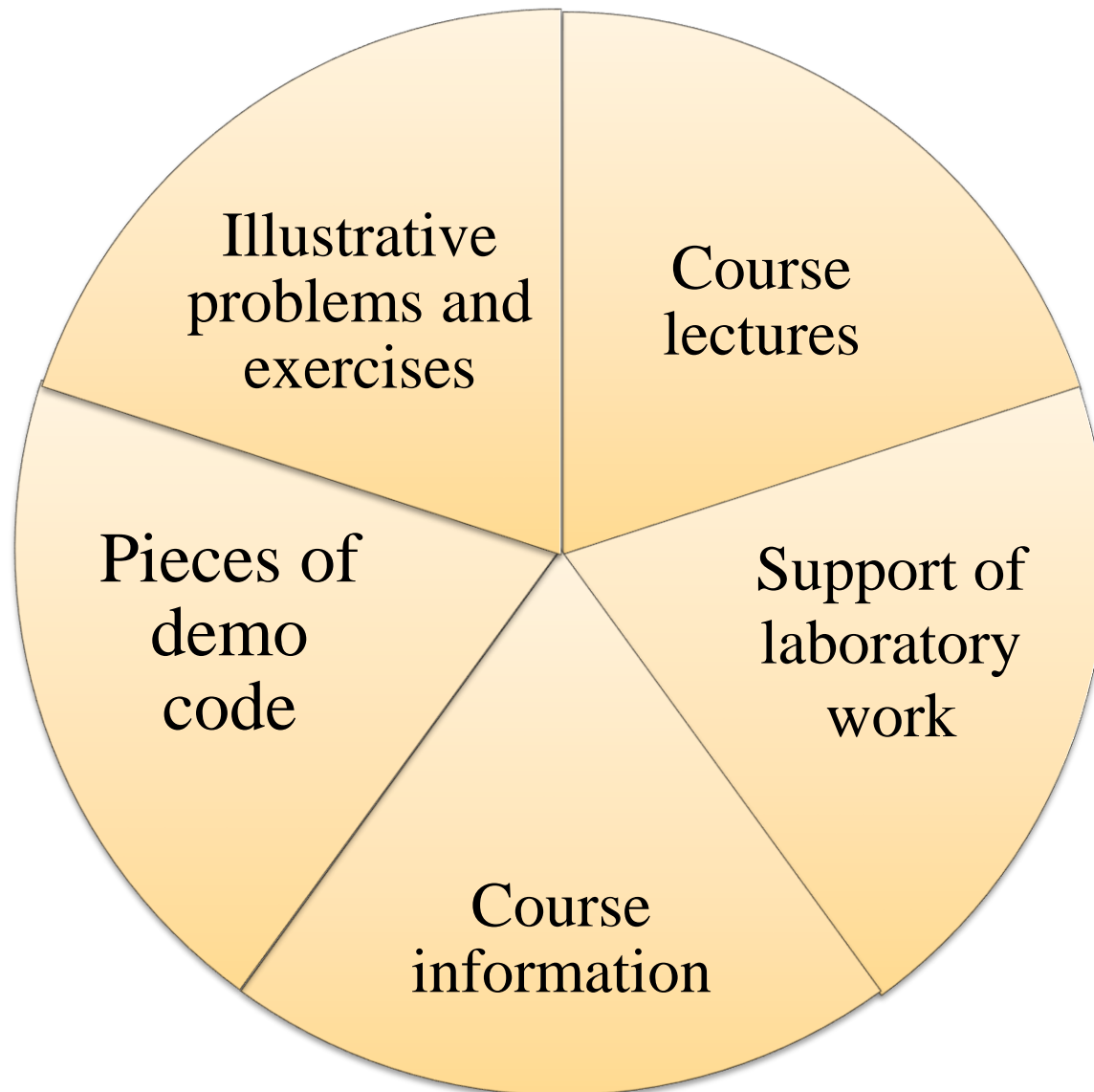


Artificial Intelligence Fundamentals

- Prof. Gabriel Oltean, Ph.D.
 - ❖ 2C
 - ❖ 1L



<http://www.bel.utcluj.ro/dce/didactic/aif/>



Student Assessment (formative and summative)

Laboratory (L)

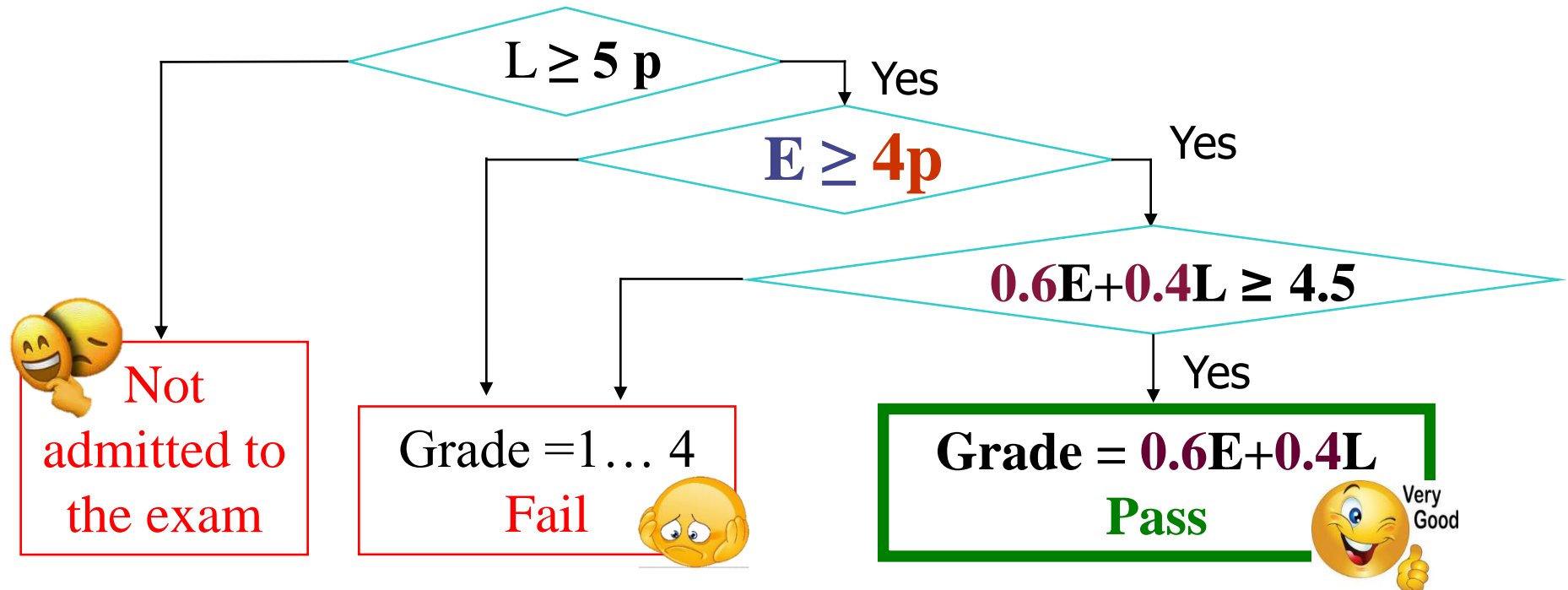
0 ... 10 pts.

- full attendance
- activity

Exam (E)

0 ... 10 pts.

- theory – 0p
- problem solving – 6p
- programming exercise – 4p



General objective

The general objective of the Artificial Intelligence Fundamentals course is to provide students with a

- strong foundation in AI
 - ❖ concepts
 - ❖ methodologies
 - ❖ applications

Specific objectives

- **Understanding core AI concepts and terminology**
(history, evolution, impact; machine learning, neural networks, deep learning, natural language processing)
- **Familiarization with AI techniques and algorithms**
(types of learning; regression, classification, clustering, prediction)
- **Understanding the fundamental principles of machine learning and neural networks**
(supervised learning, neural network architecture, backpropagation, activation functions)
- **Understanding data and its role in AI**
(sets of data, preprocessing, bias)



Specific objectives

- **Building and evaluating AI models** (model selection, training and validation, evaluation metrics)
- **Hands-on experience with AI tools and libraries** (TensorFlow, Scikit-learn, Python-based AI development environments)
- **Develop problem-solving and analytical thinking skills** (map real-world problems to appropriate AI solutions)
- **Ethics and social implications of AI** (bias in AI models, responsible use, regulatory framework and policies, risks)

- ❖ Great Learning Editorial Team, What is Artificial Intelligence in 2024?, Updated on Sep 10, 2024, <https://www.mygreatlearning.com/blog/what-is-artificial-intelligence/>
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- ❖ Aurélien Géron, [Hands-On Machine Learning with Scikit-Learn, Keras, and Tensorflow: Concepts, Tools, and Techniques to Build Intelligent Systems](#), 2019, Oreilly Media. – **unlimited free online resources**
- ❖ Ian Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning (Adaptive Computation and Machine Learning), MIT Press, 2016, <http://www.deeplearningbook.org>
- ❖ Convolutional Neural Network: A Step By Step Guide, <https://towardsdatascience.com/convolutional-neural-network-a-step-by-step-guide-a8b4c88d6943>



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- ❖ A Beginner's Guide to Neural Networks and Deep Learning, <https://skymind.ai/wiki/neural-network>
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- ❖ Michael A. Nielsen, Neural Networks and Deep Learning, Determination Press, 2015/2019, <http://neuralnetworksanddeeplearning.com/index.html>
- ❖ EthicalML/awesome-production-machine-learning. **A curated list of awesome open source libraries that help to deploy, monitor, version, scale, and secure your production machine learning.** [GitHub - EthicalML/awesome-production-machine-learning: A curated list of awesome open source libraries to deploy, monitor, version and scale your machine learning](https://github.com/EthicalML/awesome-production-machine-learning)

