

AI for Mechanical Engineering

From Design to Smart Operations

Applications, Technologies, Benefits, Challenges, and Future Trends

Amani RAAD
Lebanese University, Engineering Faculty
November 27, 2025



NO BOUNDARIES!
YOU'RE AN ENGINEERING
JUST PASSIONATE ABOUT
YOUR FIELD IS DEFINITELY
WITHIN OUR REACH

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Future Trends and Opportunities

Emerging Markets in Mechanical Engineering



- A growing emphasis on sustainable and eco-friendly materials and processes.
- Increased focus on energy efficiency and renewable energy systems.
- Advancements in nanotechnology and microfluidics.
- Growing interest in additive manufacturing (3D printing).
- Increased collaboration between academia and industry.
- Growing emphasis on interdisciplinary research and education.
- Increased focus on global and cross-cultural collaboration.
- Growing emphasis on social and environmental responsibility.



World Applications

Case Studies

Used Creo Generative Topology and test digital prototypes, on while maintaining structural

generative design for spacecraft matters, balancing safety for astronaut mobility

Neural Concept and PhysicsX with genetic algorithms to 25% and reduce pressure d

ductions in design cycles and pr engineering workflows

Operations & Maintenance Case Studies

- Siemens Turbine Maintenance: Applied thermal profile analytics and ML algorithms to predict maintenance needs, reducing forced outages by nearly 50% and maintenance costs by 30%
- Automotive Vision Quality Control: Implemented AI-driven visual inspection systems in manufacturing lines, decreasing defect escapes by 87% and increasing first-pass yield by 23%

Production Optimization: Deployed digital twins across on facilities, enabling real-time process monitoring and resulting in 15% efficiency gains and 10% energy

Measurements show improvements in mechanical engineering typically yield gains within 2-3 years of implementation



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ما فظوا
على
نفاق صفتكم

VIDEO
SEARCHING





Unleashing the AI Revolution in Mechanical Engineering

Join us to explore how Mechanical Engineering and AI work hand-in-hand to drive innovation.

A session not to be missed !

Presented by :

Dr. Amani Raad



Thursday November 27



At 12:00 PM



Floor -2