**CAD 262 3D Printing (3 credits)**

|  |  |  |
| --- | --- | --- |
|  |  |  |
|   | **Long Title:** | **3D Printing/Additive Manufacturing** |
|  |  |  |
|  |  | **Provides the student with the ability to blend the virtual and real design worlds together through the use of 3D Scanning, 3D CAD Modeling, and 3D Printing.** |
|  |  |  |

NOTE: At RRCC we use AutoCAD software to teach this course.

**STANDARD COMPETENCIES:**

**1.  Identify the materials used in the construction of printed 3D models given the technology provided.**

**2.  Establish proper safety requirements per the technology and materials used.**

**3.  Compare and contrast different 3D printers used in the industry.**

**4.  Capture reality with 3D Scanning.**

**5.  Generate 3D model files using STL, VRML, WRL, DFX, RVT, MAX, DWG, etc file formats**

**6.  Produce a basic 3D model using AutoCAD, Solidworks, Revit or 3D Max modeling techniques.**

**7.  Analyze the strengths of models printed in various linear angles.**

**8.  Construct models with varying thicknesses to analyze strengths and weaknesses of 3D models.**

**9.  Create and print a model in various scales.**

**10. Render and edit a 3D model using the 3D printer software provided.**

**11. Design and create advanced 3D software generated models in various CAD software programs.**

**TOPICAL OUTLINE:**

**I. Materials**

**a. Thermoplastics (e.g. PLA, ABS)**

**b. Metal Alloys**

**c. Gypsum**

**d. Paper/Foil/Film**

**e. Photopolymers**

**II. Safety**

**III. Types of 3D printers**

**a. Extrusion**

**b. Granular**

**c. Laminated**

**d. Light Polymerised**

**IV. Techniques for 3D Scanning**

**a. Contact**

**b. Non-contact active**

**c. Non-contact passive**

**V. File types**

**a. Color vs monochrome models**

**b. Software compatibility**

**VI. Basic 3D solid modeling**

**a. Use of various software programs**

**b. Create basic models**

**VII. Strengths of linear angled models**

**a. Create basic models and analyze the strengths of the models**

**b. Print models horizontally and vertically and at various angles to analyze the strength of the prototype**

**VIII. Strengths and weaknesses of models**

**a. Print parts with varying thicknesses to analyze strength**

**IX. Scales of models**

**a. Produce varying scales of models**

**X. Editing models using 3D printer software**

**a. Export models into 3D printer software to render**

**b. Export models into 3D printer software to edit (scale, extrude, thicken)**

**XI. Design and creation of an advanced model**

**a. Create an advanced 3D model using advanced CAD software and 3D printer software techniques**

**b. Excavate the model/part**

**c. Clean the model/part**

**d. Dip the model or spray the model using required modeling preparation and finalization**

**e. Clean and dispose of unused materials**

CAD 202 (3) and CAD 262 (3) are the old EGT 231: Drafting and Design Mech II

**CAD 202 Computer Aided drafting / 3D (3 credits)**

Projects for CAD 262 are the same as we use in EGT 231, or similar in complexity.