MECH490 - Mechanical Engineering Capstone Project
**University:** Northern University of Technology
**Course Duration:** Full Year (Fall and Winter)
**Instructor:** Dr. Michael Brown
**Contact Information:** michael.brown@nut.edu
**Office Hours:** Tuesdays and Thursdays, 2:00 PM - 4:00 PM
*Course Description*
In this final-year capstone course, students apply their knowledge to a comprehensive design project. Projects may include designing a new mechanical device, improving an existing product, or developing a sustainable engineering solution. Students work in teams and are expected to produce a functional prototype.
*Learning Outcomes*
By the end of this course, students will be able to:

1. Plan and manage a comprehensive engineering project.
2. Conduct detailed design and analysis for mechanical systems.
3. Develop and fabricate prototypes.
4. Test and evaluate the performance of their designs.
5. Communicate their design process and results effectively.

*Course Timeline and Deliverables*
**Fall Semester:**

| Date | Deliverable | Description | Weight |
|---|---|---|---|
| **September 15, 2020** | Team Formation and Project Proposal | Teams form and submit a proposal outlining the project scope and objectives. | 10% |
| **October 20, 2020** | Preliminary Design Review | Presentation of initial design, including sketches and initial calculations. | 15% |
| **November 25, 2020** | Prototype Development and Testing | Development of a functional prototype and initial testing. | 20% |
| **December 10, 2020** | Midterm Presentation | Presentation of progress and prototype performance. | 10% |

**Winter Semester:**

| Date | Deliverable | Description | Weight |
|---|---|---|---|
| **February 15, 2021** | Final Design Review | Presentation of final design, including detailed drawings and calculations. | 15% |

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| **March 20, 2021** | Final Prototype and Testing Report | Submission of final prototype and detailed testing report. | 20% |
| **April 10, 2021** | Final Presentation and Demonstration | Final presentation and demonstration of the project. | 10% |

*Grading Breakdown*

- Team Formation and Project Proposal: 10%
- Preliminary Design Review: 15%
- Prototype Development and Testing: 20%
- Midterm Presentation: 10%
- Final Design Review: 15%
- Final Prototype and Testing Report: 20%
- Final Presentation and Demonstration: 10%

**Total: 100%**

*Course Policies*

- **Attendance:** Regular attendance is required. More than three unexcused absences may result in a lower grade.
- **Late Submissions:** Assignments submitted late will incur a penalty of 5% per day, up to a maximum of 25%.
- **Academic Integrity:** All students are expected to adhere to the university's academic integrity policy. Plagiarism or cheating will result in disciplinary action.

*Required Materials*

- Textbook: "Mechanical Engineering Design" by J.E. Shigley and C.R. Mischke
- Access to CAD software (e.g., SolidWorks)
- Prototyping materials (to be specified based on project requirements)

*Additional Resources*

- University Library
- Mechanical Engineering Lab
- Online tutorials and workshops