

Fundamentals of Artificial Intelligence for Anesthesiology Residents – 2021/2022 Course Syllabus

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Module 1: August

“Anesthesiologists-in-the-loop (AITL)” – Why it makes sense to get involved in AI.

- Course logistics, LMS/group learning app, pre-course survey (anonymous)

Module 2: September

“AI of the Tiger”: How to train your own AI.

- Group project introduction: Data collection

Module 3: October

AI, ML, DL and what is AI really good at? Big picture concepts with a closer look at the OR

- From expert-systems to narrow AI and beyond (AGI, ASI): Examples (App-based PBLD)
- Find and share an AI/ML/DL definition that makes sense for you (App-based PBLD)
- Find and share a perioperative AI application (App-based PBLD)
- Are you “convoluted” yet? A brief story of neural networks (ANN, RNN, CNN -mini-lecture)

Module 4: November

Bias, trust, and ethical considerations of AI – from Academia to Wall Street to Anesthesia

- Find or imagine an AI ethics example in the perioperative area (App-based PBLD)
- The concept of ‘Explainable AI’ (XAI – mini-lecture)

Module 5: December

Perspectives: Expert/human-in-the-loop (EITL/HITL) and Anesthesiologists-in-the-loop (AITL)

- A warning for the OR:
 - “Out-of-the-loop” examples from the aviation and cruise industry (Lecture)
- From AI to IA: Human + AI (minilecture, group discussion)
- Focus, Burnout, and Cognitive Ergonomics: Find an example of IA (App-based PBLD)
- AITL-Augmented anesthesiologists: Discuss future and physician-leadership (App-based PBLD)

Module 6: December/January (ITE → mentored, app-based self-study module)

AI and big data – “Beyond Garbage-in - Garbage-out: Introduction to data science” (recorded)

- “Playing in the sand” → Find open source health data repositories (App-based PBLD)
- Find and share a big data AI article in Anesthesiology (App-based PBLD)

Module 7: February (after ITE)

“AI Olympics”: Training, Testing and Validation & Quantity, Quality and Diversity (lecture)

- AI Group Project: About labeling data (live demo)
- “Tailored AI”:
Underfitting, Overfitting and Generalized: Infographic challenge (App-based PBLD)
- AI Group Project: “Label when you can” (February-April)

Module 8: March

Academic articles in the age of AI and ML: Evaluation and publishing guidelines (lecture)

- “How dry is too dry?” – 15 min “crash course” lecture
(F1, ROC-AUC, Accuracy, Precision, Recall, COSORT-AI, SPIRIT-AI)
- “On the chopping block”: Dissecting the most voted for ML article in Anesthesia - Journal Club

Module 9: April

“Ready for Take-off”: AI platforms – low-code/no-code and “proof-of-concept-ing” (lecture)

- AI Group Project: Training and testing our AI

Module 10: May

“AI Overlord”: AI Expert Guest Speaker

- AI Group Project: Finishing touches, completion

Module 11: June

AITL course certificate @graduation

- Brain-storming for future AI group projects
- Course wrap up and post-course eval survey (anonymous)