

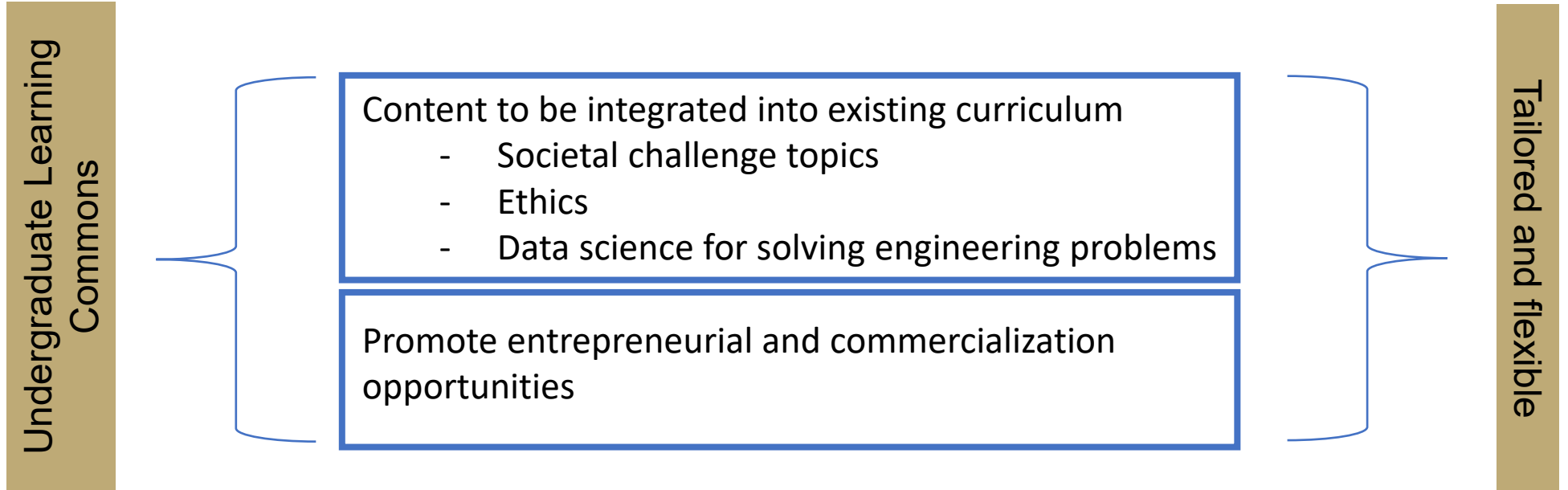
➤ Goal #2

Reimagine the mechanical engineering/nuclear and radiological engineering curriculum to provide students with a transformative learning experience.

Objectives:

- ▶ Increase innovation in the curriculum by integrating new methods in data science for solving engineering problems, enhancing exposure to ethics throughout the curriculum, and introducing societal challenge topics within specific required classes of the curriculum.
- ▶ Support flexibility and creativity by promoting entrepreneurial and commercialization opportunities.
- ▶ Grow experiential learning opportunities by creating a physical learning environment to facilitate collaboration of undergraduate students on course work.
- ▶ Provide a flexible and tailorable educational program to suit both individual student needs and accommodate a changing world.

Reimagine ME/NRE Education



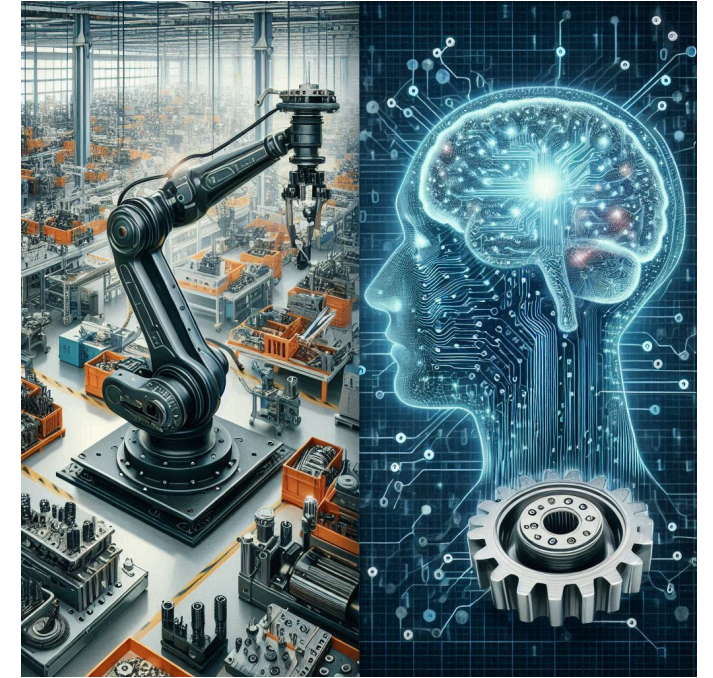
Societal challenge



Ethics



AI/ML in ME



 You

What should every mechanical engineering student learn by the time they graduate about AI and machine learning, so that they are better prepared to solve engineering challenges in their careers? Give some specific examples.

 Copilot

Certainly! As a mechanical engineering student, understanding the intersection of AI and machine learning can significantly enhance your problem-solving abilities. Here are some essential areas to focus on:

1. **Programming Languages:**

- **Python:** Widely used in machine learning (ML) due to its extensive libraries (e.g., TensorFlow, Keras, and PyTorch) and easy-to-learn syntax.
- **R:** Useful for statistical analysis, predictive modeling, and applications in scientific research, healthcare, finance, and social media analytics.
- **Java:** Known for simplicity, readability, and excellent user interaction capabilities, making it suitable for chatbot development.

2. **Machine Learning Fundamentals:**

- Understand supervised and unsupervised learning techniques.
- Familiarize yourself with deep learning algorithms like **convolutional neural networks (CNNs)** and **recurrent neural networks (RNNs)** ¹.

3. **Data Analysis and Big Data Technologies:**


- Learn to work with large datasets using tools like **Apache Spark**, **Hadoop**, **Cassandra**, and **MongoDB**.
- Gain proficiency in handling sensor data from components in power plants, production facilities, or consumer products ².

4. **AI Applications in Mechanical Engineering:**

- **Generative Design:** Explore tools that provide design options based on input requirements, optimizing trade-offs.
- **Computational Fluid Dynamics (CFD):** Use **Artificial Neural Networks (ANNs)** to approximate flow behavior with less computational power and time.
- **Internet of Things (IoT):** Understand how AI can analyze sensor data for predictive maintenance and optimization in power plants or manufacturing facilities ².

5. **Ethical Considerations:**

- Recognize the importance of ethical AI deployment.
- Ensure that AI tools are not only effective but also adhere to ethical guidelines ².

Remember, AI and ML are rapidly evolving fields, so staying curious and adaptable is crucial for success in your engineering career! 

Curriculum Exercise

- **20 minutes:** Groups of ~4-5 (all with the same selected theme) will take turns sharing their ideas using the question prompts provided. This will give the chance for each person to speak for about 5 minutes within their group.
- **20 minutes:** Collectively as a group come up with a consensus statement of key findings. Please designate someone in your group to record these so that they can be collected.



"Make a figure illustrating an external industry advisory board working together on an exercise to provide suggestions for improving mechanical engineering curriculum"
"Could we improve the diversity reflected in the photo please?"

Goals for Exercise

- Goal #1 – to gain an industry perspective perspective on how the associated topic is relevant within your industry
- Goal #2 – to identify opportunities for modifying current courses to better prepare our graduates to meet industry needs in these areas
- Goal #3 – identify potential partners who could partner to bring examples, challenge problems, and industry perspective into our classroom environment

