



Cabrillo College Program Outline Report

General Information

Program Title:	Digital Fabrication and Art Making Certificate of Achievement
Program Status:	In development
Department:	Art
Program Goal:	CTE (Credit)
Program Description	<p>The Digital Fabrication and Art Making Certificate of Achievement prepares students with the knowledge and skills to join the workforce as problem solvers, innovators, and inventors who are able to think logically and communicate effectively. Students gain job skills in step-by-step processes, production, design thinking, collaboration, perseverance, marketing, and brand development. Digital fabrication begins with design including drawing and 3D modeling. Students learn to use software and hardware to bring ideas to life. The program uses a variety of hands-on techniques as well as industry software such as computer-aided design/computer-aided manufacturing (CAD/CAM) to create a virtual object and rapidly prototype it. With digital fabrication knowledge, students will be able to create, modify, and adapt through the rapid prototyping and iterative design process. Students will utilize a variety of equipment and tools in the Cabrillo College Makerspace and FabLab including 3D printing and scanning, laser cutting and engraving, digital knife, water jet cutting, and other Computer Numerical Control (CNC) equipment. Employment opportunities are expanding rapidly and vary by industry. The skills developed in the certificate could lead students into the innovative fields of construction, engineering, entrepreneurship, design, dentistry, architecture, aerospace, art, set design, and more. Upon completion, students will be well prepared to work in and staff local Makerspace workshops in college or K-12 institutions.</p>
Control Number:	No value
Program ID:	No value
Transferability:	Not transferable
Program TOP Code (SP01) :	1099.00
Program TOP Code (SP01) :	Other Fine and Applied Arts
CIP Code:	(50.9999) Visual and Performing Arts, Other.
SOC Code:	<ul style="list-style-type: none"> • (27-1012) Craft Artists • (51-4111) Tool and Die Makers • (51-7031) Model Makers, Wood • (51-9071) Jewelers and Precious Stone and Metal Workers • (51-9162) Computer Numerically Controlled Tool Programmers
Program Award (SP02) :	Certificate requiring 16 to fewer than 30 semester units
Maximum Units:	16
Minimum Units:	16
Curriculum Committee Approval Date:	No value

Board of Trustees Approval Date:	No value
Chancellor's Office Approval Date:	No value

Proposal Details

Effective Catalog Term:	Fall 2024
Notes for Submission:	New CTE program

Submission Rationale

- New Program

Program Requirements

Digital Fabrication and Art Making Certificate of Achievement (Total 16)

Complete the following number of units: 16

Required (Total 12)

Complete the following number of units: 12

ART5 - Three-Dimensional Design (Being Revised)	3
ART95A - Survey of Digital Fabrication for Studio Arts (Being Revised)	3
ART95B - Beginning Digital Fabrication for Studio Arts (Being Revised)	3
ENGR3 - How Things Work	3

Electives (Total 4)

Complete the following number of units: 4

BUS88 - Starting and Operating a New Small Business	3
DM57 - Self-Promotion Through Social Media	1.5
DM4 - Digital Graphics	4
ENGR25 - Graphics and Design	4
ENGR26 - Solid Modeling	1
AP79 - Self-Directed Creative Careers	3
AH79 - Self-Directed Creative Careers	3
ART79 - Self-Directed Creative Careers	3
DANCE79 - Self-Directed Creative Careers	3
DM79 - Self-Directed Creative Careers	3
MUS79 - Self-Directed Creative Careers	3
TA79 - Self-Directed Creative Careers	3

Note: DM4 has a pre-requisite of DM1 0

Note: ENGR25 and ENGR26 are co-requisites and must be taken concurrently.

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AH79, AP79, ART79, DANCE79, DM79, MUS79, TA79 are equivalent courses.

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Recommended Sequences

Digital Fabrication and Art Making Certificate of Achievement

Semester 1 (Total 9)

Required ART5 - Beginning Design: 3-Dimensional Form	3
Required ART95A - Survey of Digital Fabrication for Studio Arts	3
Required ENGR3 - How Things Work	3

Semester 2 (Total 4-7)

Required ART95B - Beginning Digital Fabrication for Studio Arts	3
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Electives (Total 1-4)

Take one of the following

BUS88 - Starting and Operating a New Small Business	3
DM57 - Self-Promotion Through Social Media	1.5
DM4 - Digital Graphics	4
ENGR25 - Graphics and Design	4
ENGR26 - Solid Modeling	1
AP79 - Self-Directed Creative Careers	3
AH79 - Self-Directed Creative Careers	3
ART79 - Self-Directed Creative Careers	3
DANCE79 - Self-Directed Creative Careers	3
DM79 - Self-Directed Creative Careers	3
MUS79 - Self-Directed Creative Careers	3
TA79 - Self-Directed Creative Careers	3

PSLOs

Digital Fabrication and Art Making Certificate of Achievement

PSLO	Performance
1. Display competency and safety using digital fabrication hardware.	80
2. Produce a portfolio of objects that showcase design thinking, entrepreneurship, and traditional hands-on digital fabrication techniques.	80

Program Narrative

Program Goals and Objectives (this does not include the Catalog Description or Program Learning Outcomes) Example from MRTA degree: The primary goal of this program is: To develop students' skills in music technology and recording arts to enter into music industry careers in sound engineering, performance, electronic music composition, sound design, music arranging, song writing, broadcast engineering, and equipment manufacturing. The two primary objectives of this program are: To produce trained musicians capable of creating professional quality musical projects that demonstrate the following knowledge and recording skills: pre and post production requirements, tracking, editing, mixing, effects processing, use of plug-ins, mastering of live or studio generated music, and knowledge and experience with the behavior of sound, hardware, software, and the musical skills used in a professional recording environment. To produce trained musicians capable of planning and executing the sound requirements for events in various environments, including studio, theatre, club, concert, convention, and other live situations, as a component of a professional production.

The Digital Fabrication and Art Making Certificate of Achievement prepares students with the knowledge and skills to join the workforce of problem solvers, innovators, and inventors who are able to think logically and communicate effectively. A key to developing these skills is strengthening science, technology, engineering, arts, and math (STEAM) competencies in every student. STEAM literacy refers to a student's ability to apply their understanding of how the world works within and across five primary ways of thinking. The Digital Fabrication and Art Making Certificate of Achievement fulfills the needs of students, entrepreneurs, and employers of the ever changing job market, and provides them with the versatile skill sets needed to adapt and persevere.

Cabrillo College is seeking approval from the Chancellor's Office for the new Digital Fabrication and Art Making Certificate of Achievement in Career Education. The digital fabrication program is designed to train and educate students to design, rapid prototype, and produce art and creative solutions using digital fabrication tools. The need for maker skills has been advocated for by local organizations and supported by current, regional labor market research (Top Code 1099.00). The digital fabrication and making program is aligned with Cabrillo's mission, master plan, and statewide community college work in Guided Pathways. Approval of this program will benefit regional employers, fulfill job growth and innovation in the local community, augment college enrollment, and support non-traditional and underserved minority students in a viable career and academic path. This program would give our students the knowledge and skills they need to transition to a four-year institution or excel in the workforce. The goal is for certificate completers to be gainfully employed by the 4th fiscal quarter or continue with an associates degree. Working with employers to identify earning potential is promising, with potential for a starting salary of \$76,000-\$238,000/year in jobs ranging from jewelers/precious stone and metal workers, to Computer Numerically Controlled (CNC) tool programmers, to craft artists. It is critical to give community college students educational and professional experience that is necessary to be successful in starting their career in innovation or to advance to other certificates and associate's degrees.

Catalog Description and Program Learning Outcomes

No Value

Program Requirements with Course blocks, Dept and Course Numbers, Course Title, Total units (or hours for noncredit), and Sequence.

The Digital Fabrication and Art Making Certificate of Achievement requires 16 units. Required courses total 12 units including a foundation of three required arts courses and one engineering course. Students complete the 16 unit minimum through electives in engineering, engineering technology, business, art and/or digital media.

Master Planning Example from Elementary Algebra program: Many of the populations in the community that Cabrillo College serves have shown through assessment scores, performance in higher levels of math courses, and their ability to transfer to four-year universities that there is a need for a series of noncredit math courses that address these topics and are repeatable, affordable, and allow for more flexibility for student schedules. This certificate of competency meets that need. There are no competing noncredit programs and it is designed to enhance students' performance in higher-level math courses and programs, ultimately leading to transfer.

The mission of the digital fabrication program is to create problem solvers, innovators, and inventors who are, socially and emotionally aware, self-reliant, perseverant, use design thinking, collaboration, hands on learning and are effective communicators while being able to think logically.

The goals for the digital fabrication program are well aligned with the College mission:

- To prepare students to transfer to CSU, UC and other four year or private art schools to continue on into emerging bachelor's degree programs, such as the Digital Media and Art bachelor's degree at San Jose State University.
- To promote and cultivate critical thinking and visual literacy.
- To engage students in a supportive instructional environment.
- To instruct students in safe use of digital fabrication technology practice.
- To provide entry level and lifelong learning.
- To introduce students to vocational possibilities and to support professional growth.
- To promote appreciation of diversity and cultural understanding through the exploration of digital fabrication in a social and cultural context.

The vision and strategic planning for the digital fabrication program is to continue to respond to current and developing trends in the field. The educational approach is responsive to evolving regional workforce demands. The program will serve as a conduit linking skilled creatives with known employment and venture opportunities in a growing gig economy centered on creative inspiration, innovation, incubation, and impact.

The program continues to maximize student success and retention by providing access to optimally functioning facilities and a sufficient stock of properly functioning technological and traditional equipment for student use, and by providing up-to-date and properly functioning hardware and current software in the digital lab. Community engagement is another focus of the program and this includes student exhibitions, hackathons, and social media online display and interaction. In addition, the program is revising the progression of traditional and digital courses to provide a more comprehensive progression of skills as well as the potential of increased articulation with 4-year schools, and alignment with the Guided Pathways initiative.

The Digital Fabrication and Art Making Certificate of Achievement clearly supports Cabrillo College's mission statement: "to empower students to be effective communicators, critical thinkers, and responsible world citizens. With a commitment to quality and equity, we connect all learners to pathways that propel them from where they are, where they aspire to be, including academic, personal, and career growth." Providing an academic pathway to future occupational advancement for students supports Cabrillo College's Strategic Plan, Goal #2 "Labor Market Preparation."

Enrollment and Completer Projections (this can include a list of the courses in the degree and how many sections and the enrollment numbers over the last several years) Example from MRTA program: Enrollment Projections MRTA enrollment projections are estimated to continue along their current trajectory. They have been running at full capacity (25 students per section) since the inception of the MRTA Skills Certificate Program and are often overenrolled with 30+ students per section. Cabrillo College typically offers four sections of MRTA courses each fall term and five each spring term, totaling approximately 125 students each fall and 150 students each spring, for an average of 275 students per year. Completer Projections Though this is a new application for an AS and Certificate of Achievement, our current MRTA Skills Certificate is in its 9th year. There are, on average, five graduates in the current program per year. With approval of the AS and Certificate of Achievement, the expectation for future program graduates is: 10 Skills Certificates, five Certificates of Achievement, and 2 Associate of Science degrees. Though the program is not specifically designed as a transfer program, several graduates have transferred recently to CSU-Monterey Bay to continue their work toward a BA in music technology, and one of those this past year simultaneously found employment as an audio technician/specialist at the nearby Seascape Resort.

The program expects 20 students to enroll per semester and 20 students per year to complete the Digital Fabrication and Art Making Certificate of Achievement with an opportunity for annual growth.

Place of Program in Curriculum/Similar Programs Example from Sustainable Agriculture Technology program: The Sustainable Agriculture Technology certificate will offer a new option that responds to cross-functional technical skills required by the emerging field of agriculture technology. The degree will be housed within the Horticulture Department, and will expand the current degree offerings of: Agriculture Plant Sciences A.S.-T Transfer Degree, General Horticulture & Crop Production A.S. Degree, and Landscape Horticulture A.S. Degree. None of the historical degree offerings are interdisciplinary as they have a traditional focus on horticulture and plant science. By adding in additional coursework within Engineering, Computer Applications/ Business Technology, Geography, Computer Science, and Computer and Information Systems we are able to craft a degree that prepares students for the digital, computer literate, and mechanical skills needed by an 21st century agriculture industry employee or grower. This program does not replace any existing program and serves to expand attainable degrees for students with cross functional interests in horticulture and technology and is a certificate version of our Sustainable Agriculture Technology A.S. Degree.

The Digital Fabrication and Art Making Certificate of Achievement fulfills the needs of students, entrepreneurs, and employers in the ever changing job market, providing them with the versatile skill sets needed to adapt and persevere. The Digital Fabrication and Art Making Certificate of Achievement prepares students for continuing onward to an associate degree and transfer degree. This is an interdisciplinary effort to address the growing job market demand. The digital fabrication program shares learning goals with the art photography, art history, digital media, engineering, engineering technology, and mathematics departments. These goals include principles of art and design, visual communication, visual literacy, and the evolution of visual art processes with technological and cultural developments. There is ongoing collaboration between these departments in curriculum development, including degrees and certificates.

Similar Programs at Other Colleges in Service Area Example from Sustainable Agriculture Program: There are no similar programs in the college service area. Hartnell's Agricultural Business and Technology Institute administration has been consulted with and it has been determined that none of their programs offer a similar Certificate of Achievement in sustainable agriculture technology.

There are no Community College programs in the SC-Monterey subregion offering awards in Top Code 1099.00 - Other Fine and Applied Arts.

For CTE, additional supporting documentation is needed: Advisory Committee Recommendation, Labor Market Information (LMI) & Analysis, and BACCC Regional Program Recommendation

Advisory Committee recommendation (attached)

Labor Market Information (attached)

BACCC Regional Program recommendation (pending)