**Thesis Registration Form**

**INSTRUCTIONS:**

***Student:*** Please fill your name and ID on the form and discuss with your Thesis Advisor to fill the other contents. Afterward, sign the form to verify your agreement and return the form to the Undergraduate Academic Assistant of the Department.

***Thesis Supervisor:*** Please authorize the Thesis Registration Form for this student by signing below.

**Student’s name:** **ID:**

**Thesis title:**

**Major:** *(select the thesis major)*

* Design and implementation of medical instrumentations / lab on the chip devices
* Development/ improvement of algorithms for image/signal/data processing
* Design and implementation of experiments to verify a research hypothesis
* Development of a biological/pharmaceutical product
* Study of properties of unknown materials/compounds/devices
* Entrepreneurship of a biomedical device/product
* Others

**Thesis goals and objectives:**

*(brief description of the project output)*

**Requirements:**

*(list all major requirements for the thesis work, refer to the guidance on the next page for details)*

|  |  |  |
| --- | --- | --- |
| Name of Supervisor | Name of Student |  |
| Date of Signed | Date of Signed |  |

**GUIDELINE:** base on the thesis major and the thesis objectives, thesis supervisor specifies the requirements for the project, but the minimum requirements for each major are:

**Design and implementation of medical instrumentations / lab on the chip devices**

* Literature review
* Identifying objectives and requirements of the design
* Decision process of design solution, which include information for solution comparisons and rationale for each decision (using decision methods like decision matrix or decision tree is suggested)
* Design: from block diagram to details, with engineering methods such as iterative process and quantitative calculations. All the relevant industrial standards must be included in the design.
* Presentation of the prototypes, the process for prototype production, and practice analysis.
* Prototypes testing: collect input and output data, compare with standard equipment or use other standard methods to evaluate the results.
* Analysis of the results using statistical methods to evaluate the accuracy/ reliability of the device or sensor.
* Testing and redesigning if required.
* Report about the cost of prototype production and evaluation of the effectiveness of the design on the engineering, economic, and social aspects.

**Development/ improvement of algorithms for image/signal/data processing**

* Literature review
* Specification of objectives and requirements for thesis work: development/ improvement/ application of the algorithms, testing with data.
* Presenting the theoretical principles, mathematical models, flowcharts of the algorithms.
* Implementation of the algorithms using programming tools/ languages
* Testing with sufficient data volume for statistical analysis
* Analyzing the results by statistical methods to evaluate the pros and cons of the algorithms.
* Comparison with results from other methods.
* Conclusion and discussion.

**Design and implementation of experiments to verify a research hypothesis**

* Literature review
* Presenting and explaining the research hypothesis and the rationale for the hypothesis.
* Determining the objectives of the experiment.
* Developing protocols for each experiment, describing the equipment, methods and objectives for experiments.
* Proving that the test results from the protocols can be used to verify the research hypothesis. Identifying the factors that may affect the results or influence on the conclusions.
* Conducting experiments with reasonable samples size and number of experiments for statistical analysis.
* Presenting the experiment results; including the experimental protocols and conditions of each result.
* Using statistical and mathematical tools to analyze results, calculate outputs.
* Concluding the research hypothesis based on the results.

**Development of a biological/pharmaceutical product**

* Literature review.
* Identifying the goals and requirements for desired products; determining the improvement/ innovation of the project.
* Developing the process to produce the product, which explains the reason and basis of each step in the process.
* Developing testing methods for output products.
* Designing and conducting experiments to verify product characteristics. Evaluating the reliability of the experiments using statistics method.
* Conclusion and discussion

**Study of properties of unknown materials/compounds/devices**

* Literature review
* Identifying the goals and objectives of the research, determining the improvement/ innovation of the research.
* Determining the characteristics and properties to be studied of the research subjects.
* Developing and designing experiments/ experimental procedures to identify the characteristics of the research object.
* Conducting the experiments, collecting data, and interpreting the data.
* Analyzing the results with appropriate tools and methods.
* Conclusion, comparison with other research results, if any.

**Entrepreneurship in biomedical engineering: commercialization of a biomedical device/product**

* Literature review (the needs of the kind of biomedical device/product to be investigated, analysis of the market and existing products including competitors, cost/price, benefits)
* Identifying a biomedical device/product to be commercialized (priority: the one previously designed in the BME School), its state of development, its merits and drawbacks, decision making
* Determining objectives and requirements for the thesis works:
	+ Engineering and technology aspect: details for improvement to make the device/product commercially viable, methods to identify manufacturer for mass production
	+ Legal aspect: identification of the device/product class and methods to obtain permission for its commercialization, licensing, intellectual property
	+ Business aspect: market survey, financial analysis for pilot and industrial production scale, business plan, fund raising, start-up or transfer of technology, customer segment and finance, marketing channels
* Reporting practical achievements: sale, benefits, loss, failure
* Discussion
* Conclusion

**Others:** specify by supervisor