Hi, I'm Dr.

Wayne Whiteman. Have you ever looked at a wrench like this and wondered how much torque or a moment could be produced.

Or maybe you've wondered, why would someone use instead a lug wrench like this and how much torque or a moment could be produced like this? Or maybe as you've looked around at structures or bridges, you've thought I wonder how folks would analyze that or how much load could be carried by a bridge. And this is a truss structure that would be attached to the bridge and is the primary structure for carrying the loads. Or perhaps you might even be interested in, in looking at a cherry truck this is a model of a cherry picker truck or perhaps a crane to see what were the conditions that would keep this crane from, or this cherry truc, cherry picker truck from turning over.

If these sorts of problems interest you, then you've come to the right place for this course. This is an introduction to Engineering Mechanic's and this is Module 1. I'd like you to look at the learning outcomes for Module 1. First I'd, we'd like to discuss, what's the difference between an engineer and a scientist? What make engineering different from science? And then we're also going to look at the major topics in this course, and finally, we're going to look at the system of units that will be used in this course, and I want you to, to express those typical units. You're going to get a little exercise here where you'll be able to express those typical units for measurements of force, distance and mass,and also the acceleration due to gravity. So let's start out.

What I'd like you to do is, on your own, and I'll do this through several of the modules, I'd like you to pause and write down your thoughts and, and answer the question for yourself before you continue on.

So the first thing I would like you to do is take a piece of paper, and in your own words, write down what do you think is the difference between engineers and scientists? Now that you've answered that question, let's look at what Theodore von Karman said, he's a famous physicist and aeronautical engineer. So he says, okay, the, the scientist describes what, what the world is or how the world is, and then the engineer creates what never was.

And so I've, I've shown some structures here that are typical engineering structures as simple as, as perhaps a sign. This is a sign that I've, I've taken outside my office here at Georgia Tech. Well, here's a truss bridge, a railroad truss bridge, and this is the type of bridge that we'll be able to analyze as a result of this course or maybe even as, as complicated as the space shuttle. these, these are all systems that are analyzed by engineers, and by successfully completing this course, you'll have a good understanding of basic engineering.

So what is engineering mechanics? As I said, this is an introduction to engineering mechanics or engineering science. Well, engineering mech, mechanics takes the basic sciences, the physics, the math, the things about how the physical world works, and then, it's the linkage. Engineering mechanics are what's sometimes called engineering sciences, the linkage to the engineering disciplines of mechanical

engineering, civil engineering, material science engineering, are all kinds of other engineering. where we try to, in engineering, fulfill a human need, need by applying the science that we learned before.

This is an overview of the topics of the course, the major topics of the course. There's a handout of this sheet in your module in, in, on the website and I'd like you to print that out.

This is sort of the forest, if you will, instead of the trees for the course.This gives you a good broad overview of what you're going to learn in the course, and as we go through module by module, if you get lost and wonder what the big picture is, you should print this, this document out and keep it with you as kind of an overview of, of the entire course structure.

So we're going to start out with the concept of, of, of a force and how we express a force in two and three-dimensions. We'll then go on to particle and equilibrium, and how do we have a balance of forces on a particle. We'll then go on to the concept of moments and we'll have a series of modules on moments, and then, to the equivalent, equilibrium equations and equivalent systems for rigid bodies.

And we'll look at resultants and distributed forces,how to find centroids, the method of composite parts.

And then finally, we'll look at equilibrium of rigid bodies, and we'll learn a tool called the free body diagram, and we'll actually solve examples, and analyze examples of real world problems, in two 2 and 3D equilibrium. We're going to focus on rigid bodies in this in this, in this course as I said. This is a rigid, we can consider this to be a rigid body. We, it doesn't deform, and so, that's the main thing. Later courses that you may take, you actually have some deformation, but in this course, all the bodies that we're going to work with are rigid.

So last thing I want to do in this module is I'd like to talk about the system of units that we're going to use in the course. There's two system of units that we're going to use, one is the English system of units and the other is The International System of Units or sometimes called the metric system of units and abbreviated SI. So I'd like you to pause again and take your, your time and go through and write down what are the typical units of measurement that's used in these systems for measuring distance, measuring force, measuring mass. And then, I'd also like you to write down the gravitational constant for each of these systems of units. Now that you've answered that question, let's go ahead and look, look at the, at the correct response. For distance, in the English units, we typically use feet or perhaps inches. In the metric system, we use meters. As far as force is concerned, we use pounds in the English system, and kilograms in the excuse me, Newtons in the SI system of units. Mass is kilograms in the SI system of units or the International Systems of Units. And in the English systems of units, mass is pound seconds squared per foot, which is also referred to as slugs. And finally, as far as the gravitational constant, g, for the system units, it's 32.2 feet per second squared in the English units and 9.81 in the SI.

So at this point, you should go back to the, the learning outcomes for this module and make sure that you can achieve each of those outcomes.

And I'll see you at Module 2. Thank you.