**Graduation Project Proposal**

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| Project Title | Advanced Design and Analysis of Adhesively Bonded Joints |
| Classification | Mechanical Engineering |
| Supervisor | Doç. Dr. Bertan Beylergil |
| Abstract |  |

The project aims to advance the understanding of adhesively bonded joints (ABJs) by exploring design, manufacturing, experimental, and modeling techniques. Adhesively bonded joints offer significant advantages in lightweighting and flexibility in materials, especially in automotive, aeronautical, and naval industries. This project will focus on optimizing joint configurations, improving adhesive materials, and exploring novel manufacturing techniques such as additive manufacturing and surface treatments. The project intends to develop solutions that enhance joint performance, improve failure prediction, and enable the creation of stronger, more durable structures.

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| Course Name | MEC 401 Mechanical Engineering Design |
| Prerequisites | - |
| Corequisites | - |
| Requirements | - |
| Workflow | * Literature Review: Review state-of-the-art techniques in the design and manufacturing of ABJs, focusing on recent advancements (2016–2024) in experimental, analytical, and computational studies.
* Design Phase: Develop various joint configurations (single-lap, double-lap, stepped, scarf, butt joints) and test their efficiency under different loading conditions.
* Material Selection: Select appropriate adhesive materials, focusing on high-performance epoxies and nanomaterial-reinforced adhesives.
* Experimental Phase: Conduct mechanical testing (e.g., shear) on selected ABJ designs.
* Additive Manufacturing: Investigate the potential of additive manufacturing to create complex joint geometries that optimize bonding strength.
* Project report
* Final presentation
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| Course Name | MEC 402 Graduation Project |
| Prerequisites | MEC 401 Mechanical Engineering Design |
| Corequisites | - |
| Requirements | - |

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| Term | Fall 2024 |
| Date |  |
| Project Title | Advanced Design and Analysis of Adhesively Bonded Joints |
| Supervisor Name and Signature | Doç. Dr. Bertan Beylergil |
| Students |
| First Name | Last Name | Student Number | Signature |
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