**Yeditepe University Civil Engineering Department**

**CE 492 Engineering Project**

**Proposal Form**

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| **Supervisors Name/s** | Asst. Prof. Dr. Özden Saygılı |
| **Project Title** | Numerical Modeling and Strengthening Design of a Historical Structure |
| **Project Reference No\*** |  |
| **Relevant course/s for the project** | CE 381, CE 403, CE 488 |

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| **Project Summary:** |
| The aim of this study is evaluate the seismic behavior and strengthening design of a historical structure located in Turkey. Finite element analysis method, which is accepted as one of the most suitable methods today, will be used. Three dimensional numerical model with solid elements will be created using SAP2000 program. Eigenvalue analysis will be carried out to identify the dynamic characteristics of the structure. In order to obtain the deformation and stress distributions for determining the regions where intervention will be needed, linear time history analysis will be performed. Finally strengthening design strategy will be modelled and seismic response of the masonry structure will be evaluated. |

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| **Project Achievements:**  *(Please explain how the proposed project helps to achieve the performance criteria listed below)* | |
| **Identifying specific design objectives based on project requirements:** | 1. Dynamic characteristics of the historical masonry structure will be investigated. 2. Seismic performance of the masonry structure will be evaluated through dynamic analyses. 3. Strengthening design strategies will be modelled and seismic response of the masonry structure will be evaluated. |
| **Gathering and using relevant information** | 1. Material properties of the masonry structure will be defined through literature review. 2. Time history analysis will be performed using ground motions which are compatible with design response spectrum given in Turkish Building Seismic Code 2018. |
| **Analyzing alternatives using appropriate engineering knowledge** | 1. Different strengthening design alternatives will be evaluated. |

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| **Considering the relevant constraints in the design:**  *(Please explain how the proposed project considers one or more limitations listed below)* | |
| **Economy**  **Environmental Issues/Sustainability**  **Manufacturability** | 1) Socio-economic impact among the strengthening design alternatives will be evaluated. |

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| **Definition of outcomes linked to the objectives of projects** | “Engineering Project” aims the students to gain the  1) ability of usage their knowledge in mathematics, science and engineering,  2) ability to identify and solve complex engineering problems,  3) design experience,  4) ability to use modern tools and employ needed information technologies,  5) ability to conduct experiments if needed, gather data and analyze results,  6) routine of combining their individual creativity with teamwork,  7) oral and written presentation experiences in foreign language,  8) ability to access information and recognition of the need for following developments in science and technology,  9) awareness of professional and ethical responsibility,  10) information about business life practices like project management and risk management,  11) awareness of effects of their engineering practices on health, environment, and safety,  12) awareness of project award mechanisms and tendering procedures,  13) awareness of the interaction of designers and constructors.  *(Minimum requirements are;*   * *project timeline,* * *abstract,* * *Türkçe özet,* * *the definition of the problem,* * *the scientific information and literature review,* * *different design alternatives and decision criteria,* * *selection of optimum alternative* * *economical, sustainability, ethical issues* * *engineering drawing and demonstration methods while presenting the solution* * *appendix including standards, patents, brochures etc.)* |

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| **Approval of the Project Approved Not Approved**  State the reason(s) if not approved: | |
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| **Department Chair:**  Prof. Dr. Nesrin YARDIMCI TİRYAKİOĞLU | Signature |

*\* Project Ref.Numbers will be given by the Engineering Design Project Committee*