PROFESSOR JOEL SCHINDALL: This course represents one of four courses that are given in the Gordon Leadership Program. We have a course on engineering innovation and design, a course on engineering leadership, a course on people and organizations, which talks about how to work effectively within a company, and of course on project engineering, which teaches them how to use the same tools and skills they learned when they assemble electronic systems to assemble the management system that it takes in order to run a complicated program.

When we got funding for the Gordon MIT Engineering Leadership Program, we got together with a number of industry leaders, actually quite a large number of industry leaders, to look at what was engineering leadership and what were they looking for in the successful engineers within their companies. About 3/4 of the topics had to do with leadership-- decision-making, advocacy, cross-cultural communication-- but about a quarter of the topics that they really were looking for had to do with good engineering designers. And they were talking not just about being skilled in the craft, but actually looking at the world in a way where they realized what was wanted and needed, what was it the people who are using this product might require, and they actually came up with elegant, innovative designs. They observed that a small portion of the engineers that they hired seemed to have that ability, and a much larger portion of them would do competent design work, but just didn't pick up on the kinds of breakthrough designs that the smaller group could do.

Rather than teach the students the design skills of a particular engineering discipline, we work to teach the students to think like designers-- to be able to get outside the problem itself and look at what is the purpose of this project or product or process? What function does it serve? What is the need that is required out in the world? And how can I innovatively and creatively use the tools that I have learned in order to design, invent, produce, and implement something that will satisfy this need?

So we put together a course which is a combination of 10 design principles, Socratic

inquiry, and the students themselves being engaged in design projects, and supported by some student teaching assistants, which engages and provokes the students to develop these kinds of abilities and causes them to leave the course not so much with a specific body of knowledge-- we don't actually care whether they continue doing that specific design project-- but what we want them to do-- and they do, in fact, they can't avoid it-- is to apply this way of thinking to the way that they go about solving future problems.

I actually had a career in industry after graduating from MIT, 35 years in aerospace and telecommunications, but I couldn't resist the opportunity to come back and give back by helping MIT's young students develop the kind of attitude and behavior that is necessary to be effective as an engineer today.

PROFESSOR BLADE KOTELLY: We're successful if a student exits the course having completely changed the way they think about the world. And I know that sounds like a strange thing. And what we mean, is that hopefully they see everything differently. When they're walking down the street and they pass a door handle, they think, why is the door handle designed that way? Does it communicate effectively to me to know how to use it? What about other people? Would they understand how to use it? What's the material made of, which material's involved in that door handle? How has it been used? Is it smudged? Is it clear? Is it clear against the background? Hopefully, they see everything differently in the vast interconnectedness of everything in the world.

And the fact that everything we do is ultimately in service to people. So if you're making a part for space station, it might have to be replaced by someone or diagnosed, so that is in service to people. People to operate a bigger system that can tell us more about how we live. So if they walk out of the class being able to do that, we're successful.

PROFESSOR JOEL SCHINDALL: One way in which I like to challenge the students at the end of the course is to point out to them that the course is not ending now. It's beginning now. We actually gave them the instruction set and the way of thinking. Their job now is to go out into the world and to use that thinking in order to be more effective designers. And here's a

gotcha. Once your eyes are open to that, as has happened in this class, you can't stop doing it. So a year from now, or two years from now, or five years from now, I expect to hear back from you that you faced or came up with some kind of a creative solution to a longstanding problem. And I'm going to take great satisfaction in the fact that you came up with that solution, but some of the tools and the ways of looking at the world that we discussed in this class will have been the enabling or the facilitating factor in your effectiveness of doing that.