**Graduation Project Proposal**

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| Project Title | Strength Analysis of the Planetary Gear System of a Fully Automatic Transmission Under Different Driving Conditions |
| Classification | Research project / ~~Engineering application~~ |
| Supervisor | Sefa YILDIRIM |
| Abstract | The study examines the stress and elastic deflection characteristics of the internal ring gear within high-speed spur planetary gear units. A parameter known as rim thickness will be introduced to represent the flexibility of the internal ring gear. To depict the interaction between the internal ring gear and the gearcase, a certain number of evenly spaced linear springs will be employed. A finite element model of the entire internal ring gear will be constructed using a computer aided design software and ANSYS Workbench. The loads acting on the meshing teeth of the internal ring gear will be determined based on factors like the contact ratio and load-sharing coefficient. Through finite element analysis (FEA), the effects of flexibility and the connection status on the stress and elastic deflection of internal ring gear will be projected. |

The graduation project is the subject of the MEC 401 Mechanical Engineering Design and MEC 402 Graduation Project courses offered in the 7th and 8th semesters, respectively.

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| Course Name | MEC 401 Mechanical Engineering Design |
| Prerequisites | MEC 201 Strength of Materials I |
| Corequisites | SEC 301.2 Computer Aided Structural Analysis |
| Requirements | Basic knowledge of a finite element analysis package |
| Workflow | * Literature survey * Designing the planetary gear geometry of a fully automatic transmission * Creating the solid model * Finite element simulation using an isotropic material * Validation of the finite element model using studies available in literature * Project report * Final presentation |

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| Course Name | MEC 402 Graduation Project |
| Prerequisites | MEC 401 Mechanical Engineering Design |
| Corequisites | SEC 301.2 Computer Aided Structural Analysis |
| Requirements | Basic knowledge of a finite element analysis package |
| Workflow | * Analysis of the planetary gear using functionally-graded material * Analysis of the planetary gear under different loading conditions * Variation of the functionally-graded material and model * Comments on the results * Project report * Final presentation |

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| Term |  | | |
| Date |  | | |
| Project Title |  | | |
| Supervisor Name and Signature |  | | |
| Students | | | |
| First Name | Last Name | Student Number | Signature |
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