KEEN

ENGINEERING UNLEASHED

# WHY KEEN?

## YOU CARE ABOUT YOUR STUDENTS' SUCCESS. AND SO DO WE.

Your greatest moment as a professor is when you see your students succeed and find personal fulfillment. That is often what drives us to connect our students' innate passions with new technical skills. But what if our role is greater?

## IT'S NOT JUST ABOUT SKILL. IT'S ABOUT A MINDSET.

Technical understanding is essential to engineering. But engineers find success and personal fulfillment when they couple these skills with a mindset to create extraordinary value for others. The key is an entrepreneurial mindset. And it can be applied to any subject, including engineering.

## ENTER KEEN. ENGINEERING UNLEASHED.

To champion the entrepreneurial mindset in undergraduate engineering, we created KEEN, the Kern Entrepreneurial Engineering Network. KEEN is a collaborative network of colleges and professors dedicated to cultivating the core principles of the entrepreneurial mindset in their students. Together we unleash the full potential of engineering.

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# ENTREPRENEURIAL MINDSET DEFINED

## CURIOSITY

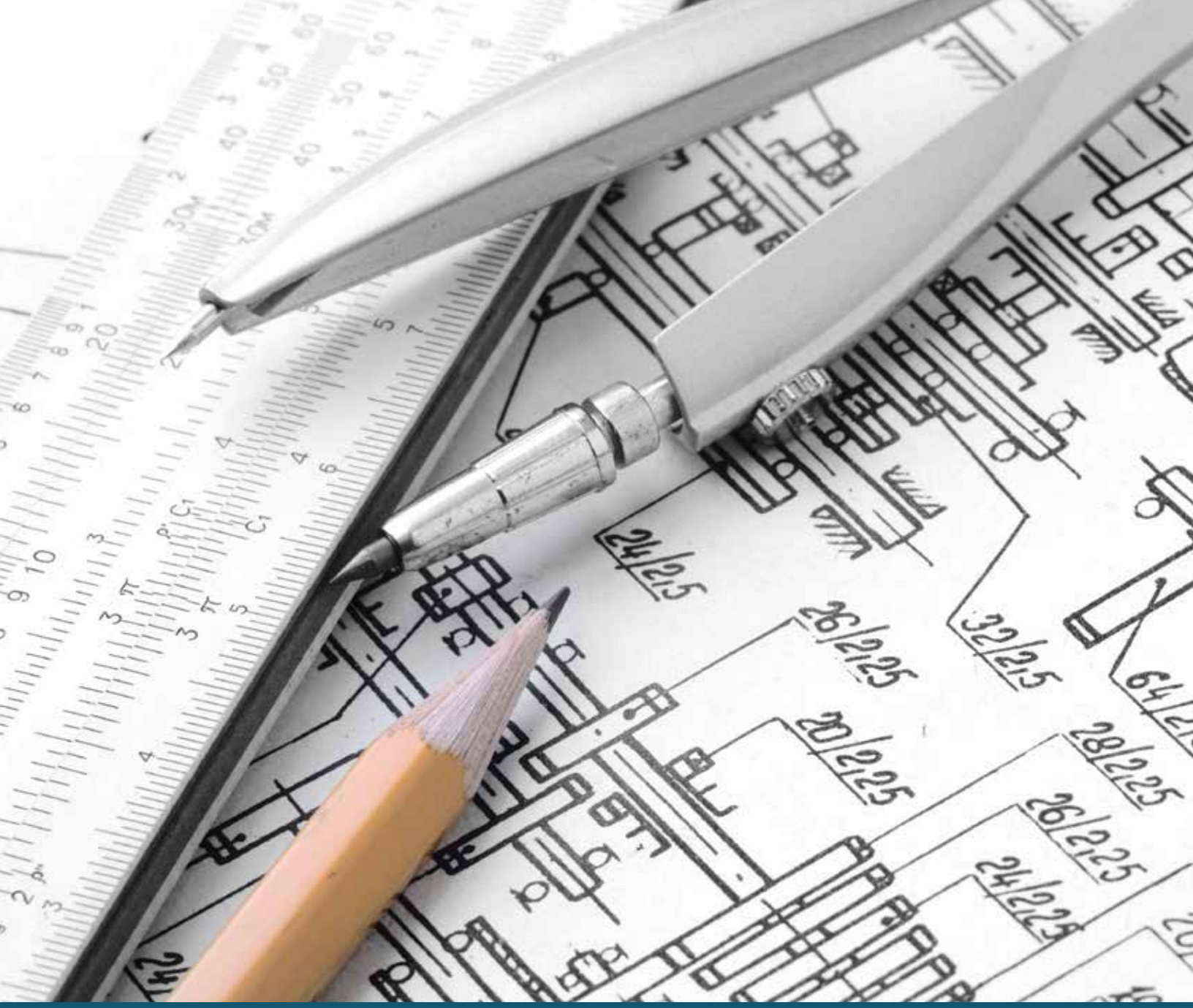
In a world of accelerating change, today's solutions are often obsolete tomorrow. Since discoveries are made by the curious, we must empower our students to investigate a rapidly changing world with an insatiable curiosity.

## CONNECTIONS

Discoveries, however, are not enough. Information only yields insight when connected with other information. We must teach our students to habitually pursue knowledge and integrate it with their own discoveries to reveal innovative solutions.

## CREATING VALUE

Innovative solutions are most meaningful when they create extraordinary value for others. Therefore, students must be champions of value creation. As educators, we must train students to persistently anticipate and meet the needs of a changing world.



# THE ENGINEER WE NEED

## HAS AN ENTREPRENEURIAL MINDSET COUPLED WITH ENGINEERING THOUGHT AND ACTION, EXPRESSED THROUGH COLLABORATION AND COMMUNICATION, AND FOUNDED ON CHARACTER.

These five KEEN Student Outcomes are expressed through various student behaviors. Teachable Skills support the development of KEEN Student Outcomes. Together, the KEEN Student Outcomes and the Teachable Skills documents form the KEEN Framework.

KEEN professors reimagine engineering education as they explore the framework in their classroom.

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# THE ENGINEER WE NEED

MUST POSSESS AN

**ENTREPRENEURIAL MINDSET**

COUPLED WITH

**ENGINEERING THOUGHT AND ACTION**

EXPRESSED THROUGH

**COLLABORATION**

AND

**COMMUNICATION**

AND FOUNDED ON

**CHARACTER**

# KEEN
# STUDENT OUTCOMES

**ENTREPRENEURIAL MINDSET**

COUPLED WITH

**ENGINEERING THOUGHT AND ACTION**

EXPRESSED THROUGH

**COLLABORATION**

AND

**COMMUNICATION**

AND FOUNDED ON

**CHARACTER**

# EXAMPLE BEHAVIORS

## CURIOSITY

**DEMONSTRATE** constant curiosity about our changing world
**EXPLORE** a contrarian view of accepted solutions

## CONNECTIONS

**INTEGRATE** information from many sources to gain insight
**ASSESS** and **MANAGE** risk

## CREATING VALUE

**IDENTIFY** unexpected opportunities to create extraordinary value
**PERSIST** through and learn from failure

**APPLY** creative thinking to ambiguous problems
**APPLY** systems thinking to complex problems
**EVALUATE** technical feasibility and economic drivers
**EXAMINE** societal and individual needs

**FORM** and **WORK** in teams
**UNDERSTAND** the motivations and perspectives of others

**CONVEY** engineering solutions in economic terms
**SUBSTANTIATE** claims with data and facts

**IDENTIFY** personal passions and a plan for professional development
**FULFILL** commitments in a timely manner
**DISCERN** and **PURSUE** ethical practices
**CONTRIBUTE** to society as an active citizen

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# COMPLEMENTARY SKILLS

| OPPORTUNITY | DESIGN | IMPACT |
|---|---|---|
| **Identify** an opportunity | **Determine** design requirements | **Communicate** an engineering solution in economic terms |
| **Investigate** the market | **Perform** technical design | **Communicate** an engineering solution in terms of societal benefits |
| **Create** a preliminary business model | **Analyze** solutions | **Validate** market interest |
| **Evaluate** technical feasibility customer value societal benefits economic viability | **Develop** new technologies (optional) | **Develop** partnerships and build a team |
| **Test** concepts quickly via customer engagement | **Create** a model or prototype | **Identify** supply chains distribution methods |
| **Assess** policy and regulatory issues | **Validate** functions | **Protect** intellectual property |

THESE SPECIFIC SKILLS REINFORCE THE DEVELOPMENT OF AN ENTREPRENEURIAL MINDSET