

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