|  |  |  |  |
| --- | --- | --- | --- |
| **Academic Year** | 20… - 20… SPRING/AUTUMN | **Date** | …/…/20….. |
| **Supervisor** |  | **Supervisor Signature** |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Student Number** | **Name Surname** | **Signature** |  | **Student Number** | **Name Surname** | **Signature** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

Supervisors should choose a topic, taking into account the issue of making it ready for the application. The topic must encourage the students to use their knowledge and skills which have acquired in previous courses, with a major design experience that will include **realistic conditions/constraints (such as cost analysis, economics, environmental issues, sustainability, manufacturability, ethical, health, safety, social and political issues) and engineering standards.**

|  |
| --- |
| **Title of the Study:** |
| **Aim of the study:** |
| **Methodology of Study:** |
| **Realistic conditions/constraints to be examined in the study (tick at least 3):**   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Economy |  |  | Cost analysis |  |  | Environmental Problems | |  | Sustainability |  |  | Manufacturability |  |  | Ethic | |  | Health |  |  | Safety |  |  | Social and Political Issues | |

**Following Realistic Constraints should be Examined in MMM 407 Metallurgical and Materials Design and MMM 498 Graduation Thesis;**

Program Outcome No. 3, contributed by the Graduation and Design studies, is defined below. In this context, supervisors must select at least three constraints and ask students for their Design and Graduation studies.

|  |
| --- |
| **Program Outcome No. 3:**  (P.Ç.3) Ability to design a complex system, process, device, or product to meet specific requirements under realistic constraints and conditions; ability to apply modern design methods for this purpose. (Realistic constraints and conditions include elements such as economy, environmental issues, sustainability, manufacturability, ethical, health, safety, social and political issues, depending on the nature of the design.) |

The constraints to be included in the Design and Graduation Studies specified in P.Ç. are given in general terms below:

**Economy:** In this context, the studies, topics should be addressed Cost analysis, Recovery rate, Wear and depreciation calculations, Renewal Analysis, Economic feasibility reports of engineering projects, and product and processing costs.

**Cost analysis:** In a product design, studies should be considered revealing the entire cost of the product as a result of all stages, such as labor, raw materials, production opportunities, facility economy, product processing costs, and energy costs.

**Environmental problems:** The studies should cover reducing the energy consumed in the processing and production stages of the product and therefore reducing the harmful substances thrown into the environment, reducing the harmful gas emissions emitted to the environment by using alternative and renewable energies, and choosing alternative materials for materials with recycling problems.

**Sustainability:** The lifetime of the product design should be considered. It would be taken into account if it will be used again after being used, such as scrap or garbage, or whether it can be reprocessed into the same or another product, or if it does, how long and in what quantity will it be recovered again?

**Manufacturability:** Studies on the producible stages that a design should go through, starting with the selection of material and production method.

**Ethic:** Consideration of the studies in terms of engineering ethics

**Health:** Investigation of whether the methods and materials used in the studies have a negative effect on human health.

**Safety:** An investigation of the selected materials for the studies in terms of engineering safety criteria, and an examination of occupational safety as to whether the methods used in the studies cause any work accidents.

**Social and Political Issues:** Consideration of the studied topics in terms of strategic and social interests in areas such as the military and defense industry, where the social and political factors are important.