



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

DEPARTMENT: Applied Technology

COURSE: MET105- Computer Aided Design

Curriculum Development Timeline

School: Ocean Township High School

Course: MET105- Computer Aided Design

Department: Applied Technology

Board Approval	Supervisor	Notes
August 2023	Patrick O'Neill	Born Date
August 2024	Erin M. Leahy	Updated to include New State Mandates



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Township of Ocean Pacing Guide	
Week	Marking Period 1-2
1	REVIT: Interface
2	REVIT: Command Entry/Point Coordinates Entry
3	REVIT: Line Standards & Layers/View Tools
4	REVIT: Object Snap tools/AutoTrack/Multiview Drawings
5	REVIT: Text Styles/Text Placement tools/Modification tools
6	REVIT: Arraying & Patterning
7	REVIT: Grips/Other selection tools/Polyline/Spline
8	REVIT: Dimension Styles/Linear, aligned, angular dims
9	REVIT: Tables, Section views and Graphic Patterns
10	REVIT: Blocks: Creation & insertion, Blocks with attributes
Week	Marking Period 3-4
11	REVIT: Layout setup, Plotting Layouts
12	REVIT: Annotative Objects
13	REVIT: External References
14	REVIT: Introduction to 3D, UCS, Solid Primitives, Sheet sets
15	Final Project
16	Final Project
17	Final Project
18	Final Project



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19	Final Project
20	Final Project

Core Instructional & Supplemental Materials including various levels of Texts

Autodesk AutoCAD
Autodesk REVIT

Time Frame	Weeks 1-14
Topic	
REVIT	
Essential Questions	
What is REVIT? Why is it called REVIT? Who uses REVIT? What is REVIT used for? Why is REVIT used? What so REVIT and blueprints have in common? What is the similarities and differences between REVIT and other software such as INVENTOR? Who uses REVIT? What is BIM? What is the difference between BIM and blueprints? Why use BIM? Who uses BIM? When is BIM used? What are the pros and cons of BIM versus blueprints?	
Enduring Understandings	
Autodesk Revit is a building information modelling software for architects, landscape architects, structural engineers, mechanical, electrical, and plumbing (MEP) engineers, designers and contractors. Revit is, among many other things, used to implement 3D models of building products to scale in a project (BIM content). Doing so allows building professionals throughout an entire project lifecycle to better understand where specific products go and how they fit into the overall design.	
Alignment to Standards	
8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.	
8.1.12.AP.4: Design and iteratively develop computational artifacts for practical intent,	



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personal expression, or to address a societal issue.

8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.

8.1.12.AP.6: Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.

8.1.12.AP.7: Collaboratively design and develop programs and artifacts for broad audiences by incorporating feedback from users.

8.1.12.AP.8: Evaluate and refine computational artifacts to make them more usable and accessible.

8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.

8.2.12.ED.2: Create scaled engineering drawings for a new product or system and make modifications to increase optimization based on feedback.

8.2.12.ED.6: Analyze the effects of changing resources.

8.2.12.ITH.1: Analyze a product to determine the impact that economic, political, social, and/or cultural factors have had on its design, including its design constraints.

Learning Activities & Key Concepts and Skills

Using Autodesk REVIT, students will be able to create accurate BIM to engineering standards and test the output based on those specifications.

Assessments

Formative:

- Daily teacher observations and individualized student feedback.

Summative:

- Accurately use prescribed Autodesk REVIT tools. Obtain Autodesk certification.

Benchmark:

- Pre-test and post-test encompassing all class units.

Alternative:

- Daily teacher observations and individualized student feedback.

Career Education



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CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP4. Communicate clearly and effectively and with reason.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP11. Use technology to enhance productivity.

21st Century Skills

9.2.12.CAP.6: Identify transferable skills in career choices and design alternative career plans based on those skills.

9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).

9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).

9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).

9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specific task (e.g., W.11-12.6.).

9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments.

Interdisciplinary Connections

RI.MF.11-12.6. Synthesize complex information across multiple sources and formats to develop ideas, resolve conflicting information, or develop an interpretation that goes beyond explicit text information (e.g. express a personal point of view, new interpretation of the concept).

SL.PI.11-12.4 Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience.



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SL.UM.11-12.5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

Technology Integration

- Students will use REVIT to collaborate and work towards solving authentic problems.
 - 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a)
- Students will use Google Classroom to collaborate, work towards sharing and evaluating REVIT tutorials, submitting and evaluating classwork and/or participate in an online classroom discussion.
 - 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem (e.g., 7.1.AL.IPERS.6)



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Time Frame	15-20
Topic	
FINAL PROJECT	
Essential Questions	
How can the skills learned by students throughout the course be used? Can students produce BIM that is of an engineering standard capable of producing an accurate product?	
Enduring Understandings	
BIM is a 21st century skill required by future Engineers and the design field. In order to create or evaluate products, factories and contractors use BIM to precisely construct the professional's vision.	
Alignment to Standards	
8.1.12.CS.1: Describe ways in which integrated systems hide underlying implementation on details to simplify user experiences. 8.1.12.CS.2: Model interactions between application software, system software, and hardware. 8.1.12.CS.3: Compare the functions of application software, system software, and hardware. 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors. 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms. 8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables. 8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice. 8.1.12.AP.4: Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue. 8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects. 8.1.12.AP.6: Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. 8.1.12.AP.7: Collaboratively design and develop programs and artifacts for broad audiences	



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by incorporating feedback from users.

8.1.12.AP.8: Evaluate and refine computational artifacts to make them more usable and accessible.

8.1.12.AP.9: Collaboratively document and present design decisions in the development of complex programs.

8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.

8.2.12.ED.2: Create scaled engineering drawings for a new product or system and make modifications to increase optimization based on feedback.

8.2.12.ED.5: Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).

8.2.12.ED.6: Analyze the effects of changing resources.

8.2.12.ITH.1: Analyze a product to determine the impact that economic, political, social, and/or cultural factors have had on its design, including its design constraints.

8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.

Learning Activities & Key Concepts and Skills

Using Autodesk REVIT, students will be able to create accurate BIM to engineering standards and test the manufactured output based on those specifications.

Assessments

Formative:

- Daily teacher observations and individualized student feedback.

Summative:

- Successfully applying course concepts to completing a coherent and detailed set of BIM and manufacturing files.

Benchmark:

-

Alternative:

- Daily teacher observations and individualized student feedback.



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SL.UM.11-12.5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

Technology Integration

- Students will collaborate and work towards developing and creating a developed solution to an authentic problem using the tools, materials, and knowledge from this class and integrating any cross content as they see fit.
 - 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a)
- Students will use Google Classroom to collaborate, work towards solving authentic problems, or participate in an online classroom discussion.
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Modifications (ELL, Special Education, At Risk Students, Gifted & Talented, & 504 Plans)

ELL:

- Work toward longer passages as skills in English increase
- Use visuals
- Introduce key vocabulary before lesson
- Teacher models reading aloud daily
- Provide peer tutoring
- Use of Bilingual Dictionary
- Guided notes and/or scaffold outline for written assignments
- Provide students with English Learner leveled readers.

Supports for Students With IEPs:

- Allow extra time to complete assignments or tests
- Guided notes and/or scaffold outline for written assignments
- Work in a small group
- Allow answers to be given orally or dictated
- Use large print books, Braille, or books on CD (digital text)
- Follow all IEP modifications

At-Risk Students:

- Guided notes and/or scaffold outline for written assignments
- Introduce key vocabulary before lesson
- Work in a small group
- Lesson taught again using a differentiated approach
- Allow answers to be given orally or dictated
- Use visuals / Anchor Charts
- Leveled texts according to ability

Gifted and Talented:

- Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles)
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Organize and offer flexible small group learning activities
- Provide whole group enrichment explorations



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- Teach cognitive and methodological skills
- Use center, stations, or contracts
- Organize integrated problem-solving simulations
- Propose interest-based extension activities
- Expose students to beyond level texts.

Supports for Students With 504 Plans:

- Follow all the 504 plan modifications
- Text to speech/audio recorded selections
- Amplification system as needed
- Leveled texts according to ability
- Fine motor skill stations embedded in rotation as needed
- Modified or constrained spelling word lists
- Provide anchor charts with high frequency words and phonemic patterns