Civil Engineering and Architecture Syllabus
2020-2021

Instructor: Orlando Montalvo
Phone: 580-5300 Ext 1435
Email: See website

Room: 405
Conference: 5th Block
Tutoring: Tuesday and Thursday (4:15pm- 5:00pm)

Course Description: In PLTW Civil Engineering and Architecture (CEA), students learn important aspects of building and site design and development. They apply math, science, and standard engineering practices to design both residential and commercial projects and document their work using 3D architectural design software.

Course Information: This is an engineering course and use of algebra- based math is required. The student must have pencils or pens, a scientific calculator, and an engineering notebook.

Course Outline: Instructional days will include: checking/reviewing assignments, quizzes, writing assignments, lecture/ explanation, hand-on activities and individual practice questions.

Textbook and Resources: PLTW website, PLTW PowerPoint presentations, notes, science/technology based videos and documentaries, internet, scientific periodicals, newspapers and other relevant media.

Instructional Procedures and Support: The teacher will be available for tutoring in the afternoon. It is the student's responsibility to ask for help when needed and for making the required transportation arrangements. Retesting will be available in accordance with SISD High School Grading Policies.

Classroom Management Procedures: District Policy Will Be Enforced.

Classroom Expectations: As per district policy major exams/assignments will count for 60% of the student's grade. Labs (reports), quizzes, and home/class work will account for the remaining 40%. All students will be given up to 3 additional days to redo a failing major assignment, but the grade will be no higher than a 70. All students will be given 3 additional days to make up a major assignment if late (with a progressive grade penalty of 10 points per day.)

Statement for Academic Dishonesty: Academic integrity is fundamental to the activities and principles of our school. No student shall cheat or copy the work of another. Plagiarism, the use of another person's ideas or writing as one's own without giving credit to the true author, will be considered cheating, and the student will be subject to academic discipline that may include loss of credit for the work in question.

Course Timeline

Unit	Lesson	Activity/Project	Tentative Week
Unit 1: Overview of Civil	1.1 History of Civil Engineering and Architecture	1.1.1 History of Civil Engineering and Architecture	1
		1.1.2 Design Principles and Elements	

Engineering and Architecture		1.1.3 Architectural Styles	
		1.1.4 Architectural Features	
	1.2 Careers in Civil Engineering and Architecture	1.2.1 This Is Your Career	2
		1.2.2 Design Charrette	
		1.2.2a Stakeholder Role	
Unit 2: Residential Design	2.1 Building Design and Construction	2.1.1 Wood Frame Systems	3
		2.1.2 Roof Systems	
		2.1.3 Utility Shed Design	
	2.2 Cost and Efficiency Analysis	2.2.1 Concrete Pad Estimate	4
		2.2.2 Shed Cost Estimate	
		2.2.3 Heat Loss and Gain	
	2.3 Residential Design	2.3.1 Affordable Housing Design	5
		2.3.2 Green Building and Sustainable Design	
		2.3.3 Designing for the Client	
		2.3.4 Adding Up to Green	
		2.3.5 Residential Foundations	6
		2.3.6 Residential Electrical Systems	
		2.3.7 Residential Site Planning	7
		2.3.8 Residential Water Supply	
		2.3.9 Residential Plumbing	8
		2.3.10 Wastewater Management	
		2.3.11 Calculating Property Drainage	
Unit 3: Commercial Applications	3.1 Commercial Building Systems	3.1.1 Keystone Library Renovation	9
		3.1.2 Land Use and Development Regulations	
	3.2 Structures	3.1.3 Commercial Wall Systems	
		3.1.4 Commercial Roof Systems	10
		3.1.5 Structural Efficiency	
		3.1.6 Commercial Floor Systems	11
		3.2.1 Structural Forms	
		3.2.2 Loads	12
		3.2.3 Beam Analysis	13
		3.2.4 Beam Analysis Shortcuts	

		3.2.5 Build a Beam	
		3.2.6 Beam Design	14
		3.2.7 Keystone Library Floor Framing Design	
		3.2.8 Foundation Types and Considerations	15
		3.2.9 Activity has been removed by PLTW	
		3.2.10 Keystone Library Spread Footing Analysis	
	3.3 Services and Utilities	3.3.1 Utilities	
		3.3.2 Plumbing	
		3.3.3 Wastewater Management	
		3.3.4 Commercial Electrical Systems	
		3.3.5 Activity has been removed by PLTW	
		3.3.6 Heating, Ventilation, and Air-Conditioning Systems	
	3.4 Site Considerations	3.4.1A Differential Leveling	
		3.4.1B Control Survey	
		3.4.2 Parking Lot Design	
		3.4.3 Soils Testing	
		3.4.4 Web Soil Survey	
		3.4.5 Storm Water Management	
Unit 4: Commercial Building Systems	4.1 Commercial Building Design Problem	4.1.1 Commercial Building Design Problem	
		4.1.2 4.1.2 Team Building	
		4.1.3 Property Description	
		4.1.4 Site Discovery	
		4.1.5 Activity has been removed by PLTW	
		4.1.6 Commercial Project Viability	
		4.1.7 Commercial Project Management	
	4.2 Commercial Building Design Presentation	4.2.1 Creating a Model	
		4.2.2A Commercial Building Design Presentation	
		4.2.2B Commercial Building Design Trade Show	