructor must ask the students to study at home prior to cover the topic in class. To encourage the study at home you can apply quizzes or give a gradable activity related to what they are expected to know. It is important that the students go over the resources as well as the bibliography assigned on each topic.

Once the students read and discussed the topic in class, explain in detail the concepts that aren't yet understood. For topic 8 it is recommended to go over the concepts of electric flux and Gaussian surface. Also go over how to get the electric field of a highly symmetric charge distribution using Gauss' law. For topic 9, ask the students to identify when a force is conservative and the difference between electric potential and electric potential energy. You can use videos or analogies to exemplify each concept. For topic 10 ask the students to identify the electric potential on a system of charges as well as the relationship between the electric field and the electric potential.

It is recommended for you to do the activity before you take the group to the laboratory, such that you can make any adjustments if necessary. It is important that you make sure the students will have access to the science's lab and the equipment needed.

In case you don't have access, you can make adjustments in some other space. Every activity is designed considering the campus to have at least a chemistry lab.

The activity assigned for topics 8, 9 and 10 consists of three parts thus, it is recommended to form groups of four students. This way they can have an easier access to the material's list. Make sure the students read the activity prior to going to the lab, have the material's list and choose a team leader.

The day of the activity check the material is complete, explain the activity's goal and the instructions. During the activity go to each team to check their progress as well as to orient them if necessary. After the activity it is recommended to use class time to check on the learning and conclusions about the activity.

To get a better understanding of Guss' law, electric potential and electric potential energy, the students need to do the assigned exercises. You can solve examples in class, going step by step and allowing the students to make questions. You can have in-class examples that increase in difficulty. Invite your students to attempt a solution by themselves and then in the board with help from the rest of the class.

It is recommended to solve the exercises individually at class time, this way the student can ask questions to other students and to the instructor. In case you allow to work in teams, make sure the exercises are solved one by one by all of the team members. They can use a scientific calculator to solve the exercises however, all of the problems must have procedures.

Module 3.

Topics 11 and 12.

This Matter and Energy course is designed in a flipped classroom format. This means that the students must be in charge of constructing their knowledge, and to achieve it,

the students must study the topic at home before the class. To encourage the study at home you can apply quizzes or give a qualifying activity related to what they are expected to know. It is important that the students go over the resources as well as the bibliography assigned on each topic.

Once the students read and discussed the topic in class, explain in detail the concepts that aren't yet understood. For topic 11, it is recommended to go over the concepts of voltage, current and resistance, the relationship among them, Ohm's law and the differences between alternating current and direct current. Use videos or analogies that allow the student to understand each concept. For topic 12, ask the students to make a table with the properties of a parallel and a series circuit. Show examples of mixed circuits and use the different methods to solve them.

It is recommended for you to do the activity before taking the group to the laboratory, such that you can make any adjustments if necessary. It is important that you make sure the students will have access to the science's lab and the equipment needed. In case you don't have access, you can make adjustments in some other space. Every activity is designed considering the campus to have at least a chemistry lab.

The activity assigned for topics 11 and 12 consists on building a series and a parallel circuit, thus it is recommended to form groups of four. This way they can have an easier access to the material's list. Make sure the students read the activity prior to going to the lab, have the material's list and choose a team leader.

The day of the activity check the material is complete, explain the activity's goal and the instructions. During the activity go to each team to check their progress as well as to orient them if necessary. After the activity it is recommended to use class time to check on the learning and conclusions about the activity.

To get a better understanding of electric circuits, the students need to do the assigned exercises. You can solve examples in class, going step by step and allowing the students to make questions. You can have in-class examples that increase in difficulty. Invite your

students to attempt a solution by themselves and then in the board with help from the rest of the class.

It is recommended to solve the exercises individually at class time, this way the student can ask questions to other students and to the instructor. In case you allow to work in teams, make sure the exercises are solved one by one by all of the team members. They can use a scientific calculator to solve the exercises however, all of the problems must have procedures.

Topics 13, 14 and 15.

This Matter and Energy course is designed in a flipped classroom format. This means that the students must be in charge of constructing their knowledge, and to achieve it, the students must study the topic at home before the class. To encourage the study at home you can apply quizzes or give a qualifying activity related to what they are expected to know. It is important that the students go over the resources as well as the bibliography assigned on each topic.

Once the students read and discussed the topic in class, explain in detail the concepts that aren't yet understood. For topic 13, ask the students to explain the relationship between charges and magnetism as well as the magnetic force of a charge moving in an external magnetic field and a current flowing in a wire. You can use videos or simple experiments to show the relationship of the electricity and magnetism. Also, go over how and when to apply the right hand rule.

For topic 14, ask the students to draw a table with the differences and similarities of the equations derived from the laws of Biot-Savart and Ampere. For topic 15 explain the theory of relativity, its postulates and implications. Use videos to show the concepts. Explain the mass-energy relation, the De-Broglie waves and the black-body radiation. Due to the complexity of these topics we invite you to be as creative as possible.

It is recommended for you to do the activity before taking the group to the laboratory, such that you can make any adjustments if necessary. It is important that you make sure

the students will have access to the science's lab and the equipment needed. In case you don't have access, you can make adjustments in some other space. Every activity is designed considering the campus to have at least a chemistry lab.

The activity assigned for topics 13, 14 and 15 consists of three small experiments, thus it is recommended to form groups of four students. This way they can have an easier access to the material's list. Make sure the students read the activity prior to going to the lab, have the material's list and choose a team leader.

To get a better understanding of the electro-magnetic phenomena and modern physics, the students need to do the assigned exercises. You can solve examples in class, going step by step and allowing the students to make questions. You can have in-class examples that increase in difficulty. Invite your students to attempt a solution by themselves and then in the board with help from the rest of the class.

It is recommended to solve the exercises individually at class time, this way the student can ask questions to other students and to the instructor. In case you allow to work in teams, make sure the exercises are solved one by one by all of the team members. They can use a scientific calculator to solve the exercises however, all of the problems must have procedures.