COURSE SYLLABUS

AI for Data Analytics Course

Learn how to use AI tools to clean, analyze, visualize, and report on data while applying validation, traceability, and critical evaluation to real-world analytics work.

Group classes in Live Online and onsite training is available for this course. For more information, email onsite@graduateschool.edu or visit: https://www.graduateschool.edu/courses/ai-data-analytics

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Course Outline

Trust but Verify

- Why verification is taught first: AI failure modes including hallucinations, wrong methods, and context blindness
- The 7-step AI Validation Checklist for systematically evaluating any AI-generated analysis
- Live hallucination example: seeing how AI fabricates plausible statistics and fictional citations
- Introduction to the AI Traceability Document for professional accountability

The AI & Analytics Landscape

- The analytics maturity curve: descriptive, diagnostic, predictive, and prescriptive analytics
- AI taxonomy for analysts: how machine learning, deep learning, and generative AI relate to data work
- The ACHIEVE framework for deciding when AI adds value vs. when manual methods are better
- Bias and fairness in AI: real-world examples and how to incorporate fairness into your verification practice

GenAI as Your Analytics Co-Pilot

- The AI-augmented analytics workflow: Import, Clean, Explore, Analyze, Visualize, Report, Verify
- Hands-on lab: clean a messy dataset, generate statistics, ask analytical questions, visualize findings, and verify results
- Understanding the “dirty data” problem: how AI automates cleaning but requires your judgment on every decision
- Why “clean” doesn’t mean “perfect”: recognizing data quality issues that survive automated cleaning

Prompt Engineering for Data Work

- Three things every analytical prompt needs: role, task with data specifics, and output format
- Six prompting patterns for analysts: Describe, Explore, Compare, Predict, Explain, Validate
- Iterative prompting techniques: Refine, Redirect, Constrain, and Challenge
- Comparing AI tools: running the same prompt in different tools and evaluating where they agree and disagree
- Building a personal prompt library of tested, reusable prompts for real job tasks

Predictive Analytics Demystified

- Core concepts: regression, classification, and clustering — when to use each, no math required
- Key metrics: R-squared, p-values, accuracy, precision, recall, and the train/test split

- Hands-on lab: build a classification model, evaluate metrics, write data-backed recommendations, and self-critique
- Defending AI-assisted findings under stakeholder questioning using your traceability document

Critical Evaluation & Responsible AI

- Progressive verification: detecting Simpson's Paradox, confounding variables, selection bias, and overfitting
- Finding subtle errors in professional-looking AI analyses through structured evaluation exercises
- Applying the full validation checklist collaboratively at speed
- Data privacy and governance: when NOT to upload data, and regulatory considerations (HIPAA, FERPA, GDPR, FISMA)

AI Tools, Chain Reaction & Live Problem-Solving

- The 2026 AI analytics tool landscape: ChatGPT, Claude, Copilot, Gemini, Tableau AI, and ThoughtSpot
- End-to-end automation demo: from raw data to stakeholder-ready executive brief in minutes
- Live problem-solving: a real work problem solved with AI in real time, unrehearsed
- Advanced techniques overview: NLP for text analysis and time series forecasting

Capstone

- Redesign a real workplace workflow with AI tools, verification steps, and traceability built in
- Map the before and after: current steps, tools, and time vs. the AI-augmented version
- Estimate time savings, identify risks, and define a concrete first implementation step
- Present and defend your redesign in a mini stakeholder simulation