University of North Carolina at Charlotte
College of Computing and Informatics
Department of Software and Information Systems

# ITIS 6880: Independent Study

# (Software Engineering for AI-Enabled Systems)

# (Spring 2025)

## Course Schedule

The following table provides an outline for the topics and activities that will be delivered during each module for this course. Any changes on the given dates will be updated accordingly and announced on Canvas.

| Calendar | Topic | Activities and Submissions |
|---|---|---|
| Week-1 (1/13) | **Syllabus & Overview of SE for AI**<br>• Syllabus Overview and Introduction<br>• Lecture 1: Software Engineering for AI | • **Team Formations**<br>• **GitHub Setup** |
| Week 2 (1/20) | Dr. Martin Luther King Jr. Day – University Closed | |
| Week 3 (1/27) | **Requirements and Model Quality**<br>• Lecture 2: Requirements Gathering for AI<br>• Lecture 3: Quality Requirements for AI | • **Optional Reading**: **How to Read a Paper**<br>• **Team Project Discussions** |
| Week 4 (2/3) | **AI Model Development**<br>• Lecture 4: Feature Engineering with ML Focus<br>• Lecture 5: Model Development with ML and DL Focus | • **Project (Task-1) Project Proposal (Due: 2/2)**<br>• **Project Proposal Presentation (in-class)** |
| Week 5 (2/10) | **AI Model Development-AI Learning Types**<br>• Lecture 6: Model Development with DL-Supervised Learning<br>• Lecture 7: Model Development with DL-Unsupervised Learning | • **Reading Assignment-1 (Due: 2/9)**<br>▸ **Analyzing and Detecting Emerging Quality-Related Concerns across OSS Defect Report Summaries** |

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| Week 6 (2/17) | **AI Model Development-AI Learning Types**<br>• Lecture 8: Model Development with DL-Reinforcement Learning | • **Reading Assignment-2 (Due: 2/16)**<br>▸ **Software Engineering for Machine Learning: A Case Study**<br>▸ **Project (Task-2)-Data Collection & Cleaning (Due: 2/16)** |
| Week 7 (2/24) | **From Models to AI-Enabled Systems**<br>• Lecture 9: Transition from Models to AI-Enabled Systems | • **Presentation Assignment-3 (in-class)**<br>• **Reading Assignment-3 (Due: 2/23)**<br>• **How Much Logs Does My Source Code File Need? Learning to Predict the Density of Logs** |
| Week 8 (3/3) | Student Spring Recess – No Classes | |
| Week 9 (3/10) | **Metrics and Measures for AI**<br>• Lecture 10: Model Quality vs. System Quality<br>• Lecture 11: Quality Metrics and Measures for AI-Enabled Systems | ▸ **Project (Task-3)-Data Labeling (Due: 3/9)** |
| Week 10 (3/17) | **Model Tradeoffs and Risks**<br>• Lecture 12: Tradeoffs among Modeling Techniques<br>• Lecture 13: Model Risks and Planning for Mistakes | • **Reading Assignment-4 (Due: 3/16)**<br>▸ **Where Do Developers Log? An Empirical Study on Logging Practices in Industry** |
| Week 11 (3/24) | **Software Architecture of AI**<br>• Lecture 14: Software Architecture of AI-Enabled Systems | • **Reading Assignment-5 (Due: 3/23)**<br>▸ **A Comparative Study on Large Language Models for Log Parsing** |
| Week 12 (3/31) | **Data Quality, Processing and Management**<br>• Lecture 15: Data Quality and Development<br>• Lecture 16: Large Dataset Management | • **Presentation Assignment-6 (in-class)**<br>• **Reading Assignment-6 (Due: 3/30)**<br>▸ **Do Pretrained Language Models Indeed Understand Software Engineering Tasks?** |
| Week 13 (4/7) | **AI Infrastructure**<br>• Lecture 17: Infrastructure Quality, Deployment, and Operations | |

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| Week 14 (4/14) | **Explainability and Interpretability of AI**<br>• Lecture 18: Explainability and Interpretability of AI-Enabled Systems | ▸ **Project (Task-4)-Feature Engineering, Model Training and Model Evaluation (Due: 4/13)** |
| Week 15 (4/21) | **Data Versioning/Version Control**<br>• Lecture 19: Version Control, Data Provenance, and Reproducibility | |
| Week 16 (4/28) | **Software Testing for AI**<br>• Lecture 20: Software Testing/Automated (Random) Testing | **Optional Reading**: **How to Write Your First Research Paper** |
| Week 17 (5/5) | **FINAL PROJECT PRESENTATION (in-class)**<br>**Due: (5/5) from 2:00 - 4:30 pm** | ▸ **Project (Task-5)-Final Report**<br>**Due: (5/4) @ 11:59PM via Canvas** |

**Dates to Note:**

- 1/20 – University Closed
- 4/30 – Last Day of Classes
- 5/1 – Reading Day (i.e., this is your day to study and prepare for your exams)