

Capstone Project Guide

Build a Real-World AI System for Your Portfolio

TL;DR: Build an intelligent GenAI system. Choose from following tracks (or propose your own). User-friendly interface, full documentation. 40% of final grade.

Project Overview

Industry Context: Organizations face increasing challenges in content creation, ideation, and knowledge management. Generative AI offers transformative potential to automate creative workflows, enhance productivity, and streamline information processing—if applied to the right use cases with proper implementation.

Focus: GenAI solutions for productivity and creative automation

Key Deliverables:

- Working AI system with user-friendly interface
- Live demo video & presentation
- Complete documentation & code
- Strategic recommendations for broader market opportunities

Project Scope: Given the complexity of these systems, teams may **focus on one specific domain or subdomain** (e.g., focusing only on blockchain patent ideation, or only on technical slide generation). Depth is valued over breadth.

Project Tracks (Choose One or Propose Your Own)

 See detailed track descriptions in: [Project Tracks NTU.pdf](#)

Quick Track Overview:

Track 1: Ideation and Realization Engine

- Build systems (e.g., generator-evaluator frameworks or any other methods) for patents, research papers, or startups
- Focus on novelty detection and evidence-based ideation
- Options: Patent writing, Paper writing, or Startup planning

Track 2: Intelligent Slides Generation

- Generate professional presentation slides with structured content and design
- Like Gamma.ai but custom-built

Track 3: Intelligent Knowledge Base with Auto-Clustering

- Semantic search and organization of personal knowledge
- Like Cursor.com + Notion

Track 4: One-Click Application Builder

- From UI sketch to deployed application with auth, payments, and analytics
- Rapid MVP development automation

Track 5: Propose Your Own

- Submit custom track proposal by Week 3
 - Must include problem statement, capabilities, technical approach, and impact
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Timeline & Milestones

Phase	Due	Deliverables
Team Formation & Track Selection	23 Nov 2025 (Sun), 11:59 PM	<ul style="list-style-type: none"> • Team composition • Track selection via Google Sheet • Initial project proposal (if Track 5)
Presentation Deck Upload	9 Jan 2025 (Fri), 5:00 PM	<ul style="list-style-type: none"> • Presentation materials upload • Demo video • Complete documentation
Actual Presentation	10 Jan 2025 (Sat), 2:30 PM	<ul style="list-style-type: none"> • Live presentation (10 min per group)
Final Submission	11 Jan 2025 (Sun), 11:59 PM	<ul style="list-style-type: none"> • All final deliverables

Final Presentation Deliverables

There are **two sets of files** to upload:

1. **Group Presentation Materials** (Due: 9 Jan 2025, Fri, 5 PM) - Deck + video for group presentation
2. **Final Submission Files** (Due: 11 Jan 2025, Sun, 11:59 PM) - Complete submission

1. Group Presentation (Deadline: 9 Jan 2025 (Fri), 5:00 PM)

Actual Group Presentation: 10 Jan 2025 (Sat), 2:30 PM

File Submission Format

Upload `Presentation_GroupX.pptx` / `.pdf` to Google Form with link that would be provided (e.g., `Presentation_Group1.pptx`).

Important: Any non-conforming file names (including capitalization and misspelling) will result in mark deductions. Follow the exact naming convention specified.

Slide Requirements

First slide must include:

- Group number
- Team members (names and student IDs)
- GitHub repository link (must be public)
- Demo link (live or video)

Important: To save time, we will use **demo videos** instead of live demos. Test all links and compatibility in advance if using your own laptop.

Presentation Details

Duration: Strictly **10 minutes**

Suggested Flow:

1. Objective – 1 min

- Problem statement and target users
- Why this matters

2. Demo – 3–4 mins

- Showcase key features clearly and concisely
- Use pre-recorded demo video for reliability
- Highlight user experience and workflows

3. Core Capabilities and Challenges – 3–4 mins

Both core capabilities and challenges must be listed to score well and demonstrate your understanding of the system.

For All Tracks:

- **Core Capabilities:** Describe what your system can do effectively
 - Example (Ideation): "Generate realistic patent ideas in blockchain domain and be able to write the first draft"
- **Insights:** Explain briefly how you achieve these capabilities
 - What makes your approach effective?
 - Any novel techniques or architectures used?
- **Challenges:** Highlight what your system struggles with
 - What kinds of inputs produce poor results?
 - What are the current limitations?
 - Mitigation strategies and future improvements

4. Conclusion – 1 min

- Key achievements
- Lessons learned

Presentation Requirements:

- All team members must present
- Absences without valid reasons will affect individual marks. MC must be provided with email.
- If someone is absent, they must record their part as a video to be shown during the session

2. Final Submission (Deadline: 11 Jan 2025 (Sun), 11:59 PM)

Submit the following files with **exact filenames** on Google Form with link that would be provided:

Important: Any non-conforming file names (including capitalization and misspelling) will result in mark deductions. Follow the exact naming convention specified.

File	Description
Readme.pdf	README with clear setup instructions, system requirements, and deployment guide

Slide.pdf Or Slide.pptx	Final presentation slide deck
Video.mp4	Demo video
Documentation.pdf	Detailed documentation (max 20 pages)
Teams.pdf	Team roles and contribution summary
Strategic_Recommendations.pdf	Strategic analysis of GenAI opportunities

Documentation.pdf Requirements (Max 20 Pages)

Must include:

1. Team Information

- Group number
- Team member names and contributions
- GitHub repository link (must be public)
- Demo link

2. Problem Statement

- Clear definition of the problem
- Target users and use cases
- Why existing solutions are insufficient

3. System Architecture

- High-level system design
- Component interactions
- Data flow diagrams

4. Technical Stack

- Technologies and frameworks used
- Justification for key technical decisions
- Integration approach

5. Features and Capabilities

- Detailed feature descriptions
- Implementation insights
- Performance metrics

6. Challenges and Limitations

- Technical challenges encountered
- Current limitations
- Edge cases and failure modes
- Proposed mitigation strategies

7. References and Inspirations

- Academic papers that informed your approach
- Technical blog posts and tutorials used
- White papers and industry reports referenced
- How each reference contributed to your implementation

- Example: "We adapted the clustering approach from [Paper X] to handle note organization at scale"

8. Conclusion

- Key achievements
- Lessons learned
- Future improvements

Teams.pdf Requirements

Provide a clear breakdown of:

- Individual responsibilities
- Contribution percentages
- Specific tasks completed by each member
- Collaboration dynamics

Strategic_Recommendations.pdf Requirements

Address the following strategic question:

"What other directions could GenAI help industries? Suggest recommendations and identify 3 low-hanging fruit opportunities (few people are doing, highest impact with lowest implementation effort)."

Guidelines:

- Focus on specific industries and use cases
- Back recommendations with market research and evidence
- Identify concrete implementation approaches
- Avoid generic ChatGPT-generated responses
- Higher marks for unique insights backed by real market analysis

Note: Think critically and conduct actual research. Use ChatGPT for assistance, but ensure your analysis is specific and evidence-based.

Grading Criteria

Category	Weight	Focus Areas
Problem Solving	40%	How well the core capabilities are addressed
User Interface Design	20%	UX-first design that lets users easily use your system; usability is more important than aesthetics
Engineering Quality	20%	Clean code, proper deployment, system reliability, scalability considerations
Documentation	10%	README clarity, code comments, system documentation
Presentation	10%	Demo quality, storytelling, capability/challenge analysis, Q&A responses

Peer Reviews

Optional peer review available near the end of project submission. Individual marks may be adjusted based on feedback. This is to encourage everyone to contribute fairly to the team to make it a great team experience!

Success Tips

Do's:

- Start with the simplest version that demonstrates core capabilities
- Focus on solving Core Capabilities, e.g., generate realistic ideation grounded by evidence
- Document as you build, not at the end
- Use version control with meaningful commit messages

Don'ts:

- Over-engineer before basics work
- Ignore edge cases and error handling
- Focus on non-core capabilities, e.g., support more user languages...
- Generic or superficial strategic recommendations

Submission Checklist

Before Presentation (9 Jan 2025 (Fri), 5:00 PM)

- `Presentation_GroupX.pptx/.pdf` uploaded to Google Form
- Demo video tested and working
- All links (GitHub, demo) verified and accessible
- Presentation practiced within 10-minute limit
- All team members prepared for their segments

Final Submission (11 Jan 2025 (Sun), 11:59 PM)

- `Readme.pdf` with complete setup instructions
- `Slide.pdf` or `Slide.pptx` (final version)
- `Video.mp4` (demo video)
- `Documentation.pdf` (max 20 pages)
- `Teams.pdf` with contribution breakdown
- `Strategic_Recommendations.pdf` with evidence-based insights
- GitHub repository is public with clean commit history
- All submitted files follow exact naming conventions
- System is functional with working UI

Why This Matters

This is your opportunity to build a production-ready AI system that solves real problems. Make it count—your future self will thank you.

Additional Resources

Recommended Readings:

- Track 1: [A Review of LLM-Assisted Ideation](#)
- Track 1B: [AI-Scientist](#)

- Track 2: Gamma.ai case studies
- Track 3: Cursor.com and Notion AI architecture
- Track 4: v0.dev and Vercel AI SDK documentation