

School of Informatics, Computing, and Cyber Systems

# Personalized Education An Al-Integrated Web Application for Tailored Tutoring

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# Motivation

#### **Every student learns differently.** So why teach them the same?

- Traditional classrooms often rely on one-size-fits all instruction methods
- Without personalization, many students fall behind not because of ability, but because of misaligned teaching methods

#### Solution

A specialized learning management system that deploys Gen AI, Prompt Engineering Techniques, and Vector Storage, to craft a personalized learning experience.



- Students can enroll in MRTL online courses
- Each course contains modules with lectures and assignments created by instructors
- While interacting with course content, students can utilize the Al-integrated chat for questions and clarification
- The system offers different AI modes, allowing the student to customize the persona, style, and method of responses
- The integrated AI can provide personalized feedback using previous chat history and student data.





### **Key Features**

#### Learning Management System

- User Profiles
- Enrollment in courses
- Modules with lectures & Assignments



#### Multiple AI-Bot Personas

Mentor Tutor **Encouragement & Direction** Structured & Step-by-Step



**Custom Learning Style Co-Learner** Works alongside the student Tailored for the Student





#### **Personalized Learning Journey**

#### Student Interactions

- Chat history
- Assignments
- Grades

#### Al Analysis

- Learning trends
- Academic Challenges

#### Personalized Feedback

- Study Concepts
- Additional Resources

#### Improved Learning Outcomes

- Clear Path
- Tailored Approach









#### Client



Metrology Research and Teaching Laboratory

The **MRTL** at NAU serves as a hub for advancing semiconductor metrology research, education, and collaboration.

#### Why has the MRTL come to us?

- program

# **Technologies & Architecture**







## **Testing & Challenges**

- Layered approach in testing Unit - Integration - Usability
- Focus Areas: Data accuracy Session/auth reliability AI feedback & Grading logic



 The client aims to create a learning management system(LMS) integrated with AI powered tutoring as an extension of the MRTL

• The platform will host online learning modules with various STEM Courses.

> Underestimated the complexity of basic LMS features

Providing chat context with a vector database and embeddings



