**Course No:** CS-AI-???

**Course Title:** Applied machine consciousness

**Credits:** (4-2-2)[[1]](#footnote-0)

**Instructor:** Max Talanov (email: [max.talanov@gmail.com](mailto:max.talanov@gmail.com))

**Prerequisite courses:** None

**Course outline**

This course is based mainly on works of Marvin Minsky and Aaron Sloman of AI and cognitive architectures domain, neuroscientific works from Harvard university.

We try to use industrial everyday examples to draw the overall picture of the unsolved problems and identify the importance of the topic.

We practice bifocal view on the complex AI problems incorporating: Philosophical views of Tononi, Marvin Minsky, Aaron Sloman, Neuroscientific views originated from the course of Neuroscience of Harvard University by David Cox and works of Antonio Damasio. Implementation focus is depicted in the third part of the course where we start from most straightforward review of technologies that could be useful for implementation of the neurobiologically inspired intelligent systems, then we review current state of cognitive architectures from the implementation perspective, and latest and possibly hardest approach of realistic neural networks that are most close to brain functioning at the moment. This provides wide view on the implementation approaches starting from current technologies to future perspectives.

**Required background knowledge:**

None.

**Course Syllabus:**

1. [Intro](https://github.com/max-talanov/1/blob/master/applied machine consciosness/intro.md).
2. Why machine consciousness matters
3. Philosophical perspective
   1. IIT: consciousness is integrated information
   2. Model of six:
      1. [Consciousness (lectures: 1, 2, 3).](https://github.com/max-talanov/1/blob/master/applied machine consciosness/consciousness.md)
      2. [Levels of mental activities (lectures 1 and 2).](https://github.com/max-talanov/1/blob/master/applied machine consciosness/levels_of_mental_activities.md)
      3. Resourcefulness
   3. H-CogAff and virtual machines
4. Neuro-physiological perspective:
   1. [Living cells: neurons, chemical synapses, neurotransmission](https://github.com/max-talanov/1/blob/master/applied machine consciosness/neurons_and_chemical_synapses.md)
   2. Instincts
   3. Learning
      1. Memory: synchronization and association
      2. Curiosity
   4. Deliberations
      1. Storytelling
      2. Commonsense
   5. Reflections
5. Artificial consciousness:
   1. State of the art
   2. Cognitive architectures
   3. Spiking NNs and HTM

**Textbook:**

**Reference Materials:**

* Minsky, M. (2007). The emotion machine: Commonsense thinking, artificial intelligence, and the future of the human mind. Simon & Schuster.
* Aaron Sloman and Ron Chrisley(2014) Virtual Machines and Consciousness
* Marc-Oliver Gewaltig and Abigail Morrison and Hans Ekkehard Plesser. NEST by example: an introduction to the neural simulation tool NEST.
* HIERARCHICAL TEMPORAL MEMORY including HTM Cortical Learning Algorithms. Numenta Inc. 2011.

**Course Delivery:** The course will be given, one day per week from September to November 2015. There will be two 2-hour classes each day. There is one assignment. Tutorial exercises will be set periodically. There is a final examination only. Course project is currently under consideration.

**Computer Resources:** No computer resources are required for this course.

**Laboratory Exercises:** There are no laboratory exercises for this course.

**Laboratory Resources:** There are no laboratory resources required for this course.

**Assessment:** Assignment (80%), and Final Exam (20%).

1. (Credit-hours – Laboratory hours per week – Lecture hours per week) [↑](#footnote-ref-0)