Syllabus and Curriculum Design Optimizer

Problem Statement No.14

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Problem Statement

Faculty face challenges in creating consistent, high-quality syllabi that align with educational and industry standards. Manual curriculum design is time-consuming and lacks adaptability to current trends. Key issues include inconsistency, time consumption, and limited outcome alignment.

Proposed System / Solution

- An AI-powered web application that helps faculty generate structured syllabi.
- - Uses IBM Granite Foundation Models (Watsonx.ai)
- - Automatically generates course title, description, modules, outcomes, and assessments
- - Enhances efficiency, standardization, and relevance

System Development Approach (Technologies Used)

Software Requirements

- Frontend: HTML5, CSS3, Bootstrap
- - Backend: Python (Flask Framework)
- - AI Model: IBM Watsonx.ai Granite-13b-instruct-v2
- - Cloud: IBM Cloud Lite Plan
- - Version: ibm-watsonx-ai 1.3.32
- - Deployment: Localhost (Development)

Hardware Requirements

- Processor (CPU): Intel Core i3 or equivalent
- RAM: 4 GB/8 GB or more

Cloud Dependencies

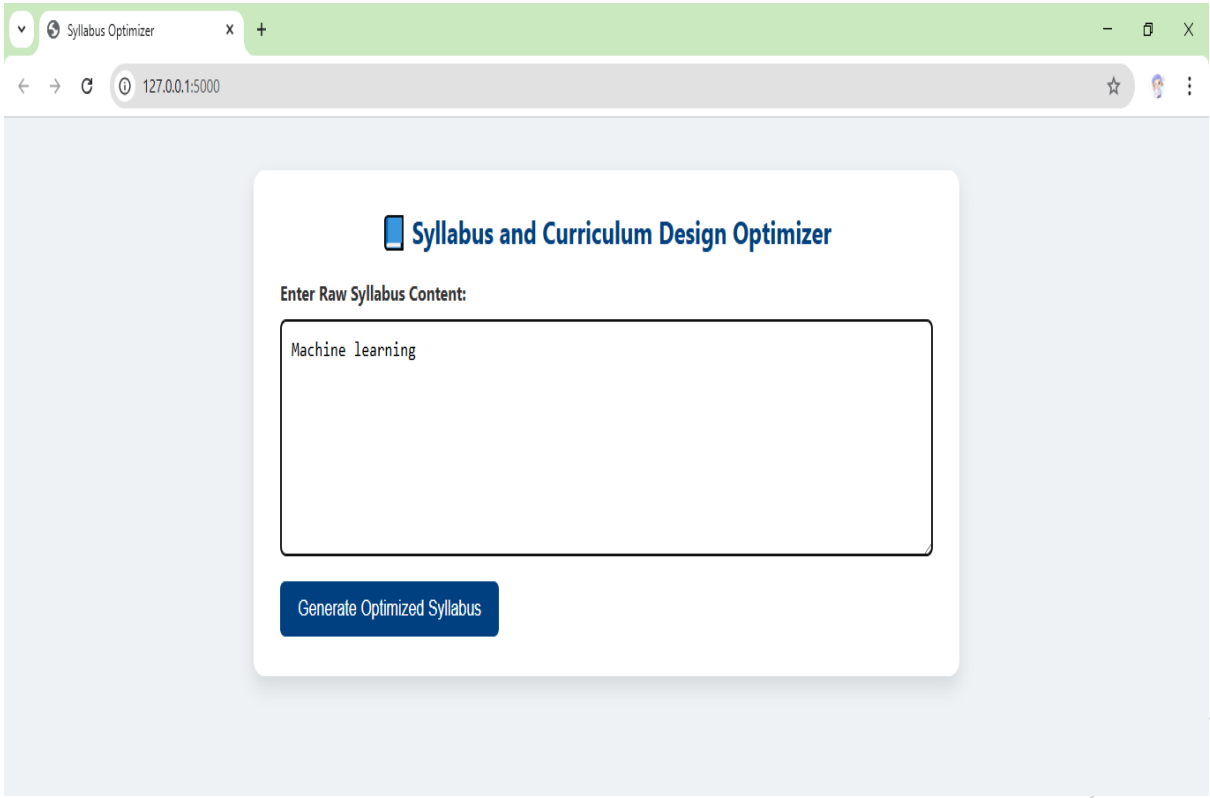
- Watsonx.ai (Granite):Used for syllabus generation using LLMs
- IAM API Key:Required to authenticate with IBM Cloud services
- Project ID:Watsonx project ID for model invocation

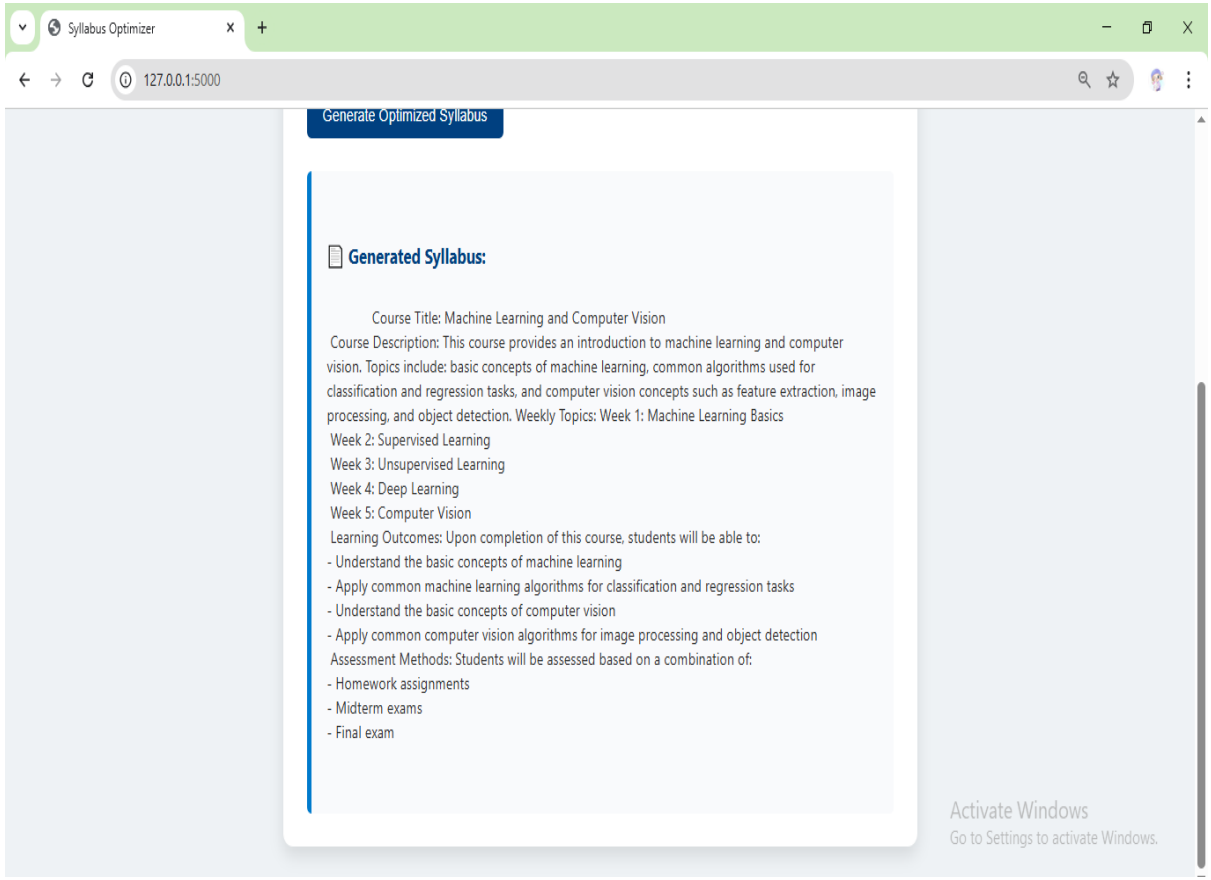
Algorithm and Development

- User provides raw syllabus input or keywords
- Flask backend forms prompt and sends to Watsonx model
- Model returns structured syllabus (title, modules, outcomes, etc.)
- Output is rendered in web UI
- User can view the structured syllabus and can also download the syllabus as pdf
- And for the future enhancement user can provide the feedback
- Includes secure authentication using IBM Watsonx.ai SDK.

Result (Output Example)

GitHub link: https://github.com/SHALINI-SK/SyllabusOptimizer




Syllabus Optimizer
127.0.0.1:5000
Generate Optimized Syllabus
Generated Syllabus:
Course Title: Machine Learning and Computer Vision
Course Description: This course provides an introduction to machine learning and computer vision. Topics include: basic concepts of machine learning, common algorithms used for classification and regression tasks, and computer vision concepts such as feature extraction, image processing, and object detection. Weekly Topics: Week 1: Machine Learning Basics
Week 2: Supervised Learning
Week 3: Unsupervised Learning
Week 4: Deep Learning
Week 5: Computer Vision
Learning Outcomes: Upon completion of this course, students will be able to:
- Understand the basic concepts of machine learning
- Apply common machine learning algorithms for classification and regression tasks
- Understand the basic concepts of computer vision
- Apply common computer vision algorithms for image processing and object detection
Assessment Methods: Students will be assessed based on a combination of:
- Homework assignments
- Midterm exams
- Final exam
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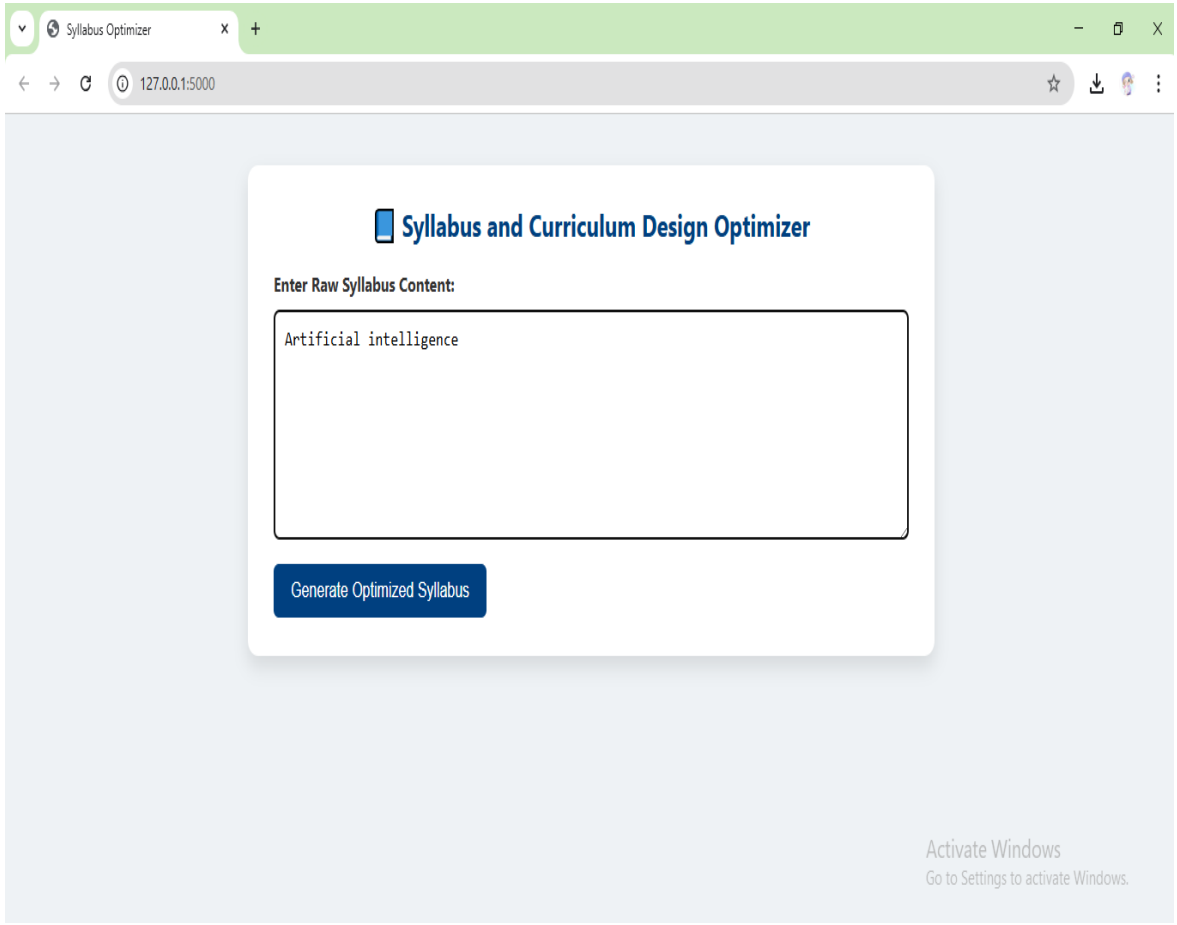
Syllabus Optimizer
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Syllabus and Curriculum Design Optimizer
Enter Raw Syllabus Content:
Artificial intelligence
Generate Optimized Syllabus
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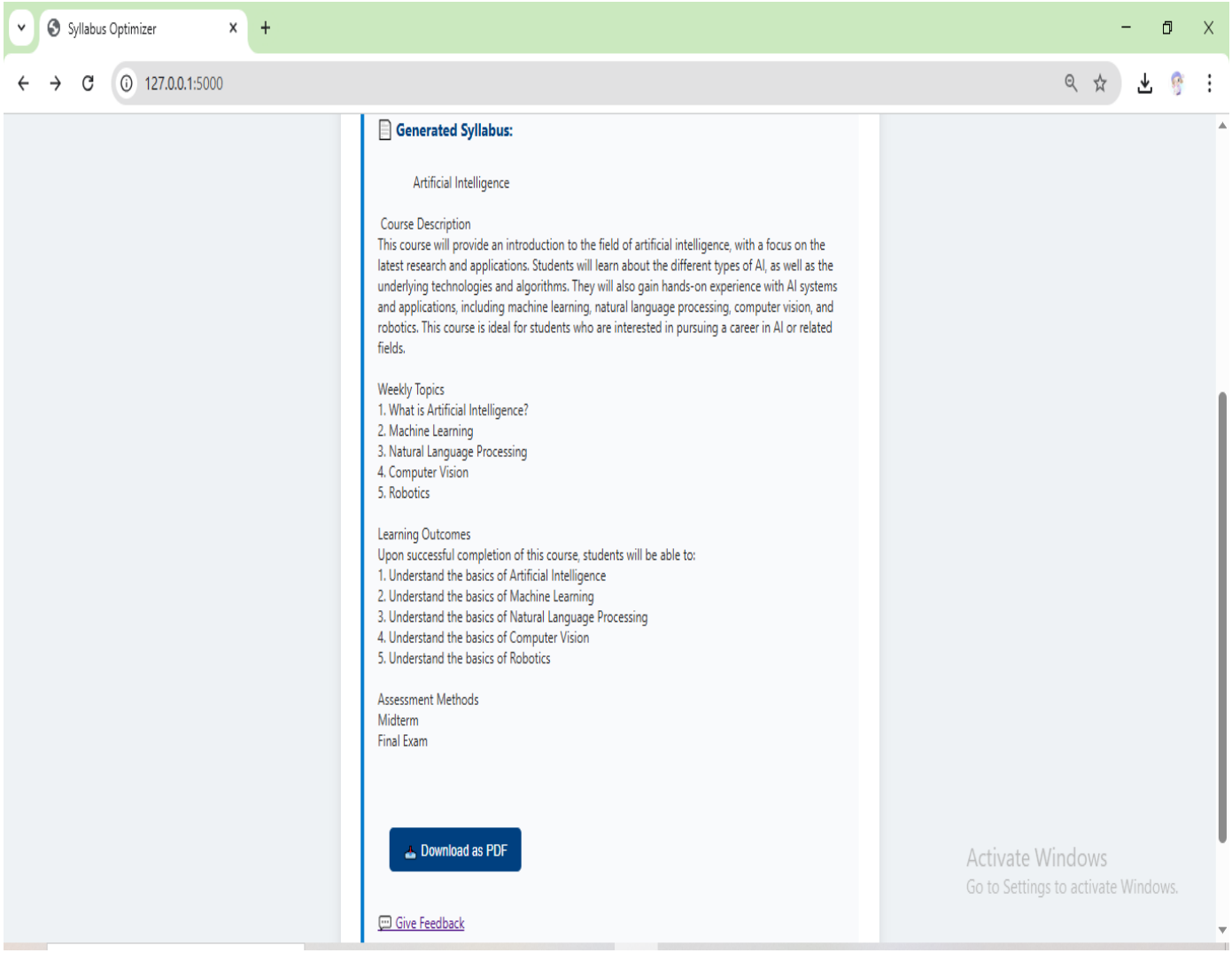
Syllabus Optimizer
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Generated Syllabus:
Artificial Intelligence
Course Description
This course will provide an introduction to the field of artificial intelligence, with a focus on the latest research and applications. Students will learn about the different types of AI, as well as the underlying technologies and algorithms. They will also gain hands-on experience with AI systems and applications, including machine learning, natural language processing, computer vision, and robotics. This course is ideal for students who are interested in pursuing a career in AI or related fields.
Weekly Topics
1. What is Artificial Intelligence?
2. Machine Learning
3. Natural Language Processing
4. Computer Vision
5. Robotics
Learning Outcomes
Upon successful completion of this course, students will be able to:
1. Understand the basics of Artificial Intelligence
2. Understand the basics of Machine Learning
3. Understand the basics of Natural Language Processing
4. Understand the basics of Computer Vision
5. Understand the basics of Robotics
Assessment Methods
Midterm
Final Exam
Download as PDF
Give Feedback
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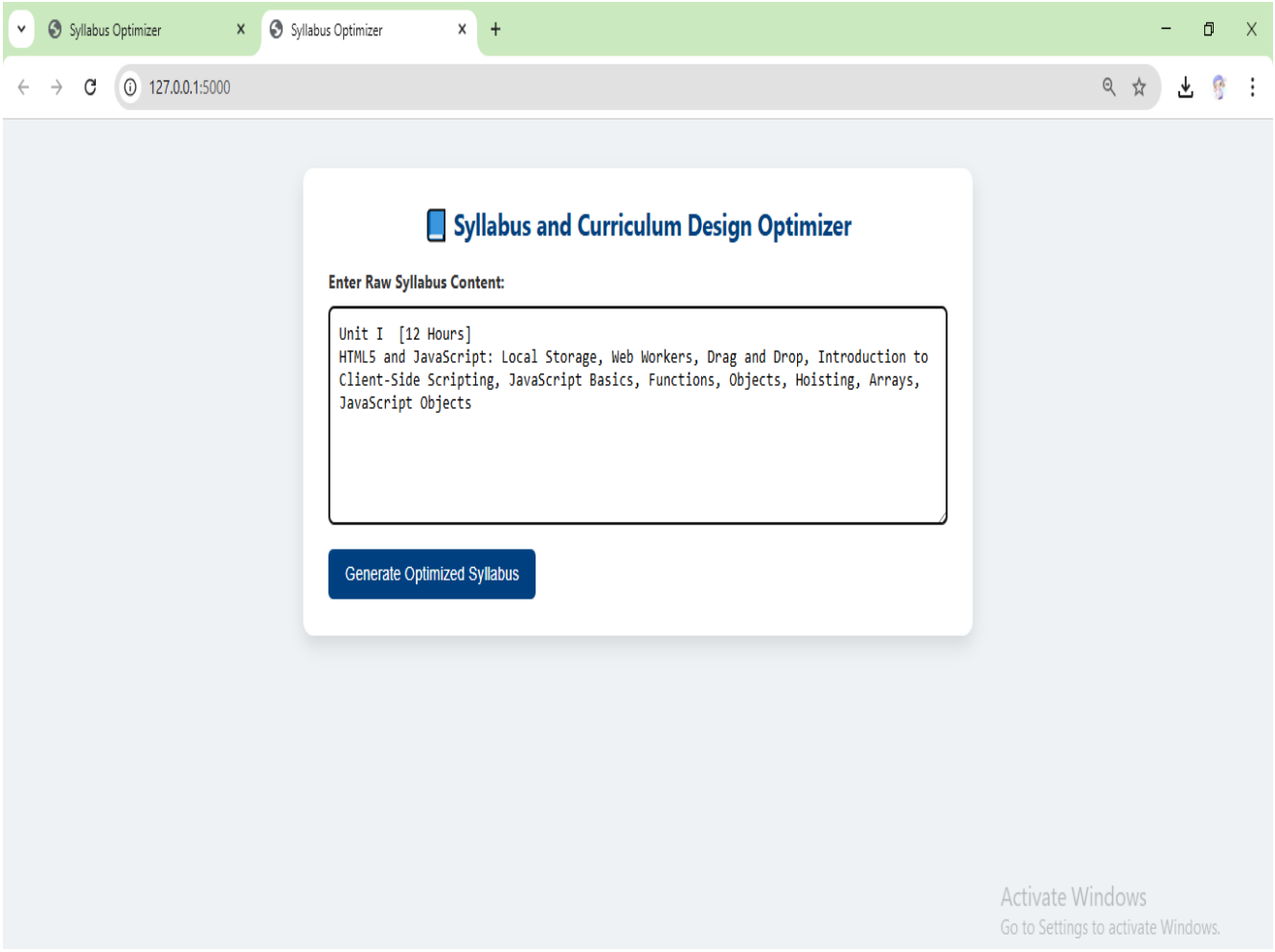
Syllabus Optimizer
Syllabus Optimizer
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Syllabus and Curriculum Design Optimizer
Enter Raw Syllabus Content:
Unit I [12 Hours]
HTML5 and JavaScript: Local Storage, Web Workers, Drag and Drop, Introduction to Client-Side Scripting, JavaScript Basics, Functions, Objects, Hoisting, Arrays, JavaScript Objects
Generate Optimized Syllabus
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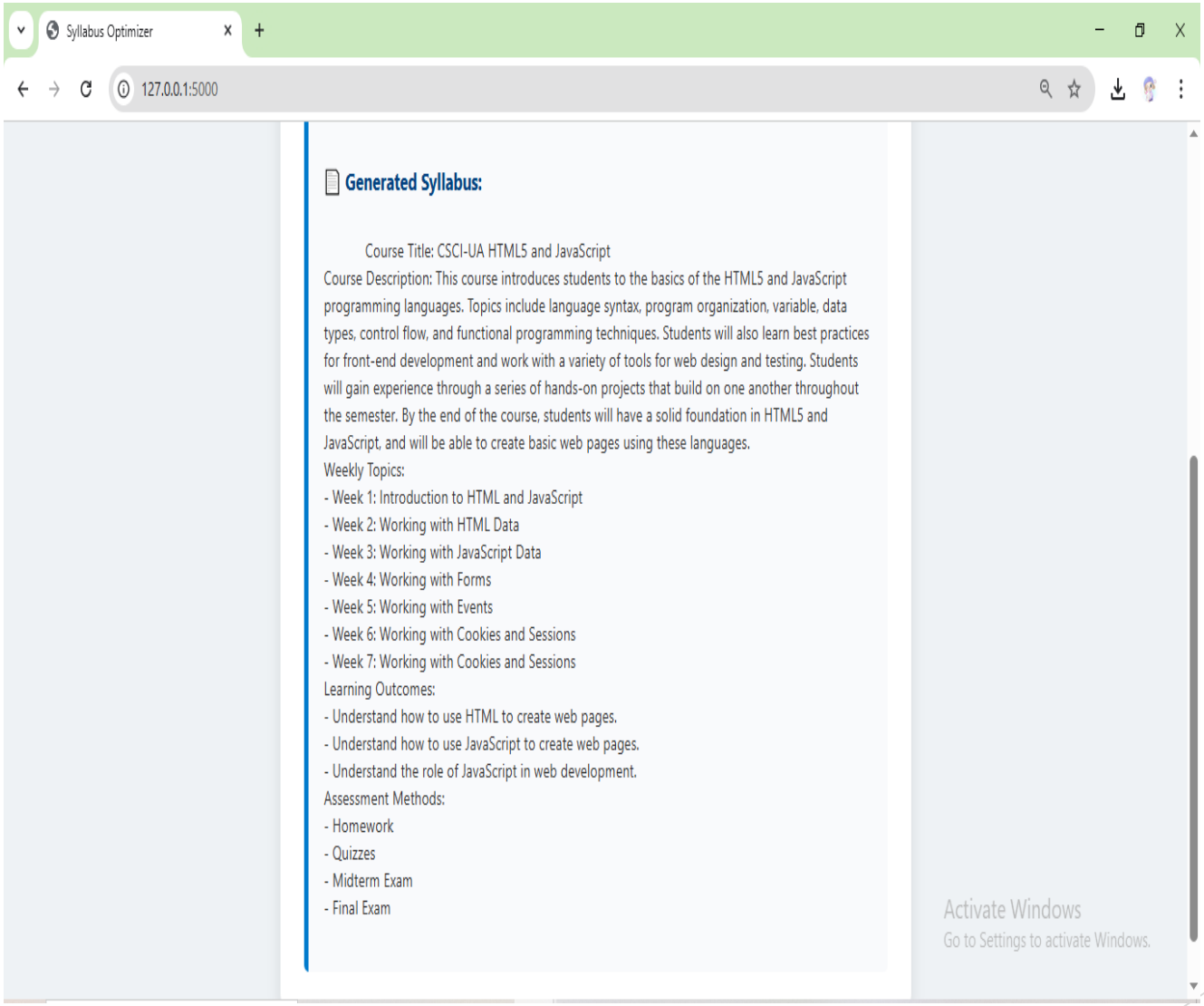
Syllabus Optimizer
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Generated Syllabus:
Course Title: CSCI-UA HTML5 and JavaScript
Course Description: This course introduces students to the basics of the HTML5 and JavaScript programming languages. Topics include language syntax, program organization, variable, data types, control flow, and functional programming techniques. Students will also learn best practices for front-end development and work with a variety of tools for web design and testing. Students will gain experience through a series of hands-on projects that build on one another throughout the semester. By the end of the course, students will have a solid foundation in HTML5 and JavaScript, and will be able to create basic web pages using these languages.
Weekly Topics:
- Week 1: Introduction to HTML and JavaScript
- Week 2: Working with HTML Data
- Week 3: Working with JavaScript Data
- Week 4: Working with Forms
- Week 5: Working with Events
- Week 6: Working with Cookies and Sessions
- Week 7: Working with Cookies and Sessions
Learning Outcomes:
- Understand how to use HTML to create web pages.
- Understand how to use JavaScript to create web pages.
- Understand the role of JavaScript in web development.
Assessment Methods:
- Homework
- Quizzes
- Midterm Exam
- Final Exam
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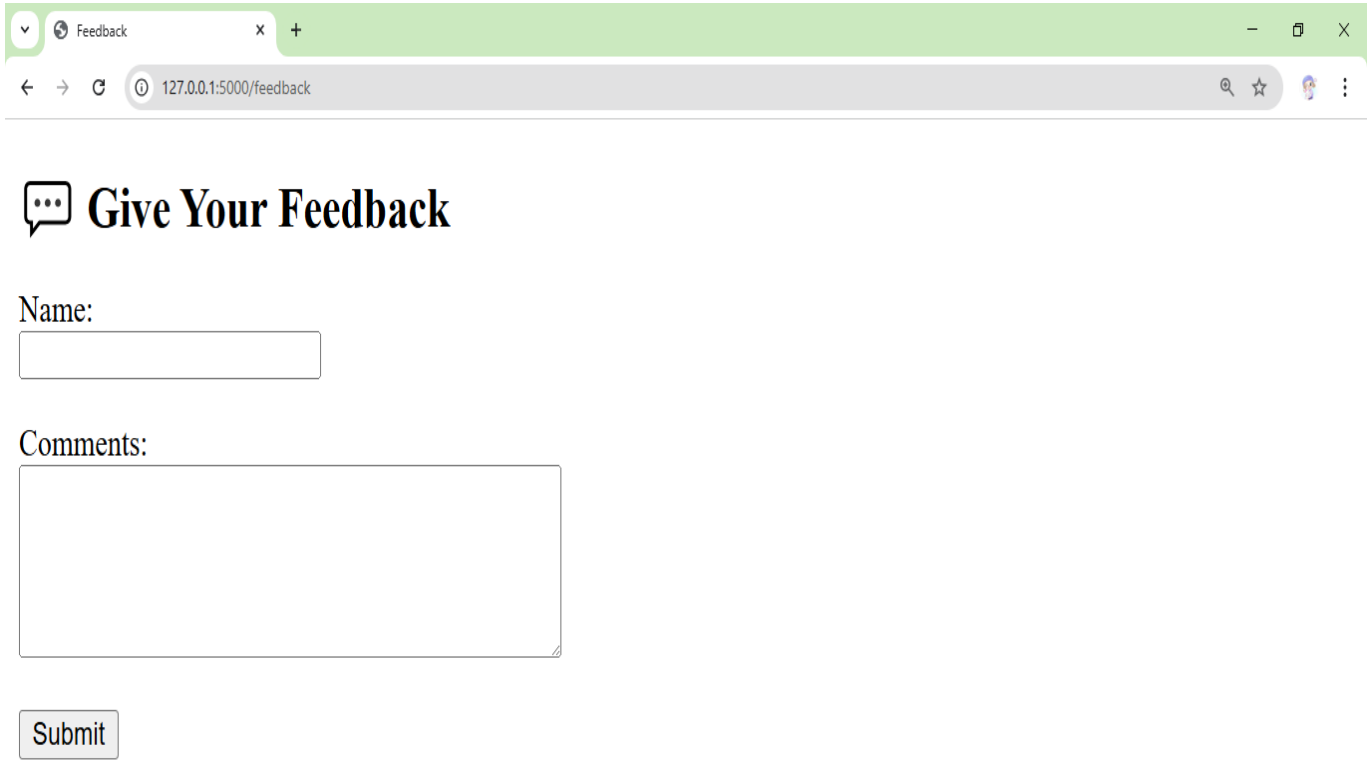

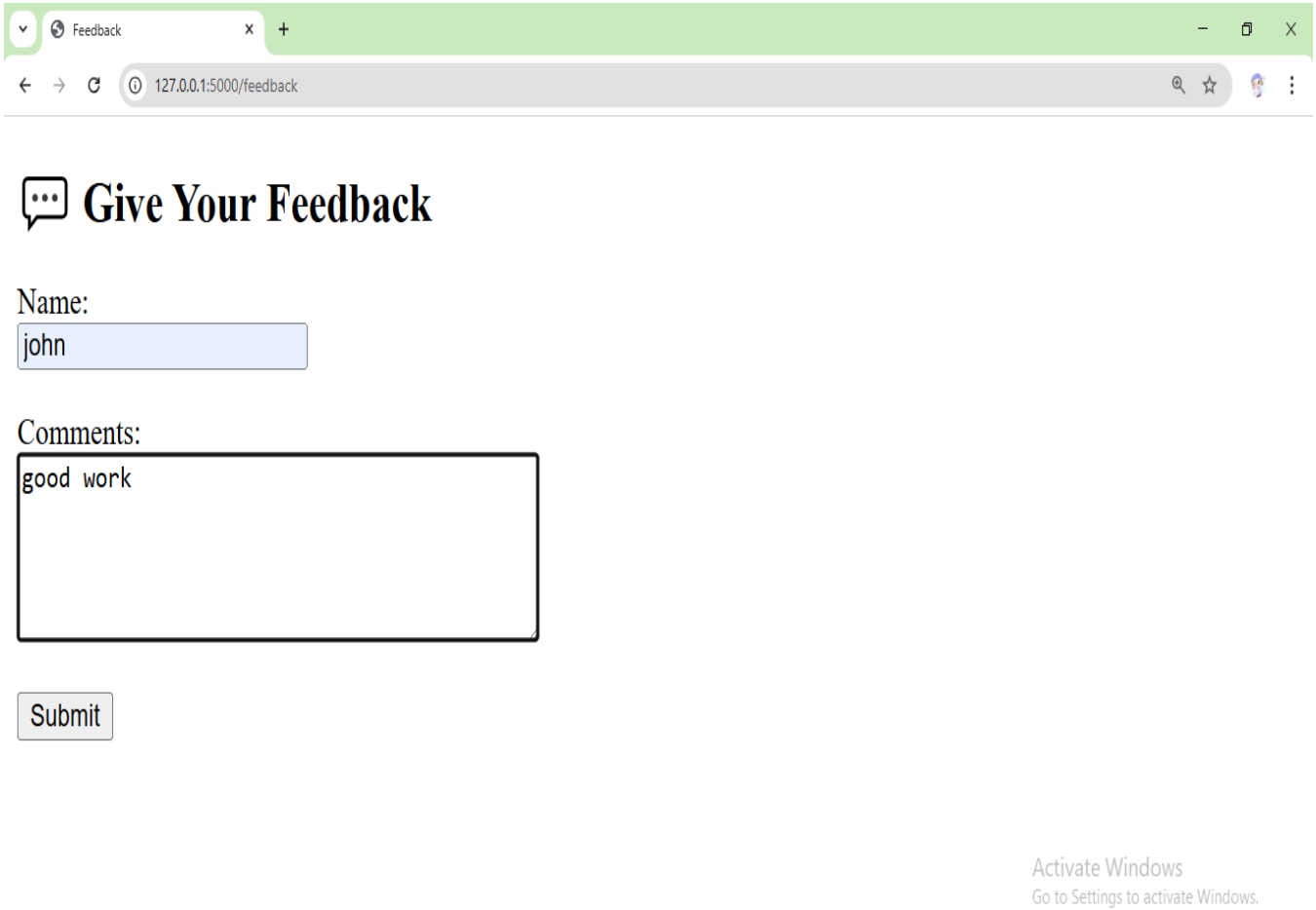

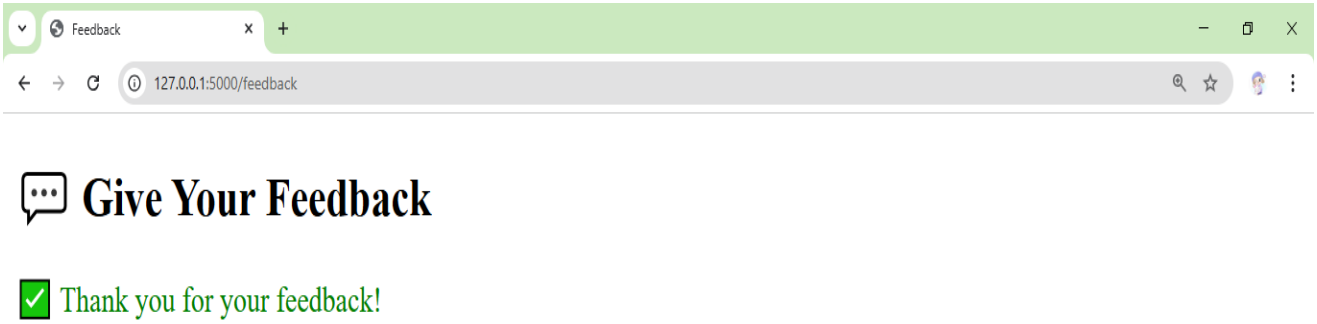

Conclusion

- The system helps educators rapidly design AI-assisted, standardized syllabi.
- - Reduces manual effort
- - Improves structure and alignment with learning goals
- - Generates quality outputs in seconds

Future Scope

- Add multilingual support
- Integrate with LMS platforms
- Include accreditation alignment (NBA/NAAC)
- Enable Keyword Highlighting
- Syllabus comparison and plagiarism detection
- Multi-language Support
- RESPONSIVE MOBILE UI

References

- IBM Watsonx.ai Documentation: https://dataplatform.cloud.ibm.com
- Flask Framework: https://flask.palletsprojects.com
- IBM Granite Models: https://www.ibm.com/products/watsonx
- Python, HTML, CSS Documentation