

Biodiesel Unit Objectives: By the end of this unit, students will be able to...

- Compare and contrast the spark ignition engine and the compression ignition engine based on their properties and function.
- Summarize what happens during each of the four strokes of a four stroke engine.
- Explain the technological advancements that have improved the performance of the compression ignition engine.
- Utilize the mechanism of the compression ignition engine to explain why they have a higher fuel efficiency than a spark ignition engine.
- Summarize how dark smoke relates to the rate of combustion of a fuel.
- Define biodiesel, summarize how it is made, and explain the sources that can be used to make biodiesel.
- Summarize the steps and chemical reactions involved in transesterification.
- Identify a transesterification reaction based on changes to the molecules involved and summarize how transesterification changes the chemical structure of a triglyceride molecule.
- Identify the chemical structure of an ester.
- Summarize the role of each of the following in transesterification: base, alcohol, triglycerides.
- Summarize the efficiency of the transesterification reaction.
- Explain why biodiesel molecules combust more completely and efficiently than petroleum diesel fuel.
- Describe why biodiesel can lengthen the life of an engine.
- Explain the properties of biodiesel that can enable it to be carbon neutral.
- Summarize why biodiesel is a safer fuel than petroleum diesel fuel.
- Define each of the following: a. Flashpoint b. Lubricity c. Cetane Number
- Compare and contrast the benefits and disadvantages of biodiesel compared to standard diesel fuel.
- Summarize the developments in biodiesel research and use this understanding to predict the future role that biodiesel will play in US transportation energy.