

Assisted Bridge Design



Economic
Structural Safety
Serviceability
Sustainability
Aesthetics
Constructability
Durability



Presented by:
Sapiens AI Team

Advanced Civil Design Tools Track

2 Months Online + 1 Month Offline Program

Program Goal & Core Topics

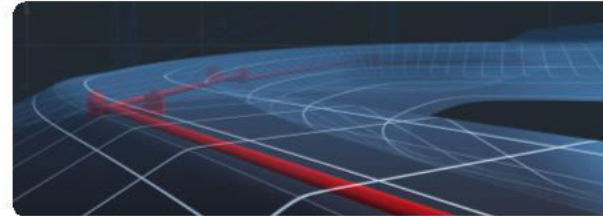
Our Program Goal

Comprehensive Proficiency: Gain a deep understanding and practical proficiency in industry-standard civil engineering software. This encompasses the latest tools critical for modern design and construction.

Integrated Workflows: Learn the effective integration of diverse software tools and collaborative workflows. This fosters enhanced coordination and efficient project delivery within a common data environment.

Project Culmination: Apply acquired skills to create a detailed 3D model for a small civil infrastructure project, providing real-world application of learned concepts and software proficiencies.

Core Topics Covered



AutoCAD Civil 3D

Master hands-on design and documentation for civil projects, from land development to transportation.



STAAD.Pro

Learn advanced structural analysis and design for diverse building and infrastructure projects.



Revit

Explore Building Information Modeling (BIM) for integrated architectural, structural, and MEP design.



Integration & Collaboration

Develop skills in seamlessly integrating software tools and facilitating collaborative workflows for project efficiency.



Structural Bridge Design



Phase 1: Foundational & Core Concepts (Months 1 & 2 Online)

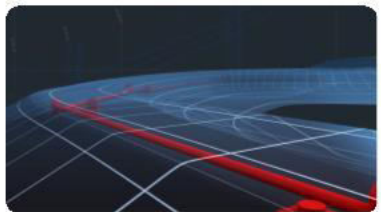
Delivered online: Theoretical understanding & hands-on proficiency

Flexible Learning Environment: This initial phase is delivered entirely online, providing the flexibility to acquire foundational concepts from any location. Our platforms are designed for accessible technical course delivery.

Dual-Focus Approach: The curriculum builds both theoretical understanding of engineering principles and hands-on proficiency with industry-standard software through practical, real-world exercises.

Individual Software Mastery

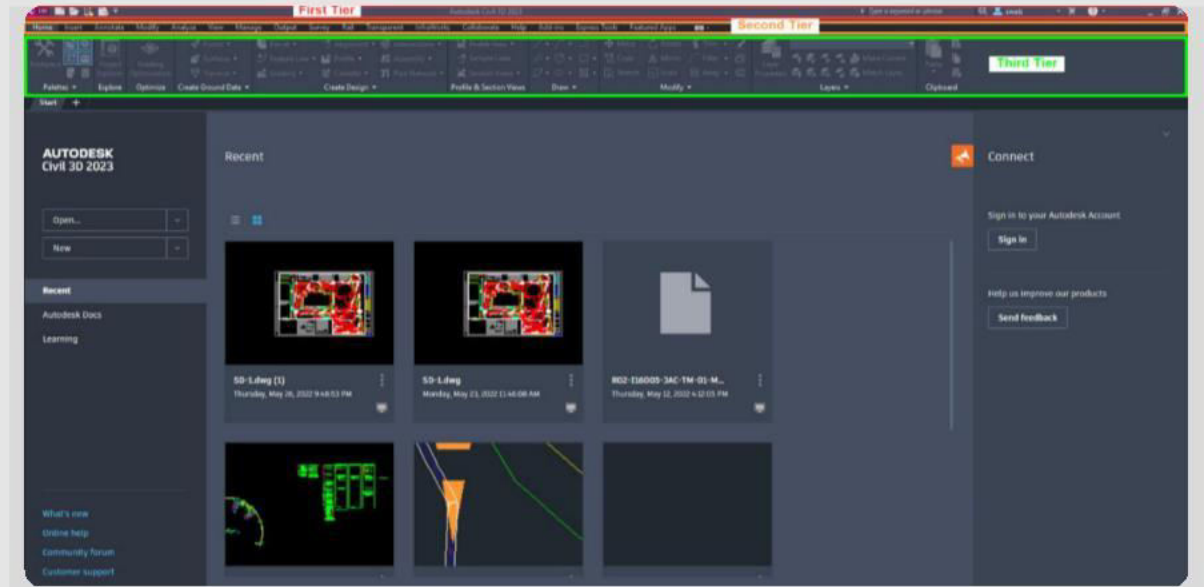
This module focuses on achieving in-depth proficiency in key software, ensuring a robust skill set for each tool.



AutoCAD Civil 3D

Develop skills in designing and documenting civil infrastructure projects.

Infrastructure



Progression to Integration Concepts

This section introduces the crucial concepts of integrating workflows, setting the stage for collaborative projects.



Cross-Software Coordination

Learn how different platforms interact to streamline design.



Common Data Environment (CDE)

Intro to shared digital spaces for collaborative project data

Month 1: Individual Software Mastery - Fundamentals

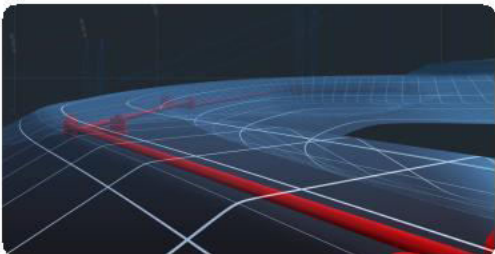
Key Objective for Month 1:

Master core functionalities for site modeling, basic structural analysis, and Building Information Modeling (BIM) across essential civil engineering software.



Week 1: AutoCAD Civil 3D

Terrain Modeling & Basic
Geometry



Interface Navigation

Points & Surfaces

Week 2: AutoCAD Civil 3D

Alignments & Profiles



Horizontal Alignments

Vertical Profiles

Grading

Week 3: STAAD.Pro

Structural Modeling &
Analysis



Interface & Geometry

Properties & Loads

Analysis Execution

Week 4: Revit

BIM & Basic Structure



BIM Principles

Architectural Elements

Structural Elements

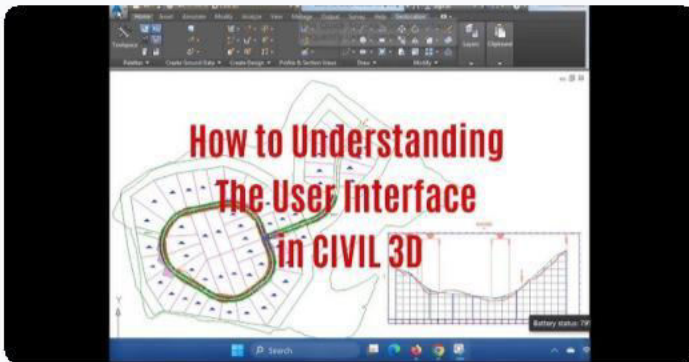
Month 2: Advanced Software Features & Integration Concepts

Driving Objectives for Month 2

Deepen Proficiency: Elevate existing skills by exploring the advanced functionalities and sophisticated features within AutoCAD Civil 3D, STAAD.Pro, and Revit.

Explore Advanced Design: Dive into complex design paradigms such as corridor modeling, advanced structural load combinations, and comprehensive BIM collaboration workflows.

Understand Data Integration: Grasp the critical concepts of data exchange and seamless integration between various software platforms, including shared models and worksharing.



Week 5: AutoCAD Civil 3D Corridors & Volumes

 **Assemblies & Corridors:** Designing complex linear infrastructure like roads



Week 6: STAAD.Pro Advanced Analysis & Design

 **Advanced Loading:** Applying complex conditions like moving wind and



Week 7: Revit BIM Collaboration & Family Creation

Week 8: Integration & Visualization Basics + Mini Project Scoping

Seamless Workflows: Bridging Software & Vision to enhance project delivery through integrated systems.

Data Exchange: Civil 3D & Revit

Understanding LandXML: Explore LandXML as the industry standard for civil data exchange, transferring surfaces, alignments, and critical design data between Civil 3D and Revit seamlessly.

Practical Applications: Learn to import/export terrain models and road alignments, ensuring design continuity and reducing errors.

Industry Standard

Data Continuity

Error Reduction

Project Collaboration Concepts

Common Data Environment (CDE): Understand the importance of a CDE like Autodesk Construction Cloud for storing, reviewing, and managing project models in context.

Integrated Documentation: Discuss strategies for

Revit to STAAD.Pro Integration

Understand the conceptual workflow for transferring structural models from Revit to STAAD.Pro for analysis and discuss solutions for maintaining data integrity.

Visualization & Rendering

Enhancing Realism: Master Revit settings for materials, lighting, and rendering to produce high-quality, photorealistic visualizations.

Dynamic Presentations: Create compelling walkthroughs and animations to effectively communicate design intent and offer bid-winning project visuals.

Phase 2: Industry Immersion & Integrated Project (Month 3 Offline)



Hands-On Project Application

Apply theoretical knowledge and software proficiency to tackle a comprehensive civil infrastructure project. This phase focuses on practical design challenges and real-world problem-solving to create a 3D model of a small civil infrastructure project.



Seamless Software Integration

Master integrating AutoCAD Civil 3D, STAAD.Pro, and Revit to create holistic project models. This emphasizes enhanced coordination and data flow within a common data environment.



Collaborative Team Environment

Practice collaborative workflows in a dynamic team setting, simulating real-world engineering projects. This fosters essential communication, collective problem-solving, and efficient task management.



Documentation & Visualization

Develop comprehensive professional documentation, including reports and drawings from integrated models. Create compelling visualizations and high-fidelity renderings to effectively communicate design intent.



Month 3: Capstone Integrated Design Project & Professional Practice

The Capstone Culmination: Real-World Civil Infrastructure Project

This month culminates your entire training, challenging you to independently apply all acquired knowledge and software proficiencies to design, analyze, and present a comprehensive 3D model of a small civil infrastructure project. This hands-on experience provides an invaluable opportunity to synthesize your learning into a tangible professional output.

Integrated Design & Analysis



3D Model Creation: Civil 3D & Revit Synergy

Leverage **AutoCAD Civil 3D** for site elements and integrate with **Revit** for detailed Building Information Modeling (BIM). This ensures a holistic, clash-free 3D representation.

BIM-driven Design

Site & Structure Integration

Precise 3D Modeling



Professional Deliverables & Practice



Visualization Generation: Impactful Presentation

Transform your 3D model into compelling visualizations. Generate high-quality images and animated walkthroughs to effectively communicate design intent and win stakeholder buy-in.

Photorealistic Rendering

Interactive Walkthroughs

Impactful Presentation



Structural Analysis:

Week 9: Project Kick-off & Integrated Modeling



Campus Arrival & Orientation

Welcome to the offline campus, marking the start of Month 3. Engage in a comprehensive orientation to the workspace, resources, and facilities. This in-person setting allows for immediate access to mentors and advanced resources.

Physical Immersion

Resource Access

Dedicated Workspace



Strategic Team Formation

Participate in team formation, designed to build cohesive groups mirroring real-world engineering teams. Each team is assigned a dedicated mentor for guidance, support, and critical feedback throughout the capstone project.

Collaborative Learning

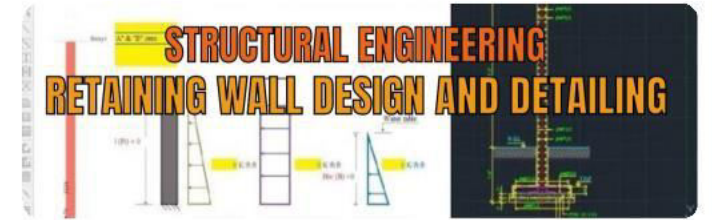
Expert Guidance

Peer Interaction



Capstone Mini Project Selection

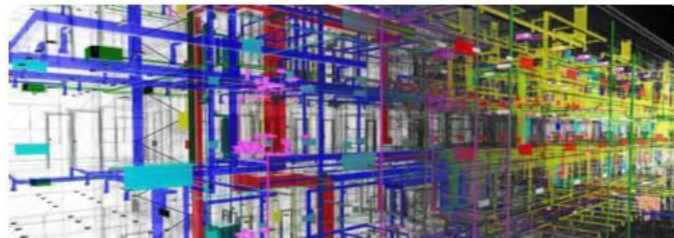
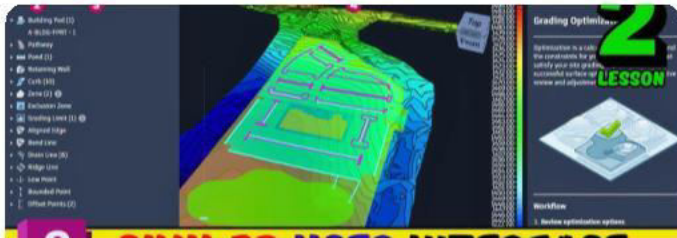
Select your Capstone Project from a list of relevant civil challenges such as a retaining wall, bridge substructure, or pump station. This selection will drive your integrated modeling efforts.



Practical Application

Real-world Scenarios

Scope Definition



Week 10: Structural Analysis Integration & Advanced Design

Bridging Design & Analysis: The Integrated Workflow

This pivotal week focuses on the crucial link between detailed modeling and rigorous structural analysis. You will master preparing models for analysis, performing comprehensive checks, and presenting findings through compelling visualizations.

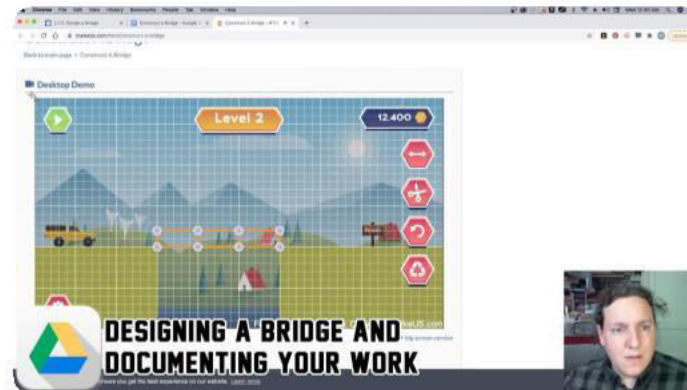
↔ Revit to STAAD.Pro Link: Analysis Model Preparation



→ Learn best practices for **exporting structural models** from Revit, ensuring data integrity for analysis.

→ Master techniques for **efficiently**

✖️ Structural Analysis in STAAD.Pro: Rigorous Design Checks



→ Apply various **load types** (dead, live, seismic) and generate comprehensive **load combinations** per building codes.

→ Execute advanced analysis and **perform**

📺 Visualization & Rendering: Impactful Model Presentation

→ Generate **high-quality images** and photorealistic renders, learning techniques for views, materials, and lighting.

→ Create immersive **walkthroughs** and animations that allow stakeholders to virtually navigate the integrated model.

→ Use visualization to aid decision-making, identify issues early, and secure project bids through compelling storytelling.

Photorealistic Output

Stakeholder Engagement

Week 11: Clash Detection, Documentation & Project Collaboration

Ensuring Model Integrity & Streamlined Project Delivery

This crucial week focuses on the vital aspects of validating design integrity, producing comprehensive project deliverables, and fostering real-time collaboration.

You will learn to identify and resolve conflicts within the model, generate all necessary professional documentation, and simulate collaborative workflows essential for modern civil engineering projects.



Clash Detection: Identifying & Resolving Conflicts

Revit Interference Check:

Master the **Revit interference check** functionality to systematically identify clashes between various model elements (e.g., structural beams intersecting with HVAC ducts). This proactive approach prevents costly errors during construction.

Navisworks Overview:

Gain an understanding of **Navisworks for advanced clash detection and coordination**. Explore its capabilities in federating models from multiple disciplines and running comprehensive clash tests across the entire project.



Professional Project Documentation

Generating Professional Drawings:

Learn to generate high-quality **professional drawings** directly from your integrated models. This includes detailed **plans, sections, elevations, and specific details** essential for construction and regulatory approvals.

Material Schedules & Quantity Take-offs:

Automate the creation of **material schedules and precise quantity take-offs** directly from the BIM model. This crucial skill supports accurate cost estimation, procurement, and project planning.

Accurate Deliverables

BIM for Documentation

Week 12: Project Showcase & Career Launchpad



Deep Dive: Design Choices

Articulate the key design choices made, explaining the engineering principles and iterative processes that led to your final design. Justify material selections, structural configurations, and site layouts.

Discuss unexpected challenges faced during design. Highlight how you adapted your approach and leveraged software capabilities to overcome hurdles, demonstrating critical thinking.



The Culmination: Your Final Integrated Project

This showcase is the ultimate demonstration of your skills. You will present your 3D model of a small civil infrastructure project, bringing together all learned software and workflows into a cohesive, professional output.

The presentation focuses on clarity, technical accuracy, and the ability to articulate complex design and analysis decisions. It's your opportunity to shine and present a tangible portfolio piece.

Model Walkthrough

Analysis Results

High-Fidelity Renderings

Comprehensive Documentation



Reflections: Integration & BIM

Detail the integration challenges encountered across Civil 3D, Revit, and STAAD.Pro. Share the specific solutions or workarounds implemented to ensure data consistency and model integrity.

Summarize the key BIM workflow lessons learned. This includes insights into effective worksharing, common data environments, and the benefits of an integrated process in enhancing project efficiency.



Career Launchpad: Empowering Your Future

Career Development Workshops

Empowering Your Professional Journey

Beyond mastering advanced software, true career readiness demands strong professional skills. This series of specialized workshops is designed to equip you with the essential tools and strategies needed to effectively present your capabilities, expand your network, and confidently navigate the job market within the civil engineering industry.

We bridge your technical expertise with the soft skills critical for success, ensuring you are not just a proficient engineer, but a compelling candidate ready for impact.

Resume & Portfolio Building

Tailored for Civil Engineering Professionals: Learn to craft powerful resumes and portfolios for **Civil Engineers, BIM Coordinators, & Structural Designers**, translating technical skills into industry achievements.

Showcasing Your Capabilities: Develop strategies to highlight your hands-on project experience, ensuring your application stands out to employers.

Industry-Specific

Project Highlight

Impactful Presentation

LinkedIn Optimization & Networking

Building Your Digital Presence: Master optimizing your **LinkedIn profile** to attract recruiters. Learn to effectively showcase your expertise and value in the digital realm.

Strategic Networking: Discover proven strategies for **building and leveraging your professional network**, turning connections into career opportunities.

Personal Branding

Connection Building

Visibility

Graduation & Certification



Your Achievement: Advanced Civil Design Tools Track

Comprehensive Mastery: Congratulations on the successful **completion of the Advanced Civil Design Tools Track!** Over the past three months, you have diligently navigated an intensive curriculum, mastering both foundational and advanced concepts in industry-leading civil engineering software.

Integrated Expertise: This program has equipped you with a comprehensive understanding of integrated workflows, from initial design and structural analysis to professional documentation and collaborative BIM environments. Your capstone project stands as a testament to your hands-on proficiency and problem-solving capabilities.

Program Completed

Integrated Proficiency

Certified Skills



Accelerated Professional Readiness

Industry-Aligned Curriculum: The Advanced Civil Design



Impact in Civil Engineering & BIM

Specialized Domain Expertise: You are now prepared to excel