MAKR M925: LASER CUTTING AND ENGRAVING I

Originator
csadnik

College
Moorpark College

Discipline (CB01A)
MAKR - MakerSpace

Course Number (CB01B)
M925

Course Title (CB02)
Laser Cutting and Engraving I

Banner/Short Title
Laser Cutting and Engraving I

Credit Type
Noncredit

Start Term
Fall 2021

Catalog Course Description
Introduces students to laser cutting and engraving. Offers practical experience in preparing designs for laser cutting and engraving. Instructs the proper, safe, and effective operation of this MakerSpace tool.

Taxonomy of Programs (TOP) Code (CB03)
1030.00 - *Graphic Art and Design

Course Credit Status (CB04)
N (Noncredit)

Course Transfer Status (CB05) (select one only)
C (Not transferable)

Course Basic Skills Status (CB08)
N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)
C - Clearly Occupational

Course Cooperative Work Experience Education Status (CB10)
N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)
J - Workforce Preparation Enhanced Funding

Educational Assistance Class Instruction (Approved Special Class) (CB13)
N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)
Y - Not Applicable

Course Noncredit Category (CB22)
I - Short-Term Vocational

Funding Agency Category (CB23)
A - Primarily Developed Using Economic Development Funds

Course Program Status (CB24)
1 - Program Applicable

General Education Status (CB25)
Y - Not Applicable

Support Course Status (CB26)
N - Course is not a support course

Field trips
Will not be required

Grading method
(P) Pass/No Pass Grading

Does this course require an instructional materials fee?
No

Repeatable for Credit
Yes
Number of times a student may enroll in this course
Unlimited

Units and Hours

Carnegie Unit Override
No

Total in-Class (full semester or term)
Total Minimum Contact/In-Class Hours (for full semester or term; not weekly)
8
Total Maximum Contact/In-Class Hours (for full semester or term; not weekly)
8

Total Student Learning

Total Student Learning
Total Minimum Student Learning Hours
8
Total Maximum Student Learning Hours
8

Prerequisites
MAKR M910 or equivalent

Entrance Skills

Entrance Skills
MAKR M910

Prerequisite Course Objectives
MAKR M910-create a document and adjust the size and number of artboards within a document
MAKR M910-demonstrate ability to save a document in a variety of formats and export assets
MAKR M910-adjust document color mode and apply modes as appropriate
MAKR M910-demonstrate ability to use the copy and paste functions

MAKR M910-create, manipulate, and adjust guides for a document

MAKR M910-create, manipulate, and adjust layers in a document
MAKR M910-recognize what the embed image option does and apply its use as appropriate
MAKR M910-use image trace to convert raster images to vector artwork and manipulate image trace controls to get a variety of results
MAKR M910-differentiate between the direct selection and the selection tool and apply their use as appropriate
MAKR M910-use the type tool to create text and demonstrate the ability to set font family, change the font style and size, and convert type to outlines
MAKR M910-demonstrate the ability to use the shape tool to create and manipulate rectangles, ellipses, polygons, and stars
MAKR M910-demonstrate the ability to use the pen tool to create custom shapes and manipulate anchor points
MAKR M910-demonstrate the ability to add and change the color of strokes and fills on both type and shapes
MAKR M910-demonstrate the ability to use the shape builder tool and pathfinder tool to create custom shapes
MAKR M910-demonstrate the ability to scale, move and rotate shapes and type

Requisite Justification

Requisite Type

Prerequisite

Requisite

MAKR M910

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Content review

Student Learning Outcomes (CSLOs)

	Upon satisfactory completion of the course, students will be able to:
1	prepare files for printing on the laser cutter.
2	operate the laser cutter safely.
3	demonstrate the ability to engrave and cut a variety of materials with the laser cutter.

Course Objectives

	Upon satisfactory completion of the course, students will be able to:
1	code and prepare files for cutting/engraving on the laser cutter.
2	demonstrate ability to manually focus the laser.
3	adjust the settings on the laser cutter to cut/engrave a variety of materials.
4	demonstrate proper laser cutter safety protocols.
5	perform manual cleaning of the lens and mirrors.
6	arrange documents for cutting/engraving.
7	operate the computer to laser cutter interface software.
8	demonstrate the ability to troubleshoot issues when using the laser cutter.
9	identify what materials are appropriate to cut/engrave with the laser cutter.

Course Content

Lecture/Course Content

1. (60%) Laser Cutter to Computer Interface and Operation
   a. loading files
   b. manipulating settings
   c. running laser cutter
   d. manually focus the laser

2. (20%) File Preparation
   a. coding cut lines
   b. coding raster engrave
   c. coding vector engrave
   d. organizing document layers
3. (20%) Laser Cutter Maintenance and Safety
   a. cleaning mirrors and lens
   b. maintenance
   c. safety protocols
   d. materials safety

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):
Problem solving exercises
Skills demonstrations

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):
Individual projects
Quizzes
Skills demonstrations

Instructional Methodology

Specify the methods of instruction that may be employed in this course
Computer-aided presentations
Class activities
Class discussions
Distance Education
Demonstrations
Group discussions
Instructor-guided use of technology
Lecture

Describe specific examples of the methods the instructor will use:
- The instructor will use a projector to demonstrate how to use laser cutter to computer interface to adjust the settings of the laser cutter.
- Instructor will demonstrate skills such as manually focusing the laser.
- Instructor will explain the difference between vector cutting, vector engraving, and raster engraving.

Representative Course Assignments

Writing Assignments
1. Take notes on the steps involved with operating the laser cutter
2. Explain the difference between raster engraving, vector cutting, and vector engraving and why one would be used over the other

Critical Thinking Assignments
1. Identify what is incorrect when presented with a file that was not set-up correctly.
2. Identify what is wrong when presented with a material that was not cut or engraved properly

Reading Assignments
1. Read and comprehend definitions of key terminology from the Laser Cutting/Engraving packet provided by the instructor.
2. Read from equipment manual on how to safely perform a cleaning of the laser cutter mirrors and lens

Skills Demonstrations
1. Demonstrate the ability to complete a laser cut job from the design phase through operation of the laser cutter.
2. Perform a cleaning of the laser cutter mirrors and lens.

3. Demonstrate the ability manually adjust the Z axis.
4. Demonstrate proper safety protocols.

Outside Assignments

Articulation

Equivalent Courses at other CCCs

College	Course ID	Course Title	Units
No comparable courses available			

Textbooks and Lab Manuals

Resource Type

Other Instructional Materials

Description

Instructor-generated Laser Cutting/Engraving Packet containing worksheets, guided activities, key terms, and machine component diagrams.

Resource Type

Manual

Description

Universal Laser Systems User Guide. Universal Laser Systems, Inc., 2008, https://users.wpi.edu/~gfischer/files/VLS460_Laser_Cutter_Manual.pdf.

Library Resources

Assignments requiring library resources

Research using the Library's print and online resources.

Example of Assignments Requiring Library Resources

Use the library to locate reference items for graphic design principles and elements.

Distance Education Addendum

Definitions

Distance Education Modalities

Hybrid (1%–50% online)

Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.

Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

Regular Effective/Substantive Contact

Hybrid (1%–50% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Regular Asynchronous discussion boards will be used to encourage discussion among students where they can compare and contrast/ discuss /identify and analyze elements of course outcomes. Other discussion boards will also be used for Q&A, and general class discussion by students and the instructor to facilitate student learning outcomes.
Other DE (e.g., recorded lectures)	Recorded lectures, Narrated Slides, Screencasts, Instructor created content, Discussions, 3rd Party (Publisher) Tools, Websites and Blogs, Multimedia (YouTube, Films on Demand, 3CMedia, Khan Academy, etc.)
Synchronous Dialog (e.g., online chat)	Communication, Online office hours, Online group discussions.
E-mail	Email, class announcements and tools such as “Message Students Who” and “Assignment Comments” in Canvas will be used to regularly communicate with all students to clarify class content, remind of upcoming assignments, and provide immediate feedback to students on coursework to facilitate student learning outcomes. Students will be given multiple ways to email instructor through Canvas inbox and faculty provided email account through their own canvas email and school email.

Examinations

Hybrid (1%–50% online) Modality
Online

Primary Minimum Qualification
GRAPHIC ARTS

Review and Approval Dates

Department Chair
03/10/2021

Dean
03/10/2021

Technical Review
03/18/2021

Curriculum Committee
4/6/2021

DTRW-I
04/08/2021

Curriculum Committee
MM/DD/YYYY

Board
05/11/2021

CCCCO
MM/DD/YYYY

DOE/accreditation approval date
MM/DD/YYYY