

NAU AI & Ethics Course Analysis

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Data Collection

I scraped course data from the NAU catalog using `scrape.py`, which iterates across course prefixes and terms, then writes results to `outputs/nau_courses.csv`. all empty prefixes were logged to `outputs/nau_empty_prefixes.csv`.

I appended three missing prefixes that were not listed in the PDF: MRE, BAN, and STAT. This added additional courses to the dataset and updated the AI candidate list.

Total unique courses (by prefix + number):

metric	value
total_unique_courses	6182

Sample of raw course rows (first 5):

prefix	number	title
ACC	199	Special Topics
ACC	255	Financial Accounting For Business
ACC	256	Managerial Accounting For Business
ACC	300	Accounting Systems
ACC	302	Cost Accounting

Missing prefixes:

prefix
ADM
BASW
CINE
EET
EIT
EMF
ENVY
IBH
SBA
SOCIO
SST
TRAN

Initial AI Analysis (High-Confidence Core)

I ran a **narrow, high-precision** AI search using `ai_analysis.py`. This produces the core AI list (`nau_courses_ai_subset.csv`) and a full dataset with AI + ethics flags (`nau_courses_with_flag.csv`). The core list is treated as a benchmark for high-confidence AI-related courses.

prefix	number	title
BAN	518	E-commerce Analytics And Strategy
CIT	460	Emerging Technologies In Information Technology
CS	102	Artificial Intelligence Literacy
CS	413	Virtual Worlds
CS	413H	Virtual Worlds - Honors
CS	470	Artificial Intelligence
CS	470H	Artificial Intelligence - Honors
CS	472	Unsupervised Machine Learning
CS	570	Advanced Intelligent Systems
CS	572	Unsupervised Machine Learning
CS	573	Interpretable Machine Learning
EE	443	Foundations Of Intelligent Systems
EE	543	Pattern Recognition
ETC	767	Research In Learning Analytics & Artificial Intelligence
INF	504	Data Mining And Machine Learning
INF	586	Data Analytics Capstone
MRE	372	Introduction To Probability And Machine Learning
PRM	165	Ai And The Future Of Fun
PSY	305	Data Science And Ai In Psychology
PSY	305H	Data Science And Ai In Psychology - Honors
PSY	628	Research Dissemination Skills In The Psychological Sciences

Total AI related courses: 21

Expanded AI Analysis (Recall-First)

To avoid missing relevant courses, I ran a broader search with `ai_analysis_broad.py`. This produces:

- `nau_courses_ai_candidates.csv`
- Total AI candidates 94

I manually reviewed the broad candidate list and found a mix of true AI-adjacent material and false positives. Some matches came from non-AI contexts (for example, courses about teaching/learning that triggered on “learning” or “intelligent”), while others surfaced useful applied topics. The full scope is documented in the separate appendix PDF (`ai_candidates_report.pdf`), generated from `ai_candidates_report.Rmd`. That appendix includes the core AI list, the AI-adjacent highlights, and the remaining non-core candidates, so the entire candidate set is available for review.

AI-Adjacent Highlights

I also highlight a few **AI-adjacent** courses that use related methods (e.g., robotics or image processing) even if they are not explicitly labeled as AI in the catalog.

prefix	number	title
ART	376	New Media: Physical Computing And Robotics
BAN	440	Applied Business Intelligence
EE	442	Image Processing
EE	526	Random Signals And Systems
MRE	471	Applied Robotics Controls

Ethics Analysis

Ethics courses were identified with `ethics_analysis.py`, using a conservative rule set to avoid casual mentions of ethics in unrelated contexts.

prefix	number	title
ACC	205	Introduction To Business Law
ACC	205H	Introduction To Business Law - Honors
ACC	340	Accounting Ethics
ACC	340H	Accounting Ethics - Honors
ACC	365	Risk Management And Compliance

Total ethics courses: 112

Keyword Strategy (AI + Ethics)

I used a keyword-driven approach because the catalog provides only titles and short descriptions. For **AI**, I prioritized explicit phrases that reliably indicate AI instruction (for example, “artificial intelligence,” “machine learning,” “deep learning,” “computer vision,” “NLP,” “LLM/GPT”). This makes the core list high-confidence. I also used a fuzzy matcher to catch small variations or typos in those same phrases.

For **ethics**, I used direct ethics terms (for example, “ethics,” “bioethics,” “professional ethics,” “ethical decision-making”) across both titles and descriptions.

This strategy works well because:

- It **minimizes false positives** in the core AI list by requiring explicit AI language.
- It **captures real course intent** as written in the catalog (the best available data source).
- It remains **auditable and explainable**: every flagged course can be traced back to a specific keyword match, which makes manual review straightforward.

AI + Ethics Overlap

Courses flagged as **both** AI-related and ethics-related:

prefix	number	title
PRM	165	Ai And The Future Of Fun

Conclusion

This analysis identifies a robust catalog of 6182 unique courses at NAU, but only 112 are ethics-focused and only 21 are high-confidence AI courses. Relative to the full catalog, both ethics and AI coverage appear limited. The overlap between these two areas is minimal: only one course (PRM 165) is flagged as both AI-related and ethics-related. This points to a curricular gap in **AI-specific ethics** coverage.

AI also appears outside traditional tech departments. PRM 165 (Parks & Recreation Management) directly addresses AI's impact on leisure, and the PSY 305 / PSY 305H courses explicitly connect AI to psychology research and careers. These are important signals that AI concepts are reaching applied and social-science contexts, but the overall count remains small.

The “Special Topics” numbers (for example, 499, 599, 699) are a black box for this type of scrape. The catalog often lists only a generic placeholder, so rotating AI-related topics are invisible in the data. A future audit would need **manual syllabus review or interviews with department chairs** to uncover AI or AI-ethics content taught under these headers.

Strategic recommendations based on the data:

- **Curriculum development:** The broad candidate list (94 courses) shows AI-adjacent content emerging across departments. NAU could integrate explicit AI-ethics modules into technical tracks (CS, INF, EE) to close the ethics gap.
- **Ethics specificity:** Ethics is present across the catalog, but AI-specific ethics is rare. Treating AI-ethics as a distinct category (not just “ethics”) would help track growth in this area.
- **Data maintenance:** The prefix list is based on `data/Course-Numbering-and-Prefixes.pdf`. If NAU adds or removes prefixes and the PDF is out of date, those changes will not appear in the scrape. A periodic prefix refresh should be part of future updates. The “missing prefixes” table should be interpreted cautiously: it only reflects prefixes that returned zero results during the scrape, and it will not surface prefixes that exist but were omitted from the PDF source (for example, BAN, MRE, STAT).

GitHub: github.com/kalebcoleman/nau-course-scraping