FAKULTA
ELEKTROTECHNICKÁ
ČVUT V PRAZE

Introduction to MLE

BECM33MLE — Ing. David Pařil

MLE Course:

Hands-on Machine Learning Engineering labs where **teams** design, build, deploy, and present an **ML-powered product** end-to-end.

Each lab accompanied by a **mini-lecture**.

Core principles:

- **work each week**
- clear milestones
- end-to-end delivery

Prerequisites:

Strong Python background: venv, pip, numpy, opencv, …

Git + CLI: pull, push, branch, merge

ML basics: train/val/test

(Optional) **Hardware tinkering:** RPi/sensors if your project needs it.

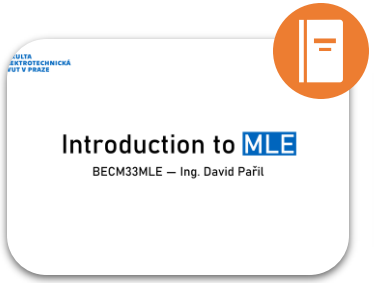
Grading Breakdown (100 points)

Points		
Project	50p	
Homeworks	15p	(3×5p)
Documentation	15p	(3×5p)
Presentation + demo	20p	
TOTAL	100p	

Absence penalty	-5p	(per additional absence)
Late submission penalty	-2p	(per submission)

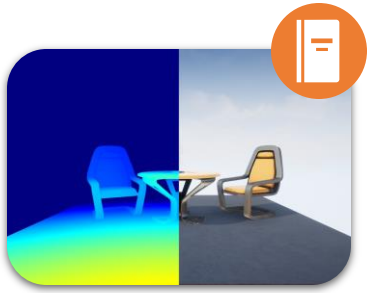
A	- ≥90
B	<90 ≥80
C	<80 ≥70
D	<70 ≥60
E	<60 ≥50
F	<50 -

Labs breakdown



1) Introduction to MLE

2) GUI + Project Setup



3) Datasets

4) Reinforcement learning in a virtual environment

5) Machine learning basics

6) Implementation details

7) Machine learning advanced

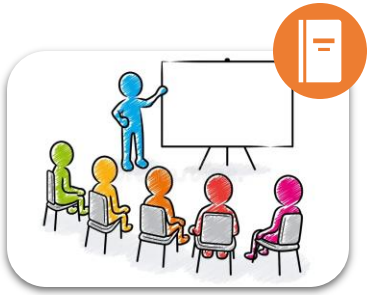
8) Deployment

9) Going to market

10) Workshop

11) Workshop

12) Workshop



13) Project presentations

Labs attendance: compulsory
Max absences allowed: 3

Semestral work requirements

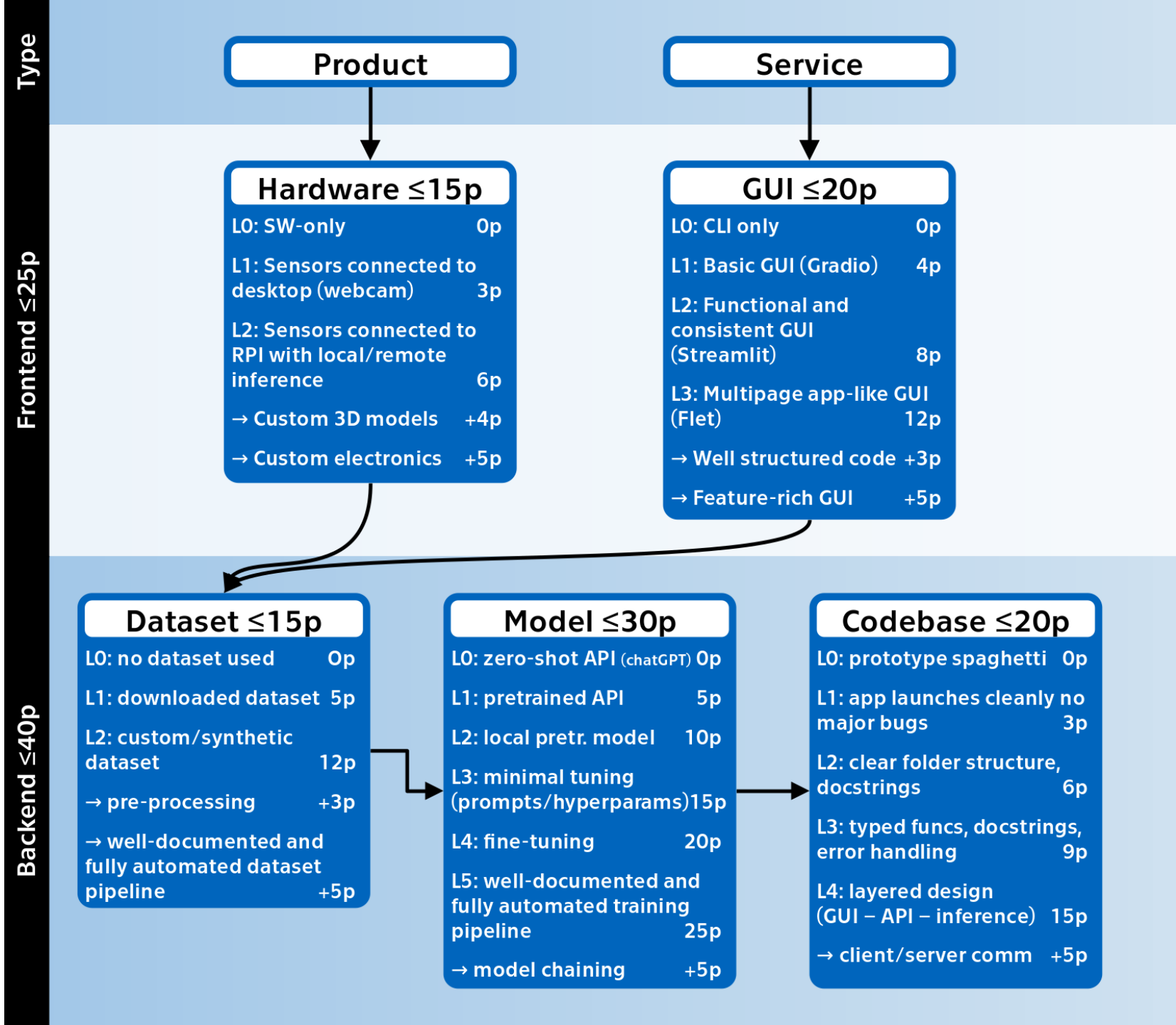
- Project: **Gain at least 50% of total project points** (25p), **usable version demo** (LAB 13)
- Implementation: **must use ML algorithm** in its core
- Results: Evaluate results in numbers (part of documentation)
- Documentation: required documentation reports + readme.md containing all required fields
- Ethics/legal: must be subject to the licenses of the used SW, must comply with GDPR, safety prompts (LLM only)

Project points

Defined in **PRD** [HW01]

Reflects required time
[9h/week/person]
[2.4h/point/person]

Suggested budget per 1 person →



Material

We can grant:

- RPI4‘s with 4GBs of memory.
- Basic electronics material.
- 3D printer.
- Basic tools.

All borrowed material must be returned at the end of the semester!

Hardware

You are free to use our GPU servers:

https://cyber.felk.cvut.cz/cs/study/gpu-servers/

3 servers, each:

48 cores / 96 threads

512GB RAM

3.6TB SSD

16 x NVIDIA A16 with 16GB memory

HW01

In teams [2±1], create a PRD document

Submissions in **BRUTE**

Deadline: Monday 29.9.2025 (1 week)

Points: 5p

Penalty for late submission: -2p

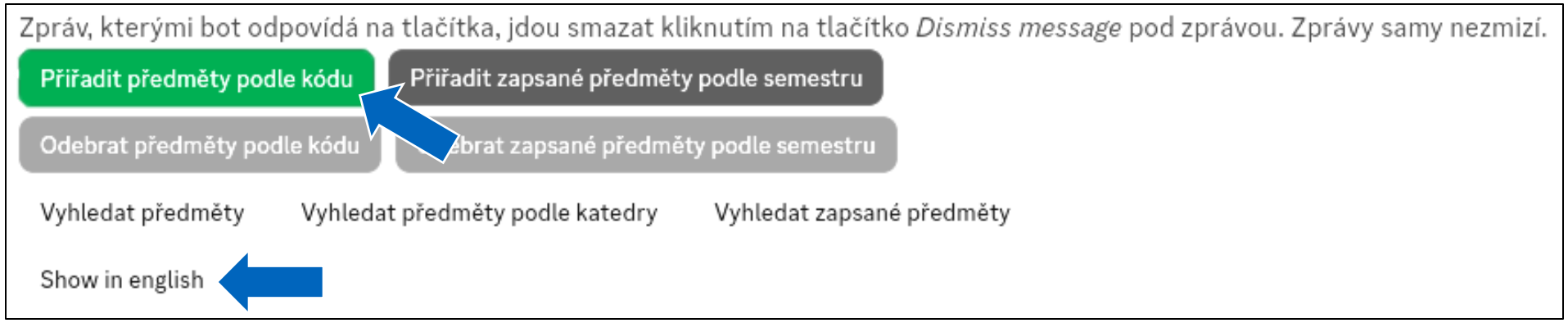
All HWs are required!

CTU FEE Discord server

Feel free to join the MLE channel on the CTU FEE discord:

https://discord.gg/cvutfel

Use the **volba předmětů** channel to add the **BECM33MLE** channel



Product requirements document

Authors, project name

Purpose and scope of the project

Target demographics, competition

Requirements:

- functional
- usability
- technical
- time (simple Gantt chart, milestones)
- financial (project points – per team member and feature)

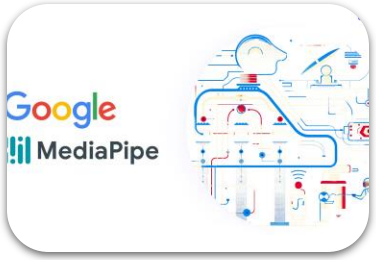
Sources

Sources

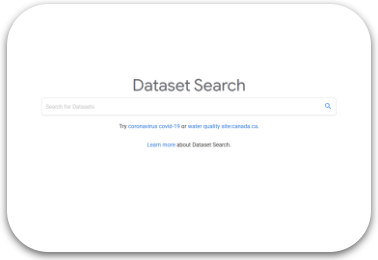
1) Hugging Face

2) Kaggle

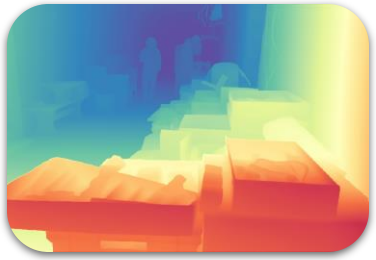
3) Ultralytics



4) Mediapipe



5) DatasetSearch



6) Depth Anything

7) Capture

8) Scrape

9) Simulation

Project proposals

Project proposals

Some of the discussed topics include:

- Robotics:
  - Autonomous toycar
  - Lego sorter
  - Smart Alarm clock
- Software:
  - Gallery sorter
  - Communication device for elderly
  - Bespoke cartoon
  - Flashcards generator
  - Spam bait
  - Menza calorie app
- Games
  - LLM-based interactions
  - Videogame object generation