

ABDULAZIZ AL OTAIBI

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EDUCATION

The Pennsylvania State University, University Park

Graduation: December 2026

Bachelor of Science in Mechanical Engineering | Major GPA: 3.92/4.00

- **Relevant Coursework:** Mechatronics (ME 454), Vibration of Mechanical Systems (ME 370), Design Methodology (ME 340), Product Design & Manufacturing Processes (IE 312), Thermodynamics, Fluid Mechanics, Heat Transfer

ENGINEERING PROJECTS

Autonomous Wall-Following Robot

ME 454 Mechatronics

- Implemented PD and finite-state-machine controllers in Arduino C++ on a RedBot platform using IR sensor feedback for closed-loop wall tracking.
- Tuned controller gains across multiple hardware units; diagnosed and resolved motor wiring asymmetry through systematic debugging.

Pendulum Tuned Mass Damper Design

ME 370 Vibration of Mechanical Systems

- Derived 4-DOF nonlinear equations of motion via Euler-Lagrange formulation for a three-story shear building with a PTMD; linearized via small-angle approximation.
- Implemented modal superposition in MATLAB and ran a parametric grid search to identify optimal PTMD parameters meeting a 7 cm peak-displacement constraint under impulse loading.

e-Formula Car Body Aerodynamic Optimization

ME 340 Design Methodology

- Competed in a semester-long Penn State e-Formula design competition against 64 teams, with the goal of achieving the fastest car through the application of mechanical engineering principles including aerodynamics, drag reduction, lift optimization, and vehicle dynamics.
- Developed three original car body designs beyond the baseline in SolidWorks, iteratively refining geometry to reduce aerodynamic drag and improve downforce at sustained high-speed lap conditions.
- Validated performance through wind tunnel testing and CFD analysis; correlated experimental and simulated results to projected lap-time improvements, advancing to the quarterfinals.

LEADERSHIP & ACTIVITIES

Public Speaking

CAS 100A Effective Speech

- Delivered weekly speeches to a live audience of 25 classmates, developing structured delivery, audience engagement, and extemporaneous speaking skills.
- Completed an impromptu speech assignment requiring one minute of preparation before speaking, strengthening the ability to organize and present ideas clearly under time pressure.

SKILLS

Software & Programming: SolidWorks, MATLAB/Simulink, Arduino IDE, C/C++, Microsoft Excel

Engineering Methods: Closed-loop control (PD, PID, FSM), embedded systems, CFD, modal analysis

Languages: English (fluent), Arabic (native)