

# AI-Assisted Literature Review

## *A Systematic Approach for Research Excellence*

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# Welcome

# About This Course

*A 5-Day Intensive on AI-Assisted Research*

## **Who this is for:**

- IAEA/FAO laboratory researchers
- Anyone conducting literature reviews
- Those exploring AI tools for research
- People wanting systematic, rigorous approaches

**What this is NOT:** A quick fix or “magic button” solution

# What We'll Build Together

## *An Intentional Approach*

This week, we'll develop:

- Systematic paper extraction methods
- Rigorous evaluation practices
- Multi-paper synthesis workflows
- IP-aware research practices

**Key principle:** AI assists, but you drive the research process

# Why This Course Exists

# The Literature Review Challenge

*What You Face Daily*

## **Common pain points:**

- Reading and extracting from dozens of papers
- Maintaining consistency across studies
- Synthesizing findings into coherent narratives
- Keeping up with growing literature

**Question:** Does this resonate with your experience?

# The AI Promise

## *What AI Can Do*

### **AI tools can:**

- Process large volumes quickly
- Extract structured information
- Identify patterns across papers
- Draft synthesis text

**These are powerful capabilities** - but they're not the whole picture

# The AI Reality

## *What AI Cannot Do*

### **AI cannot:**

- Replace your domain expertise
- Understand what matters in your field
- Ensure quality without evaluation
- Work well without careful guidance

You remain essential - AI is a tool, not a replacement



# Our Philosophy

*Intentional, Not Automated*

## **This course teaches:**

- How to guide AI effectively (not just use it)
- How to evaluate outputs rigorously (not trust blindly)
- How to maintain control (not delegate thinking)
- How to respect IP (not copy carelessly)

*We're exploring together* - AI for research is still emerging

# The Week Ahead

# Day 1: Foundations

## *Understanding the Challenges*

### **Today's journey:**

- Experience prompting challenges firsthand
- Learn the Three Gulfs framework
- Discuss tools and current practices
- Share expectations and concerns

**Goal:** Understand why systematic approaches matter

# Day 2: Prompt Engineering

## *Building Effective Prompts*

### **What you'll learn:**

- How LLMs are trained (and why it matters)
- The 7 building blocks of effective prompts
- Iterative prompt refinement
- Hands-on: Build paper extraction prompts

**Goal:** Create systematic paper extraction workflows

# Day 3: Evaluation

## *Beyond “Vibes”*

### **What you’ll learn:**

- Why LLM evaluation is essential
- Open and axial coding methods
- LLM-as-judge principles
- Hands-on: Evaluate your prompts systematically

**Goal:** Replace gut feelings with rigorous assessment

# Day 4: Synthesis

## *From Papers to Literature Review*

### **What you'll learn:**

- Multi-paper synthesis approaches
- IP-aware synthesis requirements
- Intentional, iterative workflows
- Hands-on: Synthesize your own papers

**Goal:** Apply everything to real literature review

# Day 5: Real-World & Planning

## *Bringing It Together*

### **What we'll do:**

- See production implementations (MARIS, IOM)
- Collaboratively synthesize our learnings
- Individual lab consultations
- Plan your next steps

**Goal:** Transition from course to practice

# What Makes This Different



# Not Just Tool Training

## *A Methodological Approach*

### **Other courses might focus on:**

- How to use ChatGPT
- Prompt templates to copy
- “Best practices” to follow

# Our Approach

## *What We Aim to Teach*

### **This course aims at teaching:**

- How to think about AI-assisted research
- How to develop your own approaches
- How to evaluate and improve systematically
- How to adapt to your specific needs

Methodology over templates

# Collaborative and Exploratory

*We're Learning Together*

## **This course is:**

- First of its kind for IAEA/FAO labs (to my knowledge)
- Exploratory and adaptive
- Shaped by your feedback
- Contributing to new guidelines

**Your input matters** - you're helping define best practices

# Evidence-Based Methodology

*Built on Research*

## **Our approach draws from:**

- The Three Gulfs Model (Shankar & Husain)
- Qualitative research methods (open/axial coding)
- LLM evaluation research
- Real-world production systems

**Not just opinions** - grounded in methodology

# What You'll Leave With

# Practical Outcomes

## *Tangible Skills and Artifacts*

### **By Friday, you'll have:**

- Paper extraction prompts for your domain
- Evaluation methodologies you can apply
- Synthesis workflows you can use
- A collaborative report documenting our approach

**Plus:** Follow-up support for your lab

# Mindset Shifts

## *New Perspectives on AI-Assisted Research*

### **Working with AI systematically:**

- From intuitive to explicit (clarifying what we want)
- From single-shot to iterative (refining through cycles)
- From acceptance to verification (evaluating outputs)
- From generic to tailored (adapting to specific needs)

# Mindset Shifts (cont.)

## *New Perspectives on Research Practices*

### **These shifts apply to research too:**

- More explicit about requirements
- More systematic in evaluation
- More aware of IP constraints

Developing intentional practices



# What We Need From You

# Active Participation

*This Is Hands-On*

## **We ask that you:**

- Try the exercises (even if imperfect)
- Share observations openly
- Contribute to discussions
- Bring your domain expertise

Your experience is valuable - share what works and what doesn't

# Honest Feedback

*Help Us Improve*

## **Throughout the week:**

- Add observations to shared docs
- Ask questions when unclear
- Challenge assumptions
- Suggest improvements

**This is exploratory** - your feedback shapes the approach

# Patience and Flexibility

*We're Figuring This Out Together*

## **Expect:**

- Some improvisation
- Schedule adjustments
- Iterative refinement
- Ongoing discussion

**This isn't polished** - it's authentic exploration

# Practical Matters

# What You Need

## *Tools and Access*

### **You should have:**

- A laptop with internet access
- Access to AI tools (Copilot Pro provided)
- 2-3 papers from your research domain
- Willingness to experiment

### **Optional but helpful:**

- ChatGPT/Claude accounts
- NotebookLM access
- Other AI tools you use

# Shared Resources

## *Collaborative Documents*

### **We'll use:**

- Google Docs for observations and discussions
- Shared folders for materials
- Links provided as we go

**Everything will be accessible** - don't worry about taking detailed notes

# Schedule Flexibility

## *Built-In Adaptation*

### **Each day:**

- Core content in morning
- Hands-on practice in afternoon
- Buffer time for questions
- Responsive to your needs

**If something isn't working** - we'll adjust



# Setting Expectations

# What This Course Will Do

## *Realistic Goals*

### **You will:**

- Understand systematic AI-assisted research
- Build foundational prompts and workflows
- Learn evaluation methodologies
- See real-world applications

**You'll have a strong foundation** to continue developing

# What This Course Won't Do

## *Honest Limitations*

### **You won't:**

- Become an AI expert in 5 days
- Get perfect prompts that always work
- Eliminate all manual review
- Have all answers to all questions

This is the beginning - not the complete solution

# The Learning Curve

*What to Expect - Week 1*

## **This week (the course):**

- Understanding and foundation
- Experimentation and practice
- Some frustration (normal!)
- Emerging clarity

# The Learning Curve (cont.)

*What to Expect - by December 2025*

## **Follow-up support period:**

- Application to your work
- Troubleshooting real cases
- Refinement and improvement
- Growing confidence

Learning continues beyond this week

# Questions & Discussion

# Before We Dive In

*What's On Your Mind?*

## **Common questions:**

- “Will this really save time?”
- “What if I don’t know much about AI?”
- “How does this fit my current workflow?”
- “What about data privacy/security?”

**Let’s discuss** - what concerns or questions do you have?

# Your Expectations

*What Do You Hope to Gain?*

## **Take a moment to think:**

- What brought you here?
- What would make this week valuable?
- What specific challenges do you face?
- What would success look like?

**We'll capture these** in our shared discussion later today



# Let's Begin

# The Journey Starts Now

## *Next Steps*

### **Coming up:**

- Session 1B: Tools and setup
- Session 1C: First hands-on (try it yourself!)
- Session 1D: The Three Gulfs framework
- Session 1E: Collaborative discussion

Ready to explore?