COSC 4368 (Spring 2023)

Review List Final Exam on Friday, May 5, 2p

The 4368 final exam will take 110 minutes and is open-books and notes and takes place in **SW 101**!

The final exam will be similar to the midterm exam. However, in the final exam you might be asked to write an essay!

Relevant slide shows, articles and videos, pasted from the COSC 4368 Website which are relevant for the final exam; the number of \*’s approximates how much the topic will be covered in the exam.

2023 Machine Learning Transparencies:

* \*[Introduction to Supervised Learning](http://www2.cs.uh.edu/~ceick/ai/Eick_SL.pptx) (also called "Learning from Examples")
* \*\*\*\* Reinforcement Learning: [RL1](http://www2.cs.uh.edu/~ceick/ai/RL1.pptx) (Introduction to Reinforcement Learning), Remark: Final exam will not cover Bellman Equations and TD-Learning, as these topics were covered in the midterm exam. Deep Reinforcement Learning: Watch first six minutes of <https://www.youtube.com/watch?v=IUiKAD6cuTA> (will only ask very basic questions about this topic); for reading reading material for deep learning see below.
* \*\*\* [Neural Networks](http://www2.cs.uh.edu/~ceick/ai/NN2023.pptx) (Dr. Eick's NN slides), <https://www.youtube.com/watch?v=IHZwWFHWa-w&list=PLZHQObOWTQDNU6R1_67000Dx_ZCJB-3pi&index=2> Watch only the first 12:24 minutes of the video!
* \*\*[Support Vector Machines](http://www2.cs.uh.edu/~ceick/ai/SVM.pptx) ([Review of the SVM lecture](https://www2.cs.uh.edu/~ceick/ai/SVM-Review.docx); added on March 24, 2020).

2023 Deep Learning: \*\*\*AutoEncoders ([Mahin's March 22, 2023 NN&VAE Lecture](https://www2.cs.uh.edu/~ceick/ai/NN_VAE.pptx)), \*\* Embeddings, Transformers, and Autoencoders ( [Steve's April 10, 2023 Lecture on Embeddings and Language Models](https://www2.cs.uh.edu/~ceick/ai/LM.pptx)); relevant reading material for the final exam you find at the end of this document)

\*\*\*\* 2023 Societal and Ethical Issues of AI and AI Politics

* [Human Do not Need to Apply](https://www.youtube.com/watch?v=7Pq-S557XQU&feature=youtu.be) (a video that analyzes the influence of AI on jobs)
* [AI's Impact on Society](https://www.bing.com/videos/search?q=Artificial+Intelligence+and+Society+videos&&view=detail&mid=7E16A38F386DE9777AF67E16A38F386DE9777AF6&&FORM=VRDGAR&ru=%2Fvideos%2Fsearch%3Fq%3DArtificial%2520Intelligence%2520and%2520Society%2520videos%26qs%3Dn%26form%3DQBVR%26sp%3D-1%26pq%3Dartificial%2520intelligence%2520and%2520society%2520videos%26sc%3D0-42%26sk%3D%26cvid%3D3717327387ED4998B76CFD197058097B) (watch starting 12:19 centering on fake news and then skip to 28:00 Chinese AI )
* [Discussion Questions about some of the shown videos](http://www2.cs.uh.edu/~ceick/ai/Ethics%20for%20AI.pptx)
* EU Article (see below)

2023 Decision Making and Reasoning in Uncertain Environment Transparencies

* [Review Probability Theory](http://www2.cs.uh.edu/~ceick/ai/Probability-Review.pptx)
* \* [Bayes' Theorem"](http://www2.cs.uh.edu/~ceick/ai/bayes.pdf)
* \*\*\* Dr. Eick's [Computations in Belief Networks](http://www2.cs.uh.edu/~ceick/ai/Bbn.pptx) Transparencies
* \* Hidden Markov Models Transparencies ( [Dr. Eick's Hidden Markov Model Slides](http://www2.cs.uh.edu/~ceick/ai/HMM.pptx) (only the slides that were used in the lecture) Wikipedia HMM article. Remark: The final exam will not ask any deep technical questions about HMM; however, you should know what HMM mathematically are, what can be done with them, and what the major applications are which use HMM.

**Additional Reading Material** (please read!)**:**

SVM Wikipedia Page: <https://en.wikipedia.org/wiki/Support-vector_machine>

[Introduction to autoencoders. (jeremyjordan.me)](https://www.jeremyjordan.me/autoencoders/) (you can skip the discussion of denoising and contractive autoencoders, but read the remainder of the document carefully)

[Variational autoencoders. (jeremyjordan.me)](https://www.jeremyjordan.me/variational-autoencoders/) (read until the implementation section starts (need not to read the implementation section and the sections which follow); will only ask very basic questions about variational autoencoders)

[Deep reinforcement learning - Wikipedia](https://en.wikipedia.org/wiki/Deep_reinforcement_learning) (will only ask very basic questions about this topic; just read the first paragraph and overview section of the document; ignore the remainder of the document)

Embeddings: [Embeddings in Machine Learning: Everything You Need to Know | FeatureForm](https://www.featureform.com/post/the-definitive-guide-to-embeddings)

The PCA/SVD, Recommender Systems, Computer Vision, Nearest Neighbor sections and the sections that follow the nearest neighbor section are not relevant for the final exam; however, read the conclusion!

Language Models; [A Beginner's Guide to Language Models | Built In](https://builtin.com/data-science/beginners-guide-language-models)

Read the whole document!

<https://en.wikipedia.org/wiki/Hidden_Markov_model>

(Wikipedia HMM page; might use the weather/activity HMM in the final exam)

[EuropeAIEthicsGuidelines.pdf (uh.edu)](http://www2.cs.uh.edu/~ceick/ai/EuropeAIEthicsGuidelines.pdf) (only pages 11-13 starting with 2.2 “Ethical Principles” and pages 14-22 (2.2 non-technical methods is not relevant) are relevant for the exam! I strongly recommend that you read these pages before the exam!

Relevant material from the Russel textbook (Fourth Edition)

Chapter 12: 397-402

Chapter 13: 412-416

Chapter 19: 665-669, 692-696

Chapter 21: 750-756, 778

Chapter 22: 789-803