THE OHIO STATE UNIVERSITY

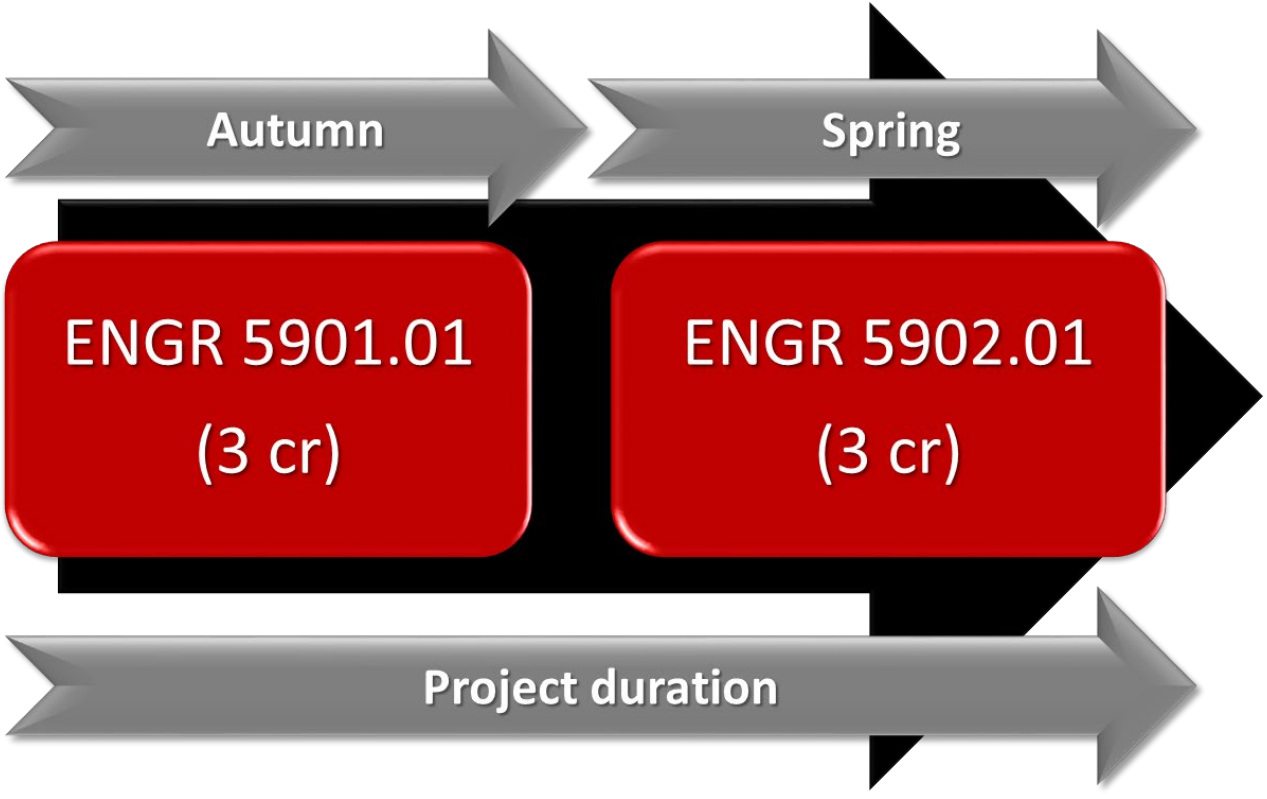
COLLEGE OF ENGINEERING

MULTIDISCIPLINARY DESIGN CAPSTONE

ENGR 5901.01/5902.01

APPLYING STUDENT KNOWLEDGE TO REAL-WORLD INDUSTRY NEEDS

Course Sequence (6 Credits)



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Multidisciplinary Capstone

- Define – Design – Build – Validate process
- Senior undergraduate engineering students from multiple disciplines
- Team-based project
- Teams often include non-engineering students
- Duration: 2-semester long project
- Industry driven

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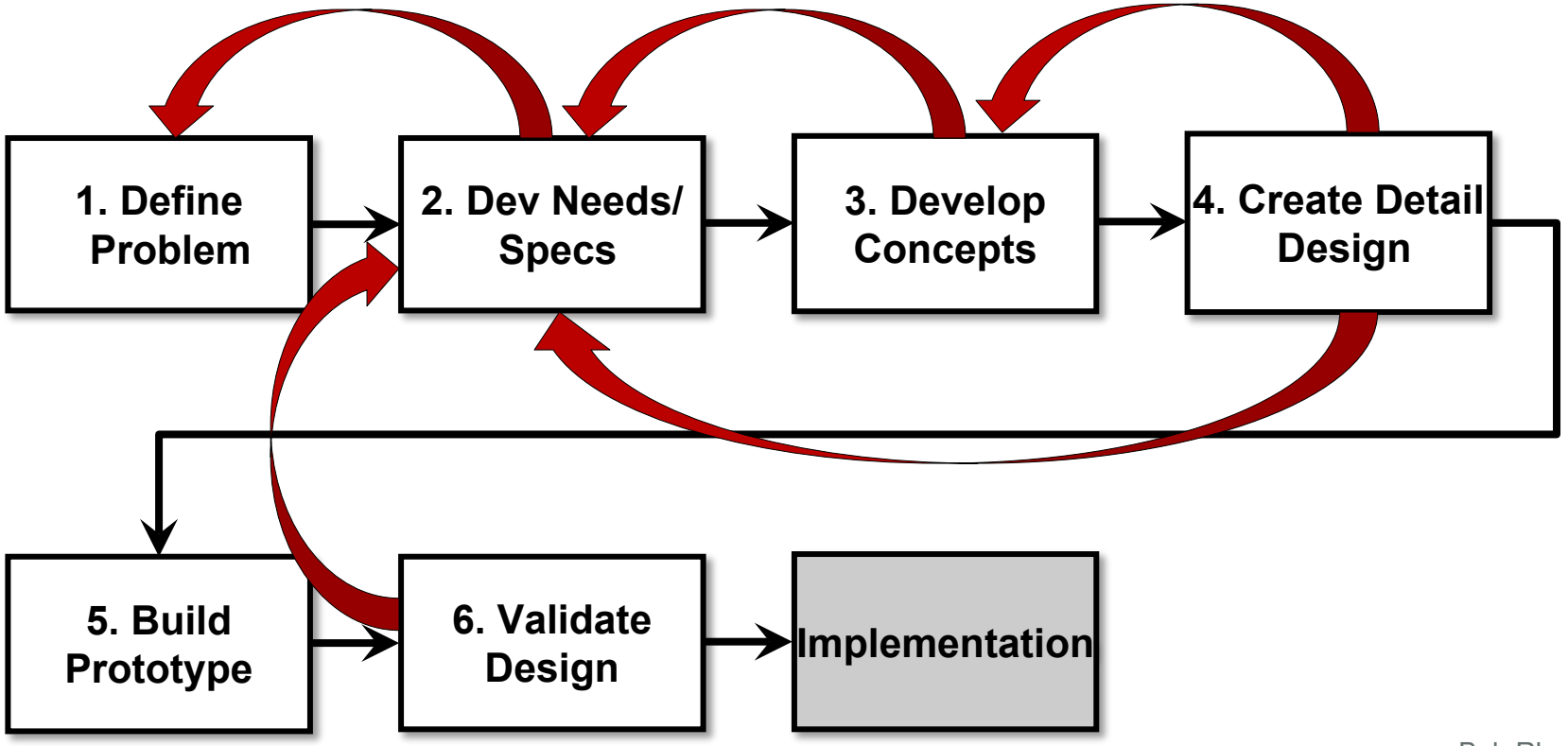
Design Process



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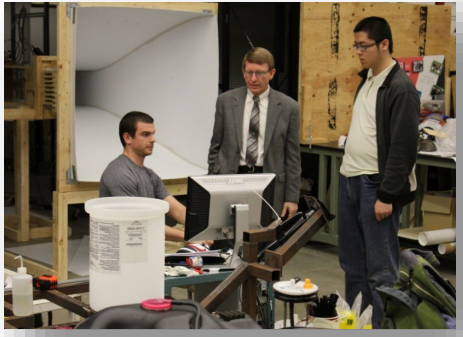
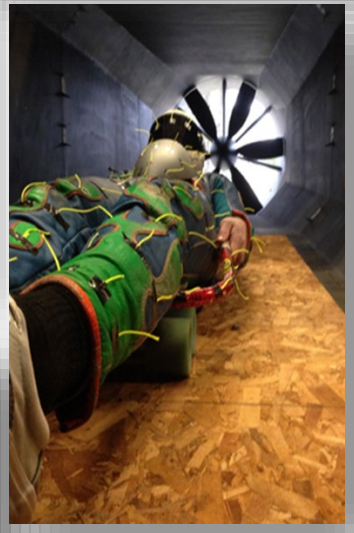
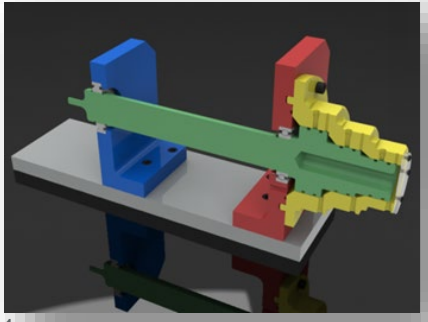
Real-world Projects

- Equipment Improvement
- System/Process Improvement
- Product Development
- Applied Research
- Modeling and Simulation
- Software Application Development







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Student Benefits

- Improve students' value to industry
- Develop professional skills
- Work on realistic industry projects
- Gain multidisciplinary team experience
- Network students and companies
- Implement rigorous design process

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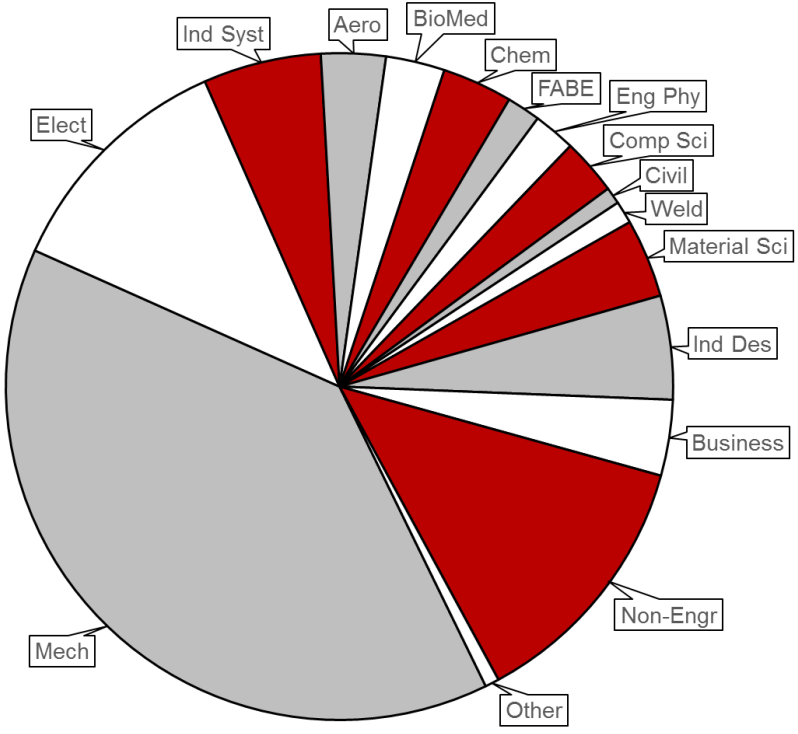
Multidisciplinary Capstone Students

- Engineering Students
  - 14 Engineering Majors
- Non-Engineering Students
  - Business
  - Humanities
  - Industrial Design



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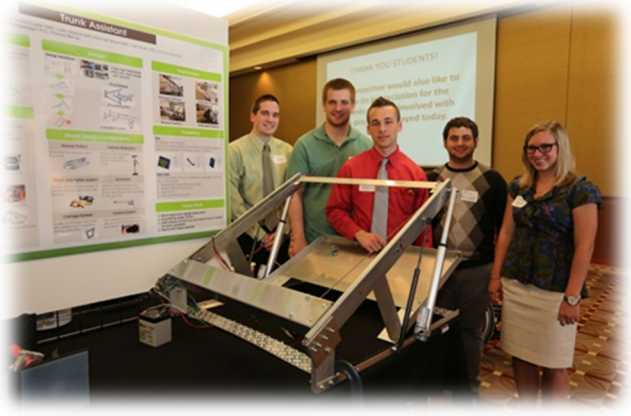
Typical Student Deliverables

- Regular Project Status Updates
- Oral Presentations
- Written Reports
- Prototypes, models, simulations, software, etc.
- Engineering Design Showcase Presentation



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Industry Involvement

Contributions:

- Provide real-world projects
- Mentor students
- Project support

Benefits:

- Gain value-added project solutions
- Contribute to educational experience
- Interact with prospective employees
- Acquire new ideas from creative and innovative students

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Representative Sponsors

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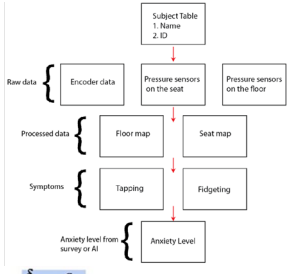
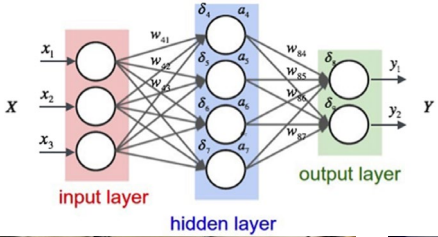
Biometrics Monitoring/Occupant Wellbeing

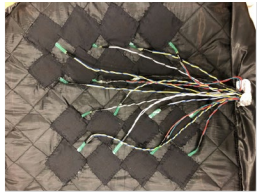
HONDA
The Power of Dreams

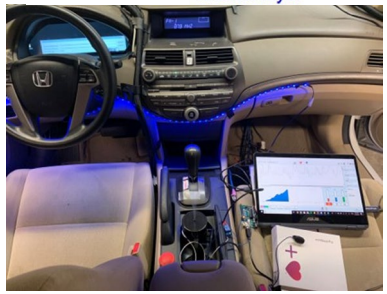
Objective: Investigate how human biometric information can be utilized to predict vehicle occupant's anxiety. Create a system to reduce this anxiety.

- Identified how biometric characteristics (e.g. heart rate, body temperature, body movement, etc.) change with anxiety
- Developed a system to measure and record biometrics
- Identified what reduces anxiety
- Developed a system based on human senses to reduce anxiety









What majors where on this team?

- Electrical/Computer, Biomedical, Material Science, Computer Science, Mechanical, Neuroscience, Info. Systems

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Automated Visual Inspection of Engine Parts

HONDA
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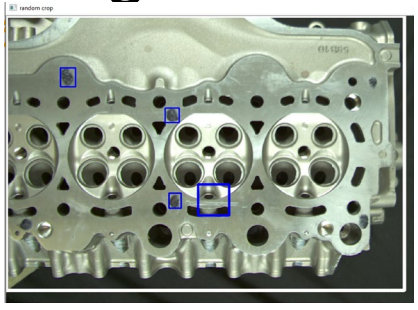
Objective: Create an automated system to visually inspect engine blocks for imperfections (e.g. porosities).



- Identified defect size and system requirements to visually recognize imperfections
- Developed a camera and lighting system to measure and record defect
- Developed software algorithm to classify imperfection through machine learning methods

What majors where on this team?

- Electrical/Computer, Mechanical, Industrial Systems, Finance, Operations Management

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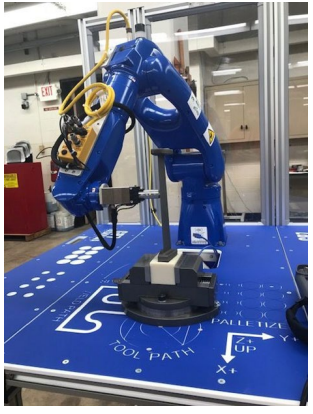
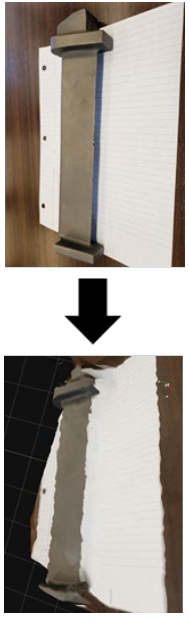
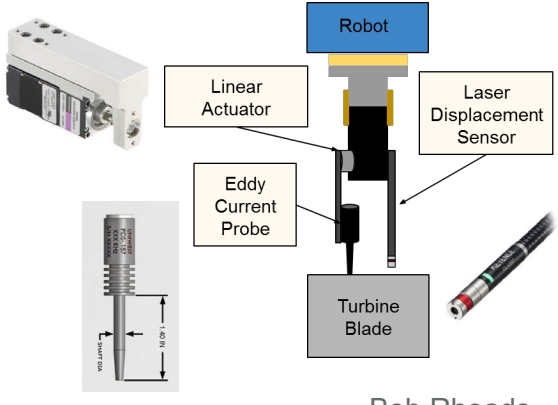
Defect Detection within Aircraft Parts

Objective: Develop a system to identify defects in aircraft rotor blades using an autonomous 6-axis robotic system.

- Identified defect characteristics and system requirements to detect imperfections
- Implemented a camera to measure and record defects
- Created a system of sensors to maintain a distance from the part without touching it
- Programmed an autonomous robotic system
- Developed software algorithm to classify imperfection through machine learning methods







What majors where on this team?

- Electrical/Computer, Mechanical, Engineering Physics, Accounting, Finance, Public Policy

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Permission of Instructor

- Confirm pre-requisites eligibility/credits with your academic advisor
- To request enrollment:
- Questions: please contact Bob Rhoads **rhoads.2@osu.edu**