CIV401: Infrastructure Design and Development
Institution: Grand Valley University
Term: Fall 2020
Instructor: Prof. Sarah Nguyen
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Office Location: Civil Engineering Building, Room 217
Office Hours: Wednesday 2:00-4:00 PM, Friday 10:00-12:00 PM
Class Schedule: Tuesday & Thursday, 9:00 AM - 10:30 AM
Classroom: Engineering Hall, Room 302

Course Overview
CIV401: Infrastructure Design and Development is an advanced course focused on the design and development of infrastructure projects. Students will work in teams to address real-world challenges in civil infrastructure, including transportation systems, water management, and urban development. The course covers the complete lifecycle of infrastructure projects, from initial planning and feasibility studies to detailed design and implementation.

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

1. Develop comprehensive project plans and feasibility studies for infrastructure projects.
2. Apply engineering principles and design standards to create detailed infrastructure designs.
3. Conduct environmental impact assessments and incorporate sustainable practices into designs.
4. Collaborate with team members to integrate various engineering disciplines into a cohesive project.
5. Present and defend project proposals to a panel of experts, incorporating feedback into the final design.

Course Modules and Timeline

Module	Topics Covered	Key Dates
Module 1	Introduction to Infrastructure Design & Development	Start: September 8, 2020
	- Course Introduction	
	- Overview of Infrastructure Systems	
	- Team Formation and Project Selection	
	Deliverable: Team Formation and Project Outline (0%)	Due: September 15, 2020
Module 2	Feasibility Studies and Project Planning	Start: September 22, 2020

Module	Topics Covered	Key Dates
	- Feasibility Studies - Project Scope and Objectives - Cost Estimation and Budgeting	
	Deliverable: Feasibility Report and Project Plan (15%)	Due: October 6, 2020
Module 3	Environmental and Sustainability Considerations	Start: October 13, 2020
	- Environmental Impact Assessments - Sustainable Infrastructure Practices - Regulatory and Permitting Processes	
	Deliverable: Environmental Impact and Sustainability Report (20%)	Due: October 27, 2020
Module 4	Detailed Infrastructure Design	Start: November 3, 2020
	- Transportation Systems Design - Water Management Systems - Urban Infrastructure and Public Utilities	
	Deliverable: Detailed Design Submission (25%)	Due: November 24, 2020
Module 5	Project Integration and Finalization	Start: December 1, 2020
	- Integration of Design Components - Risk Assessment and Mitigation Strategies - Final Project Preparation and Presentation Skills	
	Deliverable: Final Project Report and Presentation (40%)	Due: December 15, 2020

Assessment and Evaluation

- **Feasibility Report and Project Plan**: 15%
  Teams will develop a feasibility study and a comprehensive project plan that outlines the scope, objectives, and budget for their chosen infrastructure project.
- **Environmental Impact and Sustainability Report**: 20%
  This report will assess the environmental impact of the project and propose sustainable practices to be integrated into the design. The report should also address regulatory requirements.
- **Detailed Design Submission**: 25%
  The detailed design submission will include engineering drawings, calculations, and specifications for the infrastructure components. Teams must ensure that the design meets all relevant standards and regulations.

- **Final Project Report and Presentation**: 40%
  The final deliverable will be a complete project report, including all aspects of the project from initial planning to final design. Teams will also present their project to a panel of faculty and industry experts, incorporating feedback into their final submission.

Course Policies

- **Attendance**: Attendance at all scheduled classes and presentations is mandatory. Participation in team meetings outside of class is also expected.
- **Late Submissions**: Late deliverables will incur a penalty of 5% per day, up to a maximum of 20%. Submissions more than 4 days late will not be accepted.
- **Teamwork and Collaboration**: Successful completion of the course requires effective teamwork. Teams are expected to manage their own schedules and distribute work evenly among members. Conflicts should be resolved internally or escalated to the instructor if necessary.
- **Academic Integrity**: All work submitted must be original and properly cited. Plagiarism or other forms of academic dishonesty will result in severe consequences, including possible failure of the course.

Resources

- **Textbook**: "Infrastructure Planning, Engineering, and Economics" by Alvin S. Goodman and Makarand Hastak (2nd Edition).
- **Software**: AutoCAD, Civil 3D, and MS Project will be used for design and project management tasks.
- **Additional Resources**: Access to university libraries, online databases, and industry case studies will be provided.

This syllabus for **CIV401: Infrastructure Design and Development** outlines the key modules, deliverables, and expectations for students, ensuring a comprehensive understanding of the infrastructure project lifecycle.