DESIGN TECHNOLOGY – CAD DESIGN TECHNICIAN – ARCHITECTURE/ENGINEERING/CONSTRUCTION

JUSTIFICATION:

This is a new program / Certificate of Achievement

This Certificate of Achievement is a (new) program that stacks upon three smaller existing occupational skills certificates in this program thread focused on CAD drafting and design within the A/E/C building design industries. While Design Technology had several occupational skills certificates in this thread, the Certificate of Achievement has not been developed until now.

The lower unit occupational skills certificates (which is in the process of submission to be modified to low-unit certificate of achievements) integrate the foundation courses for this Certificate of Achievement. With the completion of one or two more classes, students can attain a higher-level certificate with the potential of earning an Associate’s degree in Design Technology.

This program also integrates Sustainable Technologies and CAD (computer-aided design) and BIM (Building Information Modeling) courses that integrate Sustainable design principles, codes, and techniques within the program curriculum.

**Program Goals & Objectives**

Identify the goals and objectives of the program.

1. Utilize appropriate technologies and techniques to produce iterative prototypes within a digital workflow to meet design intent and industry criteria.  
2. Apply sustainable design and construction technology principles, processes, and standards, to produce comprehensive digital and technical representations of architectural, engineering and construction projects.  
3. Communicate effectively using audience-appropriate technical, graphical, oral and written formats in the critical evaluation of design processes and products.

4. Collaborate effectively on diverse teams to identify, analyze, and solve technical design problems related to current issues at varying project scales.

**Catalog Description**

The CAD Design Technician program prepares students for entry-level positions in architectural, engineering, and construction fields. Certificate recipients learn to integrate industry specifications and codes and utilize Computer Aided Design (CAD) and Building Information Management (BIM) software to solve building and construction design problems using the principles and standards of Sustainable Technology. They also develop virtual and rapid prototyping fabrication skills.  As technicians in these realms, students find additional opportunity in related fields, such as interior design, set & exhibit design, municipal infrastructure, and sustainable technologies.

Students focus on communication and critical thinking skills, developing space-planning solutions through an iterative design process that involves preliminary sketching, 2D, 3D, and parametric drafting and modeling. They realize and evaluate these designs using rapid prototyping such as laser cutting, 3D printing, among other advanced manufacturing techniques. Building Information Modeling (BIM) allows integration between multiple technologies and procedures, towards real world applications.

The program provides the opportunity to obtain industry credentials, gain experience in real-world projects, and develop long-term transferable skills sets aligned to the work force. This course of study prepares participants for successful completion of LEED accreditation at the Associates Level. Graduating students exhibit the capability to work in professional settings, to collaborate, execute design tasks, and meet client and project requirements. They will produce CAD design, revision, and fabrication sets, build virtual and physical models, and create animations and visual presentation materials.

The program builds on several Certificates including CAD Modeling - Architecture/Engineering/Construction; CAD Designer - Architecture/Engineering/Construction; and CAD Technician - Architecture/Engineering/Construction and leads to an Associate of Science degree.

A Certificate of Achievement is awarded upon completion of all required courses with a grade of C or better.

**Program Requirements**

Required units in the program: 18

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| --- | --- | --- | --- | --- | --- |
| **Requirements** | **Dept. Name/#** | **Name** | **Units** | **Sequence**  **Option A** | **Sequence**  **Option B** |
| Required Core (12 units) | DT 017  DT 118  DT 114  DT 030 | Building Design & Construction Technical Graphics  3-Dimensional Building Design & Representation  Building Information Modeling Design (BIM Design)  Sustainable Technologies | 3  3  3  3 | Yr 1, Fall  Yr 1, Fall  Yr 1, Spring  Yr 1, Fall | Yr 1, Fall  Yr 1, Fall  Yr 1, Spring  Yr 1, Spring |
| Two or more Electives (6 units) | DT 101  DT 008A  DT 008B  ARCH 014  ARCH 022A  ART 041A  BLDG 212  BLDG 213  BLDG 214 | Fabrication Laboratory  Introduction to Digital Design and Fabrication  Intermediate Digital Design and Fabrication  Materials and Processes of Construction  Architectural Practice  Interior Design: Space Planning and Materials  Print Reading for Construction  Building Construction Codes and Standards  Materials & Processes of Construction: Sub Grade to Roof Framing | 1  3  3  2  5  3  3  3  3 | Yr 1, Fall  Yr 1, Fall  Yr 1, Spring  Yr 1, Spring  Yr 1, Spring  Yr 1, Spring  Yr 1, Spring  Yr 1, Spring  Yr 1, Spring | Yr 2, Fall  Yr 1, Summer  Yr 2, Fall  Yr 2, Fall  Yr 2, Fall  Yr 2, Fall  Yr 2, Fall  Yr 2, Fall  Yr 2, Fall |

Required Core: 12 units

Required Electives: Min 4 units

Proposed Sequence Option A

Year 1, Fall = 8-10 units

Year 1, Spring = 8-9 units

Total Units: 18 units minimum

Proposed Sequence Option B

Year 1, Fall = 6 units

Year 1, Spring = 6 units

Year 2, Fall = 6 units

Total Units: 18 units minimum

**Master Planning**

The purpose of the program is to support students to gain the skills necessary to obtain entry level careers in CAD (computer-aided design) drafting and design in the building design & construction (and related industries).

This program aligns with the following goals of the Educational Master Plan:

* Increase the median earnings and/or the regional living wage for students who exit the college.
* Align all degrees and certificates with appropriate workforce demand.
* Increase work-based learning opportunities.
* Create and sustain a culture of viable career pathways for all students

**Enrollment and Completer Projections**

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| --- | --- | --- | --- | --- | --- |
|  | | 2019-2020 | | 2020-2021 | |
| Course Department Number | Course Title | Annual # Sections | Annual Enrollment Total | Annual # Sections | Annual  Enrollment Total |
| DT 017 | Building Design & Construction Technical Graphics | 2 | 44 | 2 | 39 |
| DT 118 | 3-Dimensional Building Design & Representation | 1 | 9 | 1 | 11 |
| DT 114 | Building Information Modeling Design (BIM Design) | 1 | 9 | 1 | 9 |
| DT 030 | Sustainable Technologies | 1 | 13 | 2 | 34 |

This COA stacks upon several OSC’s in our program thread. The following students were awarded OSC’s for which this program stacks upon. It is important to note that these counts were during pandemic remote teaching environment and increase is expected in current hybrid teaching format. 10 students received OSC’s in 2021-2022 and we project that some of these OSC achievers will aim to take an additional two courses to receive this Certificate of Achievement.

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| --- | --- | --- |
| DT OSC | 2020-2021 | 2021-2022 |
| CAD Technician – A/E/C | 3 | 4 |
| CAD Designer – A/E/C | 1 | 3 |
| CAD Modeling & Animation | 0 | 3 |

Future years’ course enrollment and completions are projected to be in line with data provided from 2020-2021, with completions increasing around 5% per year.

* Projected Annual Program Completers: 7-15 per year

**Place of Program in Curriculum/Similar Programs**

Before completing this section, review the college’s existing program inventory in the CCC Curriculum Inventory, then address the following questions:

Do any active inventory records need to be made inactive or changed in connection with the approval of the proposed program? **No.**

Does the program replace any existing program(s) on the college’s inventory? Provide relevant details if this program is related to the termination or scaling down of another program(s). **No.**

What related programs are offered by the college? **N/A**

**Similar Programs at Other Colleges in Service Area**

There are a number of colleges offering CAD drafting and/or Architectural Technology courses. The LMI data shows that there does not appear to be a supply gap for the occupations of interest. However, the supply is within the COE’s acceptable margin (25% over or under the number of annual openings) and is therefore considered “supply met” rather than a “supply gap.” additionally, entry-level wages exceed the self-sufficiency standard in both Los Angeles and Orange Counties, and the Bureau of Labor Statistics lists an associate degree as the typical entry-level education for the occupations in this report. Despite the number of colleges offering Architectural Technology programs, several colleges offer larger unit Architecture transfer programs whereas our program aims to prepare students for entry-level careers as CAD/BIM drafters within the building design industry (Architecture, Engineering, and Construction) and related fields. While reviewing the other certificate programs offered by area colleges, many programs did not include Sustainable Design/Technology courses. Employment/labor market trends show a large growth in the green building sector over the next five years. This program prepares students to apply for LEED (Leadership in Environmental and Energy Design) Green Associates exam, an industry credential that is highly regarded within the A/E/C discipline.

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| Cerritos | Computer-Aided Drafting and Design |
| Citrus | Computer-Aided Design (CAD) – Architecture and Drafting |
| East LA | Architecture Drafting |
| El Camino | Computer-Aided Design Drafting |
| Glendale | Architectural Drafting and Design |
| LA Harbor | Architectural Technology |
| LA Pierce | Architectural Technology |
| LA Trade Tech | Architectural Technology |
| LA Valley | Architecture |
| Mt San Antonio | Architectural Technology Concentration |
| Rio Hondo | Architectural Design and Drawing Technician |