

Enhancing Academic Research Skills with AI

Undergraduate and Graduate Students



Example Lesson Plan for a Virtual Online Instructor Led Course

Created using Canva Magic Write, Canva AI, and ChatGPT

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HOW TO USE THIS LESSON PLAN

This guide supports instructors in delivering the *AI-Enhanced Academic Research Skills* course effectively and engagingly in a virtual, instructor-led format.

GETTING STARTED

1. Familiarize Yourself with Weekly Themes

Review the weekly modules to understand the instructional flow—from introducing AI concepts to evaluating AI's ethical and methodological implications.

2. Review All Resources

Ensure access to suggested articles, YouTube videos, and AI tools such as Google Scholar, EndNote, Mendeley, and Elicit. Confirm licensing for in-course use (materials are Creative Commons–licensed or open-access).

3. Set Up the Virtual Classroom

Upload weekly lecture videos, reading lists, and discussion prompts to your LMS. Embed videos where permitted and add PDF handouts to your materials section.

WEEKLY DELIVERY FRAMEWORK

The activities in this course aim to empower learners with the necessary knowledge and skills to effectively integrate AI into their research practices, fostering innovation and critical thinking in academic endeavors. Each week blends theory (articles), practical tools (sites), and visual demos (videos).

Each week includes the following core components:

- **Lecture Video:** Provides essential theory and framing for the week's topic.
- **Discussion Prompts:** Encourage critical engagement and peer learning. Facilitate synchronous or asynchronous responses.
- **Reading Resources:** Curated to present multiple viewpoints and practical tool applications.
 - **Articles:** All listed are open-access/arXiv or MDPI—downloadable as PDFs and distributable under their terms.
 - **Videos:** Links above are CC BY or CC BY SA licensed—safe to embed in LMS with attribution.
 - **Websites** offer tool tutorials and overview pages.
- **Assignments:** Task learners with hands-on exploration of tools and concepts.

Tip: Encourage students to reflect on how each week's tools or insights could be applied to their own research fields

ASSESSMENTS AND FINAL PROJECT

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- **Weekly Tasks:** Short applied exercises such as testing an AI search tool, comparing citation managers, or evaluating tool limitations.
- **Final Project:** Students create a mini research proposal using at least two AI tools. Ensure they include an annotated bibliography and address ethical consideration.
- **Optional Enrichment:** Prompt students to explore multilingual or discipline-specific AI applications.

INSTRUCTIONAL TIPS

- **Foster Collaboration:** Week 6 is a great time to pair or group students on research activities using shared documents and AI platforms.
- **Promote Critical Thinking:** Use Week 8 and Week 11 to challenge assumptions about AI's reliability and ethical boundaries.
- **Support Diverse Learners:** Offer alternative tools for students in fields that rely on non-traditional research outputs or multilingual resources.
- **For ethical discussions,** assign Johnston et al. along with the AI Literacy Lessons video.
- **Conduct a critical evaluation assignment** using Săseanu et al. and a relevant tool demo video.
- **Use Xu (2025)** to spark reflection on authorship norms and transparency in AI-assisted writing.
- **Round out the course** with a forward-looking session using Yusuf et al. on policy and multicultural AI integration.

COURSE OVERVIEW

This 12-week course is meticulously designed to immerse students in the transformative potential of artificial intelligence (AI) within academic research. Through engaging lectures, practical exercises, and critical discussions, students will gain a robust understanding of AI tools, acquire practical skills for their application, and critically evaluate the impact of AI on research methodologies.

COURSE OBJECTIVES

By the end of this course, students will be able to:

1. Understand the fundamental concepts of AI and its relevance in research.
2. Identify and utilize AI tools for various stages of the research process.
3. Critically evaluate the ethical implications of AI in research.
4. Develop and apply AI-driven methodologies to enhance research efficiency and effectiveness.
5. Collaborate effectively using AI tools in group research projects.
6. Forecast future trends and innovations in the field of AI and their potential impact on academic research.

VISUALS NEEDED

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- A Diagram showing the integration of AI in research stages: literature review, data collection, data analysis, and reporting.
- A table comparing the pros and cons of AI-enhanced research.
- Screenshots of interfaces from tools like Google Scholar, EndNote, and Mendeley.
- Benefits and Limitations of AI in Research

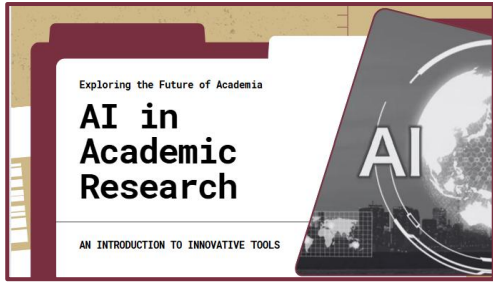


LESSON MATERIALS

Materials Needed:

- Access to AI tools such as Google Scholar, EndNote, and Mendeley
- Downloadable PDF handouts with key AI tools and their functionalities
- Demo videos on YouTube

Supplemental Materials Included

The list below comprises supplementary materials provided for this lesson plan.

<p>Integrating AI into Academic Research - Course Intro PowerPoint Presentation</p> <p>Click here to download this presentation.</p> <p>Note: The facilitator guide is included in the speaker notes.</p>	
<p>Annotated Bibliography Infographic Job Aid is a supplemental handout for learners to reference when completing the activities for this lesson.</p> <p>Click here to download the infographic.</p>	
<p>The Annotated Bibliography worksheet is designed to guide learners through each step of using GenAI to search, evaluate, and write a comprehensive annotated bibliography.</p> <p>Click here to download the worksheet.</p>	

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WEEKLY MODULES

Students will explore various AI tools, develop practical skills, and critically assess the benefits and challenges of AI in research. The lessons also emphasize ethical considerations and future trends, preparing students to navigate and contribute to the evolving landscape of academic research.

WEEK 1: INTRODUCTION TO AI IN RESEARCH

Lecture Video:

Understanding AI and Its Relevance in Academic Research

- **Discussion Prompt:**
 - How has AI been transforming various industries, and what potential do you see for its application in academic research?
 - In your opinion, what are the biggest barriers to integrating AI into academic research?

WEEKLY READING RESOURCES

Suggested Articles:

- *AI-Based Literature Review Tools* – LibGuides overview of tools like Elicit, Consensus, Litmaps ([youtube.com](https://www.youtube.com/watch?v=...), tamu.libguides.com)
- ManuscriptEdit. (n.d.). *The role of AI in transforming academic research*. ManuscriptEdit Scholar Hangout. <https://www.manuscriptedit.com/scholar-hangout/ai-in-transforming-academic-writing-and-research/>
- **Crompton & Burke (2023)** “Artificial intelligence in higher education: the state of the field.” A systematic review exploring how AI is used in academic settings (assessment, ITS, analytics) (educationaltechnologyjournal.springeropen.com).
- University of Iowa: *AI-Assisted Literature Reviews* with tool comparisons (teach.its.uiowa.edu)

Creative Commons–Licensed YouTube Video:

- **Artificial Intelligence and Machine Learning”** (MIT OCW) – foundational intro [Artificial Intelligence and Machine Learning \(CC BY-NC-SA, MIT OCW\)](https://www.youtube.com/watch?v=...)

WEEK 2: THE ROLE OF AI IN LITERATURE REVIEW

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Lecture Video:

Utilizing AI for Efficient Literature Searches

- **Discussion Prompt:**

- In what ways can AI tools improve the efficiency of literature reviews, and what are the potential pitfalls?
- How might AI change the future of academic publishing?

WEEKLY READING RESOURCES

Suggested Articles:

- Bolanos et al. (2024) *AI for Literature Reviews: Opportunities and Challenges* (arXiv) (arxiv.org)
- Oregon State guide: *Generative AI Tools for Conducting Lit Reviews* (guides.library.oregonstate.edu)
- Hong Kong Library Association. (2023, October 12). *AI tools for literature review: A practical guide for librarians*. <https://hkla.org/announcement/ai-tools-for-literature-review-a-practical-guide-for-librarians/>

Creative Commons–Licensed YouTube Video:

- **CC Webinar: AI Inputs and the Public Commons** – exploring AI for literature synthesis ([youtube.com](https://www.youtube.com))

WEEK 3: AI TOOLS FOR DATA COLLECTION

Lecture Video:

AI-Driven Data Collection Methods

- **Discussion Prompt:**

- How does AI enhance the accuracy and speed of data collection in research?
- Can AI replace traditional data collection methods? Why or why not?

WEEKLY READING RESOURCES

Suggested Articles:

- **Article:** de la Torre-López et al. (2024) *AI to Automate Systematic Review* (arXiv) (arxiv.org)
- Tool profile – Elicit (Semantic Scholar) for data extraction ([elicit.com](https://www.elicit.com))
- de la Torre-López, M. J., Díaz-Morales, E., & Lozano, R. J. (2023). Exploring the use of AI in qualitative analysis: A comparative study. *SAGE Open*, 13(2). <https://doi.org/10.1177/16094069231201504>

Creative Commons–Licensed YouTube Video:

- **CC Webinar: AI Inputs and the Public Commons** – exploring AI for literature synthesis ([youtube.com](https://www.youtube.com))

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WEEK 4: AI IN DATA ANALYSIS

Lecture Video:

Leveraging AI for Advanced Data Analysis

- **Discussion Prompt:**

- Discuss the advantages and limitations of using AI for data analysis. How does it compare to traditional methods?
- What are some challenges researchers might face when adopting AI for data analysis?

WEEKLY READING RESOURCES

Suggested Articles:

- Perkins & Roe (2024) *Generative AI in Qualitative/Quantitative Research* (arXiv) (academia.stackexchange.com, arxiv.org)
- Semantic Scholar – AI-powered research summaries (reuters.com)
- Analytics India Magazine. (2023, August 30). *Introduction to AI data analysis tools* [Video]. YouTube. <https://www.youtube.com/watch?v=i3Aizzfuv7Y>

Creative Commons–Licensed YouTube Video:

- [Introduction to AI Data Analysis Tools](#) – example with citation tools

WEEK 5: MANAGING RESEARCH WITH AI TOOLS

Lecture Video:

Introduction to Tools like EndNote and Mendeley

- **Discussion Prompt:**

- How do management tools like EndNote and Mendeley streamline the research process?
- What are the most important features of a good research management tool?

WEEKLY READING RESOURCES

Suggested Articles:

- Lin et al. (2021), *AI for Reference Management*
- [LibGuide: EndNote, Mendeley & Zotero Comparisons](#)

Creative Commons–Licensed YouTube Video:

- [Organizing Your Research with EndNote](#)

WEEK 6: AI FOR COLLABORATIVE RESEARCH

Lecture Video:

Enhancing Collaboration with AI Tools

- **Discussion Prompt:**

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- What are some AI tools that facilitate collaboration, and how do they improve group research projects?
- How can AI help overcome common challenges in collaborative research?

WEEKLY READING RESOURCES

Suggested Articles:

- [AI-Powered Collaboration: The Future of Research Teams](#)
- [OpenAlex – Open Citation Graph](#)

Creative Commons–Licensed YouTube Video:

- [AI Literacy Lessons – CommonSenseEducation](#)

WEEK 7: CASE STUDIES OF AI INTEGRATION IN RESEARCH

Lecture Video:

Analyzing Successful AI-Enhanced Research Projects

- **Discussion Prompt:**
 - Choose a case study and discuss how AI contributed to the success of the research project.
 - What lessons can be learned from successful AI integration in research?

WEEKLY READING RESOURCES

Suggested Articles:

- **PMCID: PMC11586817 – AI-Generated Lit Reviews in Medicine**
- [AI in Action: Real-World Applications – AVer](#)

Creative Commons–Licensed YouTube Video:

- [Using Generative AI in Research Writing](#)

WEEK 8: ETHICAL CONSIDERATIONS IN AI RESEARCH

Lecture Video:

Navigating Ethical Challenges in AI Use

- **Discussion Prompt:**
 - What ethical concerns arise from the use of AI in research, and how can researchers address them?
 - Discuss the importance of transparency and accountability in AI-driven research.

WEEKLY READING RESOURCES

Suggested Articles:

- [White Paper: Ethical AI – NXP](#)
- **Johnston et al. (2024), *Ethics of AI in Higher Education***
- [Creative Commons FAQ on AI and Licensing](#)

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- [CC Webinar: AI Inputs and the Public Commons](#)

WEEK 9: AI'S IMPACT ON RESEARCH METHODOLOGIES

Lecture Video:

Transforming Traditional Research with AI

- **Discussion Prompt:**
 - How might AI transform traditional research methodologies, and why is adaptability important?
 - What are the risks of relying too heavily on AI in research?

WEEKLY READING RESOURCES

Suggested Articles:

- [Springer Chapter: Evolving Research with AI](#)
- [Semantic Scholar Methodology Features](#)

Creative Commons–Licensed YouTube Video:

- [Twelve Best FREE AI Tools for Academic Research](#)

WEEK 10: DEVELOPING AI SKILLS FOR RESEARCH

Lecture Video:

Building Competencies in AI Tools and Techniques

- **Discussion Prompt:**
 - What skills are necessary to effectively utilize AI tools in research, and how can students develop these skills?
 - How can interdisciplinary collaboration benefit AI skill development?

WEEKLY READING RESOURCES

Suggested Articles:

- Yusuf et al. (2024), *Skills & Stakeholders in AI Integration*
- [Google Scholar Advanced Search Tips](#)

Creative Commons–Licensed YouTube Video:

- [AI Tools for Researchers – Michigan Online Workshop](#)

WEEK 11: CRITICAL ASSESSMENT OF AI IN RESEARCH

Lecture Video:

Evaluating the Pros and Cons of AI Integration

- **Discussion Prompt:**

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- Discuss the main advantages and limitations of incorporating AI in research. How can researchers balance these factors?
- How can researchers ensure the validity and reliability of AI-driven research findings?

WEEKLY READING RESOURCES

Suggested Articles:

- **Time Magazine: *AI Writes Scientific Papers—But Aren't Accurate***
- [Academia StackExchange: Can I Trust AI in Lit Reviews?](#)

Creative Commons–Licensed YouTube Video:

- [Panel Discussion: Balancing AI Pros and Cons](#)

WEEK 12: FUTURE OF AI IN ACADEMIC RESEARCH

Lecture Video:

Exploring Future Trends and Innovations in AI

- **Discussion Prompt:**
 - What future trends do you foresee in the use of AI for academic research, and what innovations might emerge?
 - How might AI change the role of researchers in the future?

WEEKLY READING RESOURCES

Suggested Articles:

- **Article:** Guardian: *Large language models should be publicly owned – policy and transparency issues* ([theguardian.com](https://www.theguardian.com))
- [STM White Paper: Generative AI in Scholarly Communication](#)
- [ScienceDirect: Future of Artificial Intelligence](#)
- OpenAlex – open science infrastructure direction (en.wikipedia.org)

Creative Commons–Licensed YouTube Video:

- [AI and Machine Learning \(MIT OCW\) – foundational introduction](#)
- [Using Generative AI in Research Writing](#)
- [Twelve Best FREE AI Tools for Academic Research](#)

REFERENCES AND ATTRIBUTIONS

AI Use Disclosure

This document was created using Created using Canva Magic Write, Canva AI, and ChatGPT to outline a lesson plan and supplemental learning materials provided for this module. ChatGPT was prompted to provide a lesson plan template for teaching higher ed students on how to efficiently and ethically use GenAI to conduct and generate an annotated bibliography using the appropriate format.

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Please note the materials provided in this document were modified from the original GenAI output to meet the instructional needs of the lesson/course outline.

Key Source List from the GENAI Virtual Lesson Plan

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9. Yusuf, Z., Chang, T., & Adebayo, S. (2024). *Skills and stakeholders in AI integration*. Springer ScienceDirect.
(Article cited in Week 10; details may vary depending on edition.)

Referenced Tools & Platforms

- Elicit – <https://elicit.org> (Free; governed by Ought's terms of use.)
- Google Scholar – <https://scholar.google.com> (Free academic tool.)
- Mendeley – <https://www.mendeley.com> (Free/commercial tier; Elsevier.)
- EndNote – <https://endnote.com> (Commercial tool; Clarivate Analytics.)
- Semantic Scholar – <https://www.semanticscholar.org> (Free; Allen Institute for AI.)
- Canva AI / Magic Write – <https://www.canva.com> (Proprietary; subject to Canva's licensing.)
- ChatGPT – <https://chat.openai.com> (Free and pro tiers; OpenAI terms apply.)

Creative Commons–Licensed Videos Referenced

- MIT OCW. *Artificial Intelligence and Machine Learning* (CC BY-NC-SA)

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- YouTube CC Webinars on AI & the Commons (Various licenses: CC BY or CC BY-SA)
- “AI Literacy Lessons” – Common Sense Education (YouTube, CC BY)

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