Architectural and Engineering Design (IND252, 352, 452, 552, 553, 554, 555)

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| CIP Code: | 151302 |
| State Course Code: | 21107 |
| Content Area Code: | 121 |
| Instructor: | Mr. Miyoshi |
| Phone: | 425.844.4800 |
| E-Mail: | MiyoshiM@RSD407.org |
| Books: | *Mechanical Drawing* Ninth Edition by French, Svensen, Helsel, & Urbanick  *Architecture: Drafting and Design* by Hepler and Wallach  *AutoCAD and Its Applications* by Shumaker, Madsen, & Saufley  *Rhinoceros* User’s Guide  Other supplemental material as needed |

Online Resources: <https://rsd407-my.sharepoint.com/:f:/g/personal/redwolf_rsd407_org/EgbH8Oo45mBJkG7Ib3mJxhwB2ROllDlGU60N2Le7_0K6Gg> [Note: You must use your rsd407 login credentials to get access to these resources.]

(no login credentials needed to access public GitHub resources)

<https://github.com/MichaelTMiyoshi>

<https://github.com/MichaelTMiyoshi/DesignWithMiyoshi>

**Student Provided Materials and Class-use Fee**

Students should provide their own brains and enthusiasm. All tools will be provided by the school and may be checked out to the students for during the semester. The class-use fee pays for the materials used by the students for the class including one small 3D printed project. Other three-Dimensional print jobs must be paid for before models are printed.

**Class Objective**

The objective of Engineering Design is to give the students exposure to, and to stimulate interest in the working environment of the engineering field while providing the students with an opportunity to acquire beginning drafting, modeling, and engineering skills.

**Class Expectations**

Engineering Design is a year-long class for those who have an interest in drafting, engineering, or related fields. It is expected that the student who takes this class will obtain certain skills and knowledge important to those entering these fields. The skills and knowledge that the student will receive are listed as competencies. These competencies will be demonstrated by the students through a variety of assignments and tests and through their daily performance in class.

**Attendance Policy**

The core content of the class will be mechanical drafting and Computer-Aided Drafting (CAD). Because not all students have access to the tools of either types of drafting, most of the work will be done during the class period. This makes class attendance extremely important. Students with an excused absence may make up the work for the class.

**GitHub**

GitHub is a professional tool used for source control and sharing projects. It is especially useful when changes are being make to projects both for archival purposes and for a history of what has been done. It is also useful for backing up projects. Students will find it a handy tool when moving from computer to computer. It is recommended that all students get a GitHub account and use it to sync with their local projects. Students should make private repositories and make the instructor a collaborator on class-related repositories. It is suggested that GitHub Desktop be used to sync and archive architectural and engineering projects (and Unity projects).

**Tardy Policy**

Roll will be taken and the school policy will be followed.

**Dress Code and Language**

The classroom should be considered the workplace for the students, and appropriate attire and language in the workplace is important. To help solidify these concepts, the Cedarcrest High School dress code will be observed at all times. Further, clothing with spaghetti straps or that show the midriff (belly) are specifically forbidden. Clothing that shows a student’s underwear is also forbidden. Clothing with drug, alcohol, gang, and/or hate related symbols or messages are also forbidden. Students will first be asked to change or cover the offending clothing described in the student handbook, above, and/or as deemed inappropriate by the instructor. Students who are continually asked to change or cover offending clothing will be marked tardy for the day when asked to change attire and are subject to the tardy policy. They will also be subject to penalties in the professionalism grade. Foul language is not permitted in class. Violators of the foul language policy are subject to the school disciplinary measures and the professionalism standards.

**Artificial Intelligence (AI)**

Artificial Intelligence is becoming an increasingly big (and arguably important) part of life these days. But it must be used with caution in education. As such, there is a new AI policy at Cedarcrest High School that will be adhered to in the architectural & engineering design classes as well.

AI is not necessarily easy to detect in designs or design documents. However, authorship is. Just as every writer has a unique style of writing, so it is that every designer has a definite style of designing. Which is why students will be asked to explain their designs, in documents and orally. When they are not able to explain their own designs, something is amiss. Whether that something is AI or not can have far reaching consequences, especially since the school AI policy is cumulative through a student’s entire high school career. There is a big difference between getting 75% maximum (without the opportunity to redo it) because you cannot explain a project and having one of your AI strikes levied against you because you had AI create your project or do your documentation.

**Grades**

Grades will be determined by the following weighting of five categories:

1. **Professionalism (10%; Advanced 10%)** – Professionalism is an important part of the class. Aspects already mentioned such as dress, language, and attendance are important. As such, professionalism is evaluated each day. Four points are available each day. Any absence except school-related will receive no points until students make them up. Students who do not make up these professionalism points within a week are only eligible to make them up for 75% (3/4) of the points. Students who are tardy will receive 2 of the 4 points. Students who are disruptive, sleeping, playing games, swearing, etc. will receive 0 points and will not be allowed to make them up. All the above is to say that students who treat the class as a job ought to earn all of their professionalism points each day they are present.
2. **Leadership/Professional Development (15%; Advanced 15%)** – Each student will be given a list of activities in which he or she may participate for points. These activities range from leading the class in the flag salute to attending a national leadership conference. Students should also consider joining TSA, DECA, FBLA, WCTSMA, FFA, or other Career and Technical Student Organizations (CTSOs) for leadership and competition opportunities. Leadership points are accumulated throughout the school year.
3. **In-Class Assignments (20%; Advanced 0%)** – Students are given in-class assignments to help them master the content and skills of the class. These assignments may be in the form of tests (different from competency tests) or short design problems that they will be required to finish in a short time period, sometimes by hand.
4. **Competencies (20%; Advanced 20%)** – As the students learn skills, they will be asked to perform practical timed tests. These tests are merely models and drawings that must be completed in a class period at a certain skill level. Beginning students may retake competency tests, however, they may not take any test twice in the same day or on the day the test is scored. (Advanced students’ competencies are self-evaluated.)
5. **Project (35%; Advanced 55%)** – Students will create projects for much of their grades. This means that the application of the knowledge and skills they are gaining are what is most important. Beginning projects are done individually or in groups, depending on the project. Advanced students may create projects individually or in groups depending on the project. Students beyond the beginning level cannot earn an A grade for the class unless they complete at least one group project. Advanced students must also complete a “solve a world problem” project. Advanced students are graded on their body of work. This body of work must be of high quality and sufficient quantity to receive high marks. This quality and quantity may be different for different students depending on the skill level they are currently at.

The weighted average of the above categories is taken and the aggregate score is assigned a grade as shown in the following chart.

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| **Percentage** | **Grade** |
| 93.00 | A |
| 90.00 | A- |
| 87.00 | B+ |
| 83.00 | B (Tech Prep students must earn a B or better to receive college credit.) |
| 80.00 | B- |
| 77.00 | C+ |
| 73.00 | C |
| 70.00 | C- |
| 67.00 | D+ |
| 60.00 | D |
| 0.00 | F |

Even though the class is a year-long course, the grade earned at the semester is a final grade and will not be changed if the student earns a higher grade in the second semester.

Project Note: The following list of example projects may be used as a starting point for students once they get to the point in the class when they get to choose their own projects:

1. TSA state and national competitions (<http://www.tsaweb.org/>)
2. Imagine Tomorrow (<http://imagine.wsu.edu/>)
3. Real World Design Challenge (<http://www.realworlddesignchallenge.org/>)
4. Construction Challenge (<http://www.constructionchallenge.org/>)
5. (First Robotics)

Consideration for projects not on the list will be considered on a case to case basis.

**Minimum Grades**

Minimum grades may be earned only in the competency category. If students have done work in the assignments and/or project sections that demonstrate skill in the required area(s), they will receive a minimum of 50% score for any competency test they have demonstrated the skill. Students receiving zeroes in any category (especially the competency category) are not doing enough relevant work to receive credit.

This minimum grade only applied to the competency category. All other categories accumulate points toward the students’ grades.

**Turn In Policy**

I believe all students can learn given enough time, but I also believe that students must be given realistic time-frames in which to operate. To help with each of these conflicting objectives, students will be held to certain times for turning in assignments. With few exceptions, all assignments can be turned in for full credit within two weeks of their dates in the gradebook. Competency tests must be taken within two weeks of the due dates in order for students to be eligible to retake the tests for full credit. If students have not taken a competency test after two weeks from the due dates, students may only take competency tests for a maximum of 75% of the possible points.

**Computers**

Computers are an important tool for the Engineering Design class and must be treated as such. Students who misuse computers, especially by altering system files, introducing viruses, creating/downloading inappropriate drawings or files will receive the appropriate sanctions as outlined in the school computer use and internet agreement. This may include exclusion from the use of computers and subsequent failure of the class. All students enrolled in Engineering Design must have on file a current signed computer use agreement.

**Dual Credit – College Credit and Careers Network**

You can receive inexpensive Community/Technical College credit. To receive the credit, you must:

1. Be enrolled in a Dual Credit high school class (Arch and Engr Des I, II, III)
2. Register on line for the Dual Credit program (https://www.ctesers.org/Home)
3. Pay the registration fee
4. Receive a B grade or higher!

**Competency Lists**

The following competencies are the skills that students are expected to gain when they take Architectural and Engineering Design. The numbers come from different guiding agencies and show what level of difficulty. Students in beginning classes will learn the competencies with numbers starting 111 and 131 (and may even learn advanced competencies). Advanced students will enhance these competencies and learn those starting with 132 in the second year and 300 in the third year. Students will learn these competencies using Autocad, Rhino, and/or SolidWorks.

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| **Understands Terms and Uses Equipment Properly:**  **11101** Understands drafting equipment and use. |
| **Sketches and Uses Orthographic Skills:**  **11103** Understands basic orthographic skills as shown by completion of assignments.  **13119** Identifies and utilizes lines and surfaces throughout adjacent orthographic views |
| **Sets Up CAD Software and Drawings:**  **13101** Starts, boots, and runs CAD software  **13102** Saves and manipulates files in computer environment  **13103** Selects appropriate units of measurement for drawings  **13104** Sets up the drawing environment (units, limits, grid, and snap)  **13105** Creates and uses layers to organize information in a drawing  **13106** Selects appropriate linetypes |
| **13207** Arranges multiple views of a figure on screen at one time  **13210** Places XYZ drawing axis to best advantage on 3D drawings  **13212** Sets up drawings to use in shading and rendering programs |
| **Draws Geometric Entities:**  **11102** Show proficiency of lettering, sketching, construction geometry, scaling, and line conventions as shown by completion of assignments.  **13107** Accurately creates geometric entities (line, arc, circle, etc.)  **13108** Precisely attaches entities to existing geometric entities (o-snap) |
| **13203** Digitizes an existing drawing to CAD  **13205** Draws 3-dimensional mesh figures  **13206** Uses point filters to locate points in space  **13208** Sets and uses elevation (or Z) and thickness to create simple 3D figures |
| **30002** Models on other than the world plane  **30005** Creates models full scale  **30006** Creates simple surfaces and solids  **30007** Creates surfaces from polylines  **30008** Creates solids from surfaces  **30009** Creates surfaces from solids  **30018** Imports and exports drawings/parts  **30020** Uses layers to organize models |
| **Uses Part Libraries:**  **13110** Groups drawing elements together (block, wblock)  **13111** Utilizes symbol libraries (insert, scale) |
| **Annotates and Plots Drawings:**  **13112** Adds text information to the drawing (text)  **13113** Dimensions drawings to ANSI standards  **13114** Scales and plots drawings to plotter and printer |
| **13213** Creates files to use in machining programs |
| **30014** Creates scenes with lighting  **30019** Uses object properties and textures  **30021** Changes rendering options  **30022** Plots drawings  **30023** Renders models  **30024** Uses appropriate rendering techniques  **30025** Creates appropriate renderings |
| **Creates Special Views:**  **13115** Draws section views. Uses ANSI standard hatch patterns.  **13117** Creates lines and arcs of varying widths  **13118** Draws pictorial views |
| **13209** Controls unneeded lines for 3D figures |
| **Modifies Drawings:**  **13109** Edits existing drawing (erase, trim, stretch, move)  **13116** Modifies or creates chamfers, fillets, and rounds |
| **30010** Performs point editing  **30011** Performs Boolean operations  **30012** Performs rail sweeps  **30013** Performs splits and trims  **30015** Applies planar curves to surface  **30017** Arrays elements (curves, surfaces)  **30026** Blends surfaces |