



Course Syllabus

Course Code	Course Title	ECTS Credits
COMP-546DL	Deep Learning and Reinforcement Learning	10
Prerequisites	Department	Semester
COMP-544DL	Computer Science	Fall
Type of Course	Field	Language of Instruction
Elective	Data Science	English
Level of Course	Lecturer(s)	Year of Study
2 nd Cycle	Dr Francois Schnitzler	1 st
Mode of Delivery	Work Placement	Corequisites
Distant Learning	N/A	None

Course Objectives:

The main objectives of the course are to:

- Provide understanding of what is Deep Learning
- Introduce Deep Learning Frameworks and other computational tools
- Introduce some of the main deep learning architectures, including convolutional, recurrent and generative models
- Introduce tips and tricks to learn or use Deep Learning models
- Provide understanding of what Reinforcement Learning is
- Introduce basic Reinforcement learning algorithms and a glimpse of deep reinforcement learning

Learning Outcomes:

After completion of the course students are expected to be able to:

1. use a deep learning framework
2. use a pre-trained deep network for inference
3. discuss the merit of different classes of deep learning architecture for a learning problem
4. develop and implement a learning strategy for a given deep network
5. evaluate the resulting model
6. use “classical” reinforcement learning methods

7. explain a deep reinforcement learning paper

Course Content:

Introduction to Deep learning

- Hardware and Software tools for learning and using networks
- Training deep models:

Deep Learning architecture

- Basics of deep learning
- Convolutional net
- Recurrent net
- Learning representation
- Deep generative models

Reinforcement learning:

- Introduction and bandits
- Markov Decision Processes and planning
- Reinforcement learning in MDP
 - Deep Q learning and alpha-Go

Learning Activities and Teaching Methods:

Lectures, Demonstration of Tools, Assignments, Projects.

Assessment Methods:

Project

Final Assessment *

* The Final Assessment can be either a Final Exam or Final Assignment(s) with Viva Participation/Homework Assignments/Quizzes

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
<i>Deep learning.</i> Vol. 1.	Goodfellow, Ian, Yoshua Bengio, Aaron Courville, and Yoshua Bengio	Cambridge: MIT press	2016	9780262035613
<i>Reinforcement learning: An introduction</i>	Sutton, Richard S., and Andrew G. Barto.	MIT press	2018	978-0262039246