

## CTE Program Review

Program Name: **Drafting Technology**

Program Contact: **Vorobey, Lilya**

Academic Year: **2016-2017**

Status: **Submitted for review**

Updated on: **10/28/2016 11:54 PM**

### 1. Description of Program

Provide a brief description of the program and how it supports the college's [College Mission and Diversity Statements](#), [CSM Strategic Goals 2013/14 to 2015/16](#), and other [Institutional Program Planning](#) as appropriate. What is the program's vision for sustaining and improving student learning and success over the next three years?

Drafting is common to all manufacturing and construction activities. The drafter interprets the engineer's, architect's, interior designer and industrial designer's ideas, presenting them in the language of manufacturing and construction. The Drafting Technology Program courses are designed as project based learning that educates a diverse student population that includes engineers, designers, architects, fabricators, contractors as well as students interested in fields of study that require CAD/CAM programs.

The CSM Drafting Department offers three distinct sequences for students. Which sequence a student selects depends on their career technical and/or educational goals.

Aligning with the Board of Trustees' Core Value of a Student Centered Mission, as well as College of San Mateo's Mission Statement, students may choose an AA, AS degree or a Certificate of Achievement study track.

Drafting 121 and 122 (CAD using AutoCAD) is a two-sequence course of study which is designed for students majoring in Architecture, Industrial Design, Interior Design as well as updating drafting skill sets needed in our community.

Drafting 113 (REVIT), a Building Information Modeling course caters to architects, plumbers, building contractors, inspectors, electricians and project managers as well as students of architecture and interior design.

Drafting 110 and 111 (SolidWorks), a 3D modeling track is for industrial designers, engineers, architects and the community working in the machining and fabrication trades. This includes prototype shops and the medical device production industry.

All drafting classes transfer to CSU and will fall under Area E5d career exploration, and self-development section of the AA/AS Degree requirements (to be included in the next CSM catalog).

The CSM Drafting Department, in support of the 5 in 5 College Strategies, is currently providing early entry to high school students as well as increasing CTE outreach and community collaborations with student internships opportunities.

### 2. Student Learning and Program Data

#### A. Discuss Student Learning Outcomes Assessment

1. Reflect on recent SLO assessment results for courses and degrees and certificates offered by the program. Specify how SLO assessment informs curriculum development and changes to curriculum.

All of our drafting courses have real life based technical problem solving projects. SLOs are assessed via quizzes, project and homework assignments. We have found that students who have not had a technical (hands on) drafting course do not do well in visualizing and do not complete assigned projects as quickly as those who have come from industry where sketching is used often to communicate ideas in engineering firms, prototype and fabrication shops. Thus, at the beginning of the semester, we now spend time covering hand sketching of orthographic and isometric drawings.

Because of the diversity and range of student proficiencies – that is, the breath of student skills because of their occupations, SLOs have been tailored to the software programs being taught as well as to specific occupations. Each semester is different based on the variety of students enrolled in specific classes. For example, recently we had a class that was 88% credentialed architects. This was extremely exhilarating for the few architecture students in the class to be working next to real-world experts (and sometimes extremely agonizing for the teacher!).

In addition to training students in theoretical concepts for understanding the basics of software programs, we have adding the social construction of community based projects, with the intention of having them make inquiries in the social, cultural, and political aspects of design processes used in their field of study such as architecture, interior design and building construction.

Course content is updated each semester for each class based on the latest trends in our area. CAD/CAM software is now being updated once a year. Because of this, keeping current to provide out students the latest information is a continual focus throughout the courses.

2. Comment on the success rates in the program SLOs that are aligned with specific course SLOs. What do the program SLO and course data reveal about students completing the program? Identify trends and discuss areas in need of improvement. Is the alignment between course and program SLOs appropriate and informative? Describe any additional methods used to assess program SLOs and reflect on the results of those assessments. See [course-to-program SLO alignment mapping](#).

Even though our SLO success rates are high we have one specific issue with students completing our program – that of the availability of our capstone class, DRAF 130.

Since the entire program functions in the evenings, we have concluded that teaching a few of the courses concurrently aids in the head count as well as providing the students a path to a degree. Currently we offer DRAF 110 and 111 at the same time as well as DRAF 121 with the capstone DRAF 130 class.

The majority of students come to take drafting courses when an employer requires a specific software program, or the student is looking to update their skill set to the newest version of the software program or they are interested in working in a specific field that requires a specific software skill. Thus, not all students are interested in completing the degree or certificate program since their interest, most often than not, is course specific.

We have been touting the benefits of promoting the benefits of students learning all of the software programs we offer, and have found that more students are showing an interest in this since it offers an employer a wider range of skills. Also, more students are beginning to be interested in acquiring a degree or certificate.

3. For any courses in the program that satisfy a GE requirement, which GE SLOs are supported or reinforced by the course SLOs? What do assessment results for the course SLOs (and for the GE SLOs, if available) reveal about student attainment of the GE SLOs? See [GE SLO Alignment Summary Report](#) or [All Courses GE SLO Alignment Data](#).

Our program does not support the majority of GE SLO's. In the capstone DRAF 130 class and during final presentations, students present to the class thus effective communication, and social awareness is ostensible. Critical thinking, on the other hand, is something that is used throughout the courses since each project solution outcome can be realized through a myriad of pathways.

## B. Student Success Indicators

1. Review [Student Success and Core Program Indicators](#) and discuss any differences in student success indicators across demographic variables. Also refer to the [College Index](#) and other relevant sections of the [Educational Master Plan: Update, 2012](#), e.g., Student Outcomes and Student Outcomes: Transfer. Basic Skills programs should also refer to [ARCC](#) data.

The Drafting program in the 2015-2016 school year reported a small decrease in overall student enrollment. DRAF is only 0.9% below the college's 85.2% retention rate for 2015/16. The department did achieve student success average of 72.2% for all reported age groups.

Regarding other measures, DRAF students are similar to the college overall with younger students (19 years or less and 25-29) having the lowest success rates while older students (20-24, 30 – 50+) have the highest successful course completion rates.

Students in the DRAF courses are more often returning students attempting to re-evaluate their skill set. Thus they are not interested in transferring, although, those who do transfer generally list something other than DRAF as their majors and are not entered into our transfer rates.

All DRAF courses have just over a 4:1 ratio of male to female which is better than the previous years. down from 5.3 to 1 male at the last writing of this report. The success rate of males and females is disconcerting since females are roughly 7.8% lower than males.

We attribute this to the current climate where women are not encouraged to go into the mechanical design, industrial design, architecture, engineering and construction fields.

The top three ethnic groups in the DRAF courses are White (34.3%), Asian (19.4%), "other" (16.7%) and Hispanic students (14.8%) coming at fourth. The high percentage of White students may have to do with the working engineers and designers who come to take drafting as a supplement to their job duties.

2. Discuss any differences in student success indicators across modes of delivery (on-campus versus distance education). Refer to [Delivery Mode Course Comparison](#).

Currently all of the drafting classes are lecture / lab. On line courses would be difficult to offer since beginning courses require a considerable amount of guidance in mouse and command usage. For example, one command will require a student to use both the left mouse button, right mouse button as well as the center wheel. This is something that would be difficult instruction in a virtual setting since understanding what the student is doing wrong is easier to correct when watching the student first hand. A large percentage of our students have actually attempted to take an on-line course only to find that the physical lab time provides them with immediate corrections to their learning obstacles via the instructor or adjacent student.

C. Program Efficiency Indicators. Do we deliver programs efficiently given our resources?

Summarize trends in program efficiency as indicated in the [Student Success and Core Program Indicators](#) (LOAD, Full-time and Part-time FTEF, etc.)

DRAF LOAD was higher in 2014-15 (409.9) compared to 2015-16 (333.1).

The department has one full time faculty. Since we have not been able to offer second semester courses due to low enrollment (not enough first sections to secure 20 students for the second course), we have not offered the second semester courses that would normally employ two adjunct faculty.

We have been reduced to one lab which has made it difficult to offer second semester sections. Our day time program was discontinued when a full time professor retired. The discontinued welding program and manufacturing technology programs provided the instructor of record for this department.

### 3. Career Technical Education

## A. Career Technical Education Data (This information is required by California Ed. Code 78016.)

1. Review the program's available labor market data, as applicable. Here are two relevant links:

- [State Of California Employment Development Department, Labor Market Information Division](#) (the official source for California Labor Market Information)
- [Employment data](#) (by Program Top Code) from the State Chancellor's Office

Explain how the program meets a documented labor market demand without unnecessary duplication of other training programs in the area.

At this time DRAF has an AA/AS degree and a Certificate of Achievement and all of the DRAF courses are CSU transferable. Since drafting is no longer a stand-alone occupation, those entering our course of study may list other transferring majors. In San Mateo County, our courses provide instruction for not only students, but architects, engineers, mechanical and industrial designers, interior designers and aerospace designers.

Employment of drafters is expected to grow 9.5 percent from 2016 to 2021 (Drafting Technology Occupation Overview Emsi Q2 2016 Data Set)

It is difficult to find specific information for "drafters" since other professions such as Architects, Civil Engineers, Electrical and Electronics professionals, Environmental Engineers, Mechanical Engineers, Surveying and Mapping Technicians and Building Contractors use drafting as a subset of their careers. Thus, it is imperative that we market to touch specific industries such as electronics, architecture, interior design, industrial design and engineering.

2. Summarize student outcomes in terms of degrees and certificates. Identify areas of accomplishment and areas of concern.

[collegeofsanmateo.edu/institutionalresearch/degcert.asp](http://collegeofsanmateo.edu/institutionalresearch/degcert.asp)

This semester we are offering DRAF 130 so that a number of students will be able to obtain certificates. By teaching this course simultaneously with another class each semester, we will see a rise in certificates.

3. Review and update the program's Advisory Committee information. Provide the date of most recent advisory committee meeting.

Drafting Advisory Council Members:

Robert Scheren, AIA Architect, Dean & Professor Emeritus, Kent State University Jason Hill, Fly SFO, CAD Manager

Tony Calavano, Digitization Lab Manager, Stanford University

Joseph Nobles, Joseph Nobles Design

Jason Silva, Silva Construction, Half Moon Bay

Michael Perkins, Engineering Student

Jeff Payne, SFO Airport, CAD Manager, Adjunct Faculty

Lilya Vorobey, Faculty

Dean Kathy Ross

The Drafting Advisory Council has communicated via email due to the difficulty in setting a time when everyone could meet. In addition, I was in a wheel chair for a few months which also limited the available time. I have met with individual advisory board members to address needs and ideas that can be incorporated into our classes.

#### 4. Additional Factors

Discuss additional factors as applicable that impact the program, including changes in student populations, state-wide initiatives, transfer requirements, advisory committee recommendations, legal mandates, workforce development and employment opportunities, community needs. See [Institutional Research](#) as needed.

The Advisory Committee has recommended that we consider offering an additional semester of REVIT - a CAD program that is recommended preparation (in addition to AutoCAD) for architectural related employment. This course was introduced in Fall 2013 and is now offered each semester. The problem we see with an advanced class filling is that Community Education now is offering various courses that supplement the REVIT course.

In addition, the designers in the committee have queried why we do not have bench top machinery that would expose students to understanding materials such as plastics, wood, and metals. Morphing the drafting department into an industrial design curriculum would cater to the needs of the area and promote drafting skills through the obvious needs of being able to build something.

Drafting, sketching, and conceptual work is where all of the products produced in the bay area begin.

The major issue drafting program faces is the implementation of a day program to support filling second semester courses. This with a marketing program to specific student populations could produce a viable program.

Living in the Bay Area provides the opportunity to hire faculty who are involved in the latest technology advancements. Yet the ever changing nature of software programs that support the industries also require professional development.

#### 5. Planning

##### A. Results of Program Plans and Actions

Describe results, including measurable outcomes, from plans and actions in recent program reviews.

A DRAF 111 SolidWorks II class was added to the curriculum in 2011 although filling the class with the required 20 students has been problematic in that we are only offering one section of beginning course which then creates a low enrollment in the second semester courses. In addition we have added a DRAF 113 REVIT class that is now in its fourth semester (Spring 2015). We have to publicize our courses since students mention that they find out classes by chance.

Another factor that undermines enrollment is the lack of local knowledge of our curriculum in the area's high schools. Our dean is working on a pathway to the CTE programs at CSM. In addition to this we are modeling short courses that will be program specific such as a drafting program catering to electronics or architecture in the hopes of attracting more students on our campus and providing them with a language that is not CAD generic but in fact specific to their needs.

##### B. Future Program Plans and Actions

Prioritize the plans to be carried out to sustain and improve student success. Briefly describe each plan and how it supports the [CSM Strategic Goals 2013/14 to 2015/16](#). For each plan, list actions and measurable outcomes. Plans may extend beyond a single year. Describe the professional activities and institutional collaborations that would be most effective in carrying out the program's vision to improve student learning and success.

In the next three years to continue our efforts to schedule and maintain a wide breadth of drafting courses that meets the needs of our diverse student population. We will be marketing the program to veterans, handicapped persons, as well as industrial designers,

architects, interior designers as well as engineers. As the department grows, we will be able to add advanced courses or summer courses in order to maintain interest in the program. The department is a one person department and generally only offers only three courses. In the future, we will strengthen partnerships with business and industry through the Advisory Board to be able to offer more courses.

## 6. Program Maintenance

### A. Course Outline Updates

Review the [course outline update record](#). List the courses that will be updated in the next academic year. For each course that will be updated, provide a faculty contact and the planned submission month. See the [Committee on Instruction](#) website for [course submission instructions](#). Contact your division's [COI representatives](#) if you have questions about submission deadlines. **Career and Technical Education courses must be updated every two years.**

Courses to be updated	Faculty contact	Submission month
All	Lilya Vorobey	Fall 2017

### B. Website Review

Review the program's website(s) annually and update as needed.

Faculty contact(s)	Date of next review/update
Lilya Vorobey	Yearly

--	--

C. SLO Assessment Contacts

Faculty contact(s)	Date of next review/update
Lilya Vorobey	Spring 2017

**7. Dominant Themes Summary for IPC**

Briefly summarize the dominant, most important themes or trends contained in this program review, for division deans to collect and forward to the Institutional Planning Committee. What are the key program issues that matter most? (Brief paragraph or bullet points acceptable).

With the possibility of a new Emerging Technology building in our future - one that may have a "Fab Lab" or "Maker's Space", the idea of adding courses that round out the Drafting Department and change it into an Industrial Design program would bring the department in concert with the trends of the imaginative bay area.