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# BLG561 Deep Learning

## 2025/2026 Fall

### Term Project Syllabus

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**Proposal Deadline: 09/11/2025**  
**Presentation Deadline: 28/12/2025**  
**Report Deadline: 02/01/2026**

**\*\*All students are required to read the entire project document from beginning to end.**

## 1 Introduction

In this assignment, you are expected to complete a deep learning project from start to finish. This involves curating a 1) dataset, 2) applying a deep learning model, 3) evaluating the model, and 4) reporting the results.

The project's scope is defined by several constraints to help you; build the project, analyze it, and prepare a report (and a presentation) for your work within the given time frame. **Please read this document carefully and follow the guidelines. Reading everything written here is part of your responsibilities for this course.** Project evaluation criteria will be published via another document on Ninova.

You are free to choose any problem topic. However, we will check your proposal with you and may suggest some modifications.

Selecting a project topic can be challenging. The problem must be both non-trivial and inspiring. In addition, since you will be creating the dataset, it's important to plan ahead. If your data collection takes more than 1 week, do not delay building your model until the dataset is ready. Start as soon as possible (even with a few data instances), develop your full pipeline, and continuously improve your data.

As a rough guideline, you can divide your project time as follows:

- Data collection and dataset curation: 15%
- Literature review, setting up the deep learning pipeline: 25%
- Analysis, experiments and notebook: 30%
- Writing up the report: 20%
- Preparing the presentation: 10%

## 2 Setup

- You must create groups of 2 (or max 3\*) people.
- Groups of 3 people should propose bigger projects (Quantitatively bigger self-collected dataset, more & complex models/analyses).
- You should **make a proposal** with the **given template**. Define your problem, dataset, candidate model(s), and explain briefly in the proposal form. The proposal form should be **maximum 2 pages** long. **Proposals and Reports generated by LLMs (e.g. Chatgpt, Gemini, Local version included) will fail.** You must obtain acceptance within two iterations. If acceptance is achieved in the second iteration, a **10-point penalty** will be applied to the final evaluation. Failure to obtain acceptance in the second iteration will result in a **grade of VF**. If you are unsure of your project idea or proposal, you can come and speak to us beforehand to make sure you understand the requirements completely.
- More than one team can work on the same problem topic and create similar datasets. Also, they can merge their datasets for the final training and evaluation of their models. **However, we will still evaluate each team's dataset creation process separately.**
- **Resubmitting project proposals from previous years will not be accepted as valid proposals. Doing so will result in fail of proposal.**
- If you change the problem you proposed or do not use the selected dataset in your proposal without our knowledge and approval, a **10-point penalty** will be applied to your final project grade.

## 3 Dataset

Through the dataset creation process, you will gain a more realistic real-life experience of engineering deep learning models. We are aware that the deep learning models require lots of examples and limited semester time will limit the quantities you can acquire. However, think of this stage as a proof-of-concept. In model development and testing you are not limited to your own dataset; however, we would like to see the results obtained from your dataset.

In your data curation pipeline, we would like to see the following steps:

- **Data Collection:** Collect your own dataset. For data collection, we must see some active effort. For example, writing a scraping script to download some internet data; recording voice data from ITU students; taking pictures of people, cats, and flowers; getting some medical or finance data from experts; downloading Twitter/YouTube data on a specific topic; think something about 102th year of the Republic of Turkiye or 252th year of ITU.

- Given that you collect part of the data. You can merge with other datasets. For example, you can take pictures of a road and combine them with a daily weather dataset from an official dataset provider (NASA, TUIK, IBB, AFAD, YouTube, Twitter, IMDB, IMKB, etc).
- More than one team can contribute to the same dataset as long as they contribute to data collection separately. For example, two different teams can collect 100 images on the same problem and merge their datasets for model training and evaluation. We will still evaluate each team separately.
- Subset selection from existing datasets without significant effort will be graded poorly. For example, writing a script to just collect a random subset or whole cat pictures from Imagenet or any other Kaggle dataset will be graded low.
- **Discuss your ideas with us.**

## International Challenges (Optional)

- **Purpose & Scope:** You may participate in reputable external challenges (e.g., SemEval tasks, Kaggle/DrivenData, workshop challenges). Participation is optional and does not replace core project requirements.
- **Extra Data Requirement:** Beyond any datasets provided by the competitions, your team must **collect additional data of your own** (active effort required: scraping, recording, photographing, expert curation, etc.). Clearly document how this new data integrates into your pipeline. **Please choose any challenge with this in mind, and avoid tasks where you cannot feasibly collect additional data.**
- **Evaluation Policy:** Work submitted to external challenges will be evaluated using the same **rubric** as the course project (data curation quality, methodology, experimental rigor, analysis, and ethics/compliance checks).
- **Other Challenges:** If you wish to join challenges or tasks not listed below, you **must discuss your ideas with us in advance**.
- **Example Challenge Hubs:**  
SemEval Tasks: [SemEval 2026 Tasks](#)  
Kaggle Competitions: [PhysioNet - Digitization of ECG Images](#)
- **Clean and validate:** Clean double instances. Make sure your data points are valid, and represent the problem.
- **Ethical aspects and anonymization:** Do not collect anything which will violate KVKK or copyrights. However, you can collect personal data, faces, and voices if you get permission according to KVKK. Do not collect sensitive material (TCKN, passwords). Anonymize your data as much as possible. Consult us if you have

any concerns about this. We will not publish your datasets publicly. Document how you addressed these problems.

- **Transformations:** Dataset curation may involve reformatting and transformations. For example changing, cropping, rotating, and resizing pictures. Editing or scaling tabular data.
- **Packing and storage:** Package your datasets as a torch dataset. Your dataset must be loadable with dataloader. However, you can tell us if you have some reason which prevents you from packaging.

You can store your data in any storage media. Including disks, cloud etc.

- **Explain your data:** Make sure your notebook and report contain an EDA (Exploratory Data Analysis) of your data. We would like to see the data source, formats, number of instances, and distributions.
- **Documentation:** Document all the work for all the steps, record different dataset versions, and store processing scripts as proof of work.

## 4 Model

You can choose your deep learning model freely. You can code your own model but you are not expected to write all the code from scratch. You are free to use existing papers, GitHub repos and code bases, or even use pretrained models, as long as you cite all the sources properly. You can use transfer learning, generic feature learners, LLMs fine-tuning, instruction tuning, prompt engineering, etc. **We will take into account the amount of adaptation work you do for the model.**

## 5 Analysis

Whatever dataset or model you use, we would like to see a detailed analysis of:

1. **Performance:** Show error plots, confusion matrices, correct and misclassified examples for the test set etc.
2. **Statistical tests:** Conduct statistical tests to prove validity of your results: 5x2 cross-validation, weight initialization with different seeds, etc.
3. **Optimizers:** Show dependency on optimizers (e.g. SGD vs ADAM, Adabelief).
4. **Hyperparameters:** Try different learning rates, number of neurons, layers etc.
5. **Feature representation:** Extract some features and plot them. (If you are using an LLM, this step may be quite challenging. Check recent literature, e.g. <https://huggingface.co/papers/2401.12874>. Design your workflow accordingly!)

6. **Timing:** Report training and inference times.
7. **Ablation Study:** Remove a feature of your model and measure the performance. For example how training dataset size affect your test performance.

All analyses will be submitted as a notebook file (.ipynb), there can be additional files for supporting libraries, scripts, and code bases. Format your notebook clearly with headings and comments to indicate different sections of your analysis. Datasets are not required in the submission file. Just upload the datasets to an online repo and provide the link.

## 6 Report

A good term project should be publishable or nearly publishable in a conference. After evaluating your projects, we will choose the best ones and encourage those teams to prepare conference papers. Therefore, when doing your project and writing your report, read recent papers on the same (or similar) problem as a model. Try to replicate their organization and analysis with your own data and model. You can check papers from major conferences such as ACL, ICML, NeurIPS, CVPR, ECCV, and MICCAI. Additionally, you can visit [paperswithcode](#) to find state-of-the-art models and their corresponding papers.

In your report:

- State your problem clearly.
- Include a literature survey (Introduction+Related Work).
- Explain/analyse the dataset, and show insights.
- Explain your Method.
- Report your experiments and results. Also, briefly explain your evaluation metrics. Do not copy-paste standard text such as definitions for "cross-validation" or formula for "precision/recall". Include statistical tests and ablation studies.
- You may use your proposal as a starter and expand it into your report with additional sections as; results, ablation studies, conclusion etc. Report should have 5-8 (double column) pages length with additional appendix. You can also check the original [IEEE conference template](#) for guidance.
- Use latex and IEEE conference template (you may use any other conference template if you are preparing your work to submit to some other conference)
- **Reports found to written by LLMs will receive a 10-point penalty in project grading.**

## 7 Presentation

- At the end of the semester, in the week of final exams, you will present your project in a **5 minutes (8 minutes for groups of 3) presentation**.
- Time limit is absolute and you must not exceed it. You are suggested to practice beforehand.
- A **10-point penalty** will be applied to the presentation grade for groups that exceed the time limit.
- **Those who do not attend the presentation will receive a grade of 0** for the project.

## 8 Demo

- We will invite you to a demo session where we will ask questions about your code, general structure of your project and experiments.
- All team members must be present for the demo session. **Each team member will be evaluated individually. Despite the division of tasks, all team members are responsible for the entire project from start to finish.**
- We expect you to be able to explain and modify your code.
- We expect you to be able to explain your models in all aspects and techniques you used.
- We expect you to be knowledgeable about the mathematical foundations of the models you developed.
- **Those who do not attend the demo will receive a grade of 0** for the project.

## 9 GPU Access, and Ethical Rules

- You will create a private GitHub repository for this assignment, and you are expected to commit regularly. We expect continuous progress, which will be considered in grading.
- You can use [Google Colab](#) or [Kaggle](#), or the free \$300 per-person [Google Cloud GPU credit](#).

- By submitting your work, you confirm that you are the owner and creator. Any form of cheating or plagiarism will not be tolerated. This includes actions such as, but not limited to, submitting the work of others as one's own (even if in part and even with modifications). Serious offenses will be reported to the administration for disciplinary measures.