

Bergen Community College

ASSESSMENT REPORT FORM FOR ACADEMIC PROGRAM

Assessment Period: 2014-2015

Department/Program: IDT – Industrial & Design Technologies, Drafting & Design Program

Department Chair: Prof. Matt King (Term ended 12/14), Emily Vanderlovsky (current ADC)

Department Assessment Liaison: Prof. Matt King

Date Submitted: 6-25-15

❖ **Program Description or mission/goal statement of the Department/Program:**

To produce qualified design-draftspersons who, in support of architects, engineers or contractors, in diverse technical fields will be able to communicate design information by conventional pencil and sketch drafting, computer aided drafting, and oral communication.

❖ **Program Learning Goals/Outcomes:**

1. Read and create multi-view mechanical and architectural drawings compliant to industry standards.
2. Demonstrate effective time management responsibility by completing projects with assigned time constraints.
3. Develop drawings using Computer Aided Drafting software and add-on software packages. Outcome being portfolio drawings from final project assignments.
4. Illustrate pictorial axonometric and perspective drawings using pencil techniques, CAD and related software by production of assignments and projects.
5. Solve basic descriptive geometry engineering problems including measuring translation between imperial and metric.
6. Implement common presentation software used to further enhance CAD rendered images.
7. Design basic residential and commercial structures and their related systems through the production and presentation of their designs.
8. Describe contractual guidelines for building codes, zoning codes, and handicap facilities through assignments and exams.
9. Estimate basic residential construction costs through assigned class projects.
10. Analyze structural designs by completion of exercises and exams.
11. Defend in a simulated professional setting, the decisions made in developing ones individual designs via classroom presentation.
12. Our graduates are able to communicate orally the nature of the contents of one's portfolio, in proper technical terminology through classroom presentations to instructors.
13. Our graduates can identify methods of design technology such as rapid-prototyping, reverse engineering and model making.

SEMESTER 1: CREATING PROGRAM-LEVEL ASSESSMENT PLAN

1. Program Learning Goal(s) or Outcome(s) to be assessed (from the above section):

PLG4: Illustrate **pictorial axonometric** and perspective drawings using pencil techniques, CAD, and related software by production of assignments and projects.

2. Means of Assessment:

The assessment will use a two drawing assignments from DFT-207 and its prerequisite DFT-107 following a newly expanded and enhanced lesson plan in Isometric Drafting. This graded drawing assignment, as outlined in the DFT-107 Drafting I syllabus, is one of 12 assignment drawings given during the semester comprising 70% of the final grade.

SEMESTER 2: DEVELOPING ASSESSMENT TOOL (s) and TIMELINE

3A. Describe or attach assessment tool (s), including sources of data, timeline for data collection and how data will be analyzed.

This assessment report spans two semesters; Fall 2014 and Spring 2015.

In Fall 2014, a DFT-107 Drafting I lecture topic titled "Isometric Drafting" will be modified for all seven sections and a new drawing assignment given to students. The Fall 2014 portion of the assessment will show results of the graded drawings from this new assignment.

In the Spring 2015, an existing, unaltered assignment given in DFT-207 Drafting II will be analyzed. Historically, students perform poorly on this assignment due to underdeveloped skills. The results will show whether this modified lecture and drawing assignment in Drafting I result in improvement to this assignment.

3B. Desired results faculty would like to see. (Note: the points below are all within the "Technical Accuracy" portion of the basic rubric):

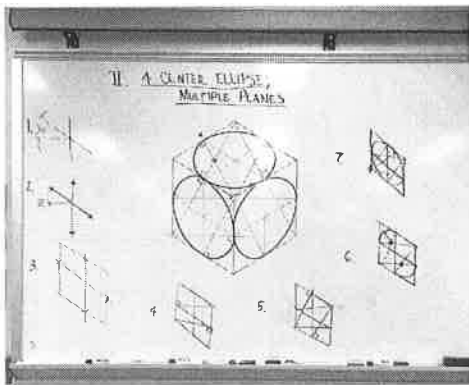
The desired results the faculty would like to see, based upon the rubric established (1 = poor, 4 = excellent) is a 3.0 or B. This rubric was used on the four categories below when grading each student drawing for the Drafting I isometric assignment.

1. Ellipses are oriented correctly for each plane
2. Evidence of proper ellipse development using construction lines and drafting compass.
3. Proper line weights of ellipse outline and construction lines.
4. Correct placement of overall dimensions in each Isometric plane.

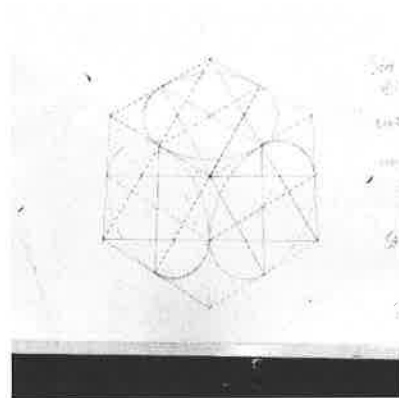
SEMESTER 3: COLLECTING AND ANALYZING DATA

4. Summary of Results (attach aggregated data table, survey tool, etc., to support the summary)

The expanded lecture included students creating a four center ellipse in each of the three planes (see below left). In previous lectures, only a single top plane ellipse construction was presented, and a top plane ellipse assignment was given, followed by a top plane problem on the exam. In DFT-207 Drafting II, there is an advanced Isometric lecture (and assignment) requiring multiple plane ellipses. The results are typically unsatisfactory. This exposes visualization weaknesses that need to be improved. The illustrations below show the expanded marker board drawings created during the lecture (left) and each student's lecture drawing (right) that followed the marker board drawings.

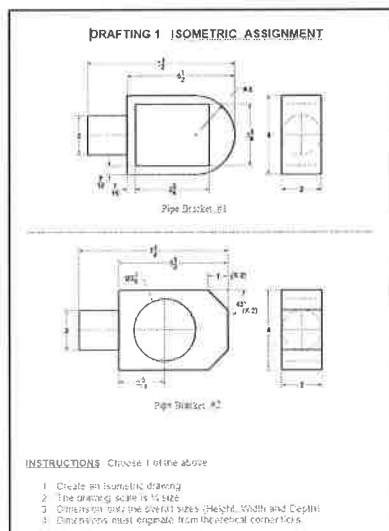


Marker Board drawing during lecture

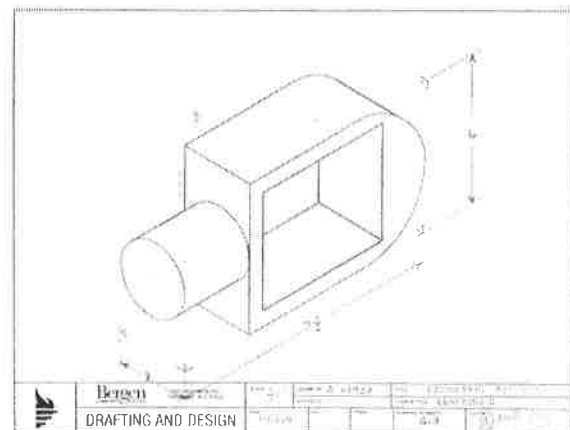


Each student's drawing during lecture

The assignment, (see below left), and an example of a completed students work (see below right), required ellipses in two of the three planes:



Assignment given (choice of two)



Example of completed student work

Data Planning:

In planning the expanded Isometric lecture, there were five instructors consisting of both Full time and adjuncts (Full-time: Prof. Matt King, Prof. Vince Benanti, Adjuncts: Steve Palladino, Mike Lee, and Cesar Parra) teaching seven total sections of Drafting I for this assessment. We all discussed and agreed upon the delivery of the three plane ellipse demonstration and the assignment (above left) was developed from the input of all instructors. The graded results were photo-copied by each instructor and submitted together at the end of the semester for analysis. The returned graded drawings from the seven sections consisted of a total of 70 drawings for this assessment. These 70 drawings represented all of the Drafting I students enrolled in the seven sections for the Fall 2014 semester. (See attached packet for the collected 70 student drawings.)

Results: (rubric: 1=poor, 4= excellent)

A. Fall 2014 Drafting I – Expanded Isometric Lecture & Follow up assignment

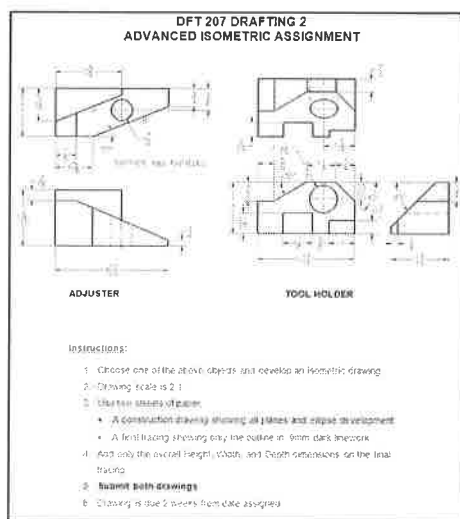
Total Number students for Isometric assignment: 70

Average Grade for all students: 3.43 or B+

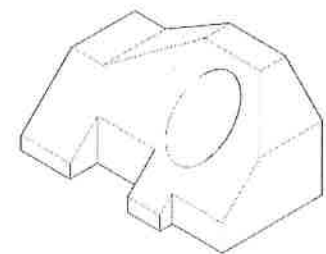
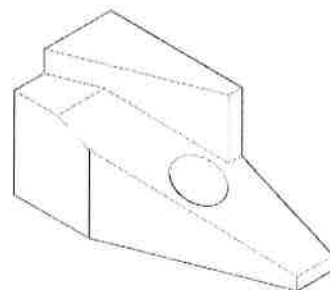
Desired Goal of outcome: 3.0 or B

From the 70 students, the total average grade for the above assignment was 3.43 or B+. This is a very satisfying number as agreed by the instructors. However, the real proof comes from the next level (Drafting II) with the Advanced Isometric assignment problem containing multiple plane ellipse requirements.

B. Spring 2015 Drafting II – Advanced Isometric Assignment (see example below).



Example of Advanced Isometric Assignment



Completed Examples of Advanced Isometric Objects

Results: The results below show the assignment grades taken from the graded roster sheets for the Fall 2014 and Spring 2015 semesters. The rubric used for grading these assignments is the same used for DFT-107 Drafting I students, i.e., the “Technical Accuracy” category as described above in 3B: (Rubric: 1 = poor, 4 = excellent)

(13 Students total) Average Grade of Advanced Isometric assignment - **Fall 2014 (This is before enhanced Isometric Lecture): 2.8 or B-**

(14 students total) Average grade of Advanced Isometric assignment - **Spring 2015 (after enhanced Isometric Lecture): 3.07 or B**

Desired Goal of outcome: 3.0 or B

The pool of Drafting II students was significantly smaller, therefore results may be more easily skewed. There is only one section of Drafting II per semester and in the Fall 2014 section, there were 13 students resulting in an 2.8 average. These students did not receive the enhanced Isometric lesson and assignment. The Spring 2015 semester had 14 students resulting in an 3.07 total average. These students did receive the enhanced Isometric lesson and assignment the previous semester.

SEMESTER 4: CLOSING THE LOOP AND SHARING KNOWLEDGE

5. Recommendations for Improvement:

A meeting should be arranged during the first week of the Fall 2015 semester to meet with faculty of upcoming Drafting I sections and review these results. This collaboration will likely result in further improvements of the lesson and assignment. The group should suggest an exam problem that will help reinforce the multi plane ellipse concept.

The students in Drafting II will likely need additional review and practice of the concepts for further reinforcement. We should include the construction of the multiplane ellipse process in the Advanced Isometric lecture. The Isometric problem on the final exam should also be revised to align with the multiplane ellipse process.

6. Use of Results:

We are pleased with improvements made with the Drafting I assignment. Faculty teaching the class should continue with the enhanced lesson and are encouraged to create more effective variations of the assignment for each semester.

We are not pleased with the marginal improvement from 2.8 to 3.07 resulting from the Advanced Isometric assignment of Drafting II students. Granted, these results are from a much smaller pool of 13 students verses 70 students from the Drafting I classes, and results can be easily skewed with a couple of good or bad grades. Still, the program will implement further emphasis of Isometric plane and ellipse plane development in Drafting II as described above in the recommendations for improvement. This improved conceptualization skill will translate to all other areas of design and drafting and help with the overall success of the student.

Explanation of Fall 2014 Drafting I Assignment

It is important to understand that the modified Isometric lecture and the follow up assignment drawing focused upon in the Fall 2014 semester is the eighth of the twelve drawing assignments. All of the semesters drawing assignments have a grading rubric which is handed out with the first assignment and has four points of assessment (1= poor, 4 = excellent, Note: half points may also be used, example, .5, 1.5, 2.5, 3.5) which will make up the total assignment grade:

DRAFTING I: ASSIGNMENT #2

MULTIVIEW DRAWING

DRAWING - 1

DRAWING - 2

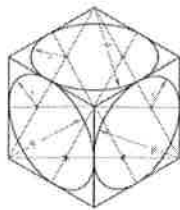
Instructions:

1. Choose ONE of the above objects.
2. Using the 9x12 BCC Drawing Vellum, create a Front, Top, & Right Side View.
3. Drawing must be to the exact size specified by the dimensions above.
4. Do not draw any of the dimension labels.
5. Leave all construction lines (and the line at a 45 degree angle), but they should be light!
6. Drawing is due next week.

Grading Rubric:

- Handed in on time
- Technical accuracy
- Lineweight quality
- Completeness/quality (penmanship) of lettering in titleblock

The assessment for the new Isometric Drafting I drawing assignment focus only on one category above - Technical accuracy". The other three categories above are typically quite developed by eighth assignment of the semester. The "Technical accuracy" category differs for each lesson topic and assignment given. For this particular topic, it is for Isometric ellipse and plane development. Isometric drafting is a sub category of Axonometric drawings which are three-dimensional drawings commonly used to communicate designs. Within the Isometric drawings, there are three possible planes for an Isometric ellipse to be drawn (see below - Left, Top, and Right) and the drafter must understand the orientation of the planes to determine the ellipses development. Lack of understanding of this capability has a direct correlation to poor conceptualization skills by the student.



Left, Top, and Right Plane Isometric Ellipses

Good conceptualization and visualization capability is a primary, fundamental skill necessary for any design and design related career. It can be a difficult skill to acquire, however, with practice, the skill will improve. Our approach to improve this skill is by expanding the Isometric lecture to give the students more exposure and practice to develop the ellipses within each of the three planes during the hands-on lecture then administer a drawing assignment which challenges the student to create a isometric drawing requiring an ellipse in multiple planes. Previously, we only focused upon requiring a top plane ellipse. Any time an assignment requiring a drawing containing an ellipse in other than the top plane, the majority of the students were unable to perform this task. This problem carried into upper level classes, especially DFT-207 Drafting II where advanced Isometric assignments are given and multiple plane ellipses are expected to be mastered.