Laser Cutting for Starters

6.S063 Engineering Interaction Technologies

Prof. Stefanie Mueller | MIT CSAIL | HCI Engineering Group
benefits::

fast (good for design iteration)
easy to learn and get started!
how can
I laser cut something?
create a 2D vector drawing
define power, speed of laser
(different for each material)
laser cutter control panel: hit cut button
(looks different for each laser cutter model)
homework
until next Wednesday
laser cut your own business card:
homework until next wednesday (Sept. 13)
pass / no pass (not graded)
deliverables:

- bring your card to class on Wednesday (Sept. 13)
- upload a photo of your card to gradebook
- upload the laser cut file to gradebook
what we do today to get you started:
• live demo laser cutting in small groups (5-10 people)
• getting your 2D drawing program to work
• which materials you can use and where to get them
• how to access laser cutters on campus
which materials to use
most common materials:

- paper
- cardboard
- wood
- acrylic
what other materials can we laser cut?

<google>

<30 second brainstorming>
unconventional materials...

food...
never cut materials::
that are **flammable**
create **toxic fumes**

if you are not sure, **ask the shop manager!**
can we laser cut metal and glass?

no we can’t, at least not on the machines we have, but high-power industrial laser cutters can.
where to buy materials
buy materials here in Boston (15 min on redline):

Altec Plastics
116 B St
Boston, MA 02127

both cast and extruded acrylic are fine
Altec Plastics
116 B St
Boston, MA 02127
buy materials online:

https://www.acrylite-shop.com/US/us/acrylite-/fluorescent-g3g0uco8gns.html
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https://www.acrylite-shop.com/US/us/acrylite-/fluorescent-g3g0uco8gns.html

expensive shipping
(group orders?)
<table>
<thead>
<tr>
<th>Material</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>cheap low-fi prototyping</td>
</tr>
<tr>
<td>Cardboard</td>
<td>$10-$20 per sheet</td>
</tr>
<tr>
<td>Wood</td>
<td>$10-$20 per sheet</td>
</tr>
<tr>
<td>Acrylic</td>
<td>depending on thickness</td>
</tr>
</tbody>
</table>
accessing laser cutters on campus (and beyond)
International Design Center (IDC)::

card access:

to the shop: 8am - 5pm, mondays - fridays

to the main space: 24h, including weekends
Engineering Design Studio (EDS, 38-501):

typically 9-5pm, mondays-fridays, but their times vary
check their calendar for ‘open hours’

(no card access required)

http://eds.mit.edu/hours
where else can we laser cut?

< any thoughts? >
MIT's Makerspaces

Makerspaces at MIT (and many universities) are usually one of three types. They all have similar maker tools, but their community elements differ, and they are purpose and managed in a different way:

- **Machine shops** - Spaces that specialize in training/mentoring/making on creation of complex systems and/or fine-detailed components. Interaction with staff (skilled machinist educators) is their key value, so they specialize in quality of maker education/work vs. quantity of students served.

- **Project makerspaces** - Spaces that primarily support class projects. These spaces usually contain more resources to facilitate collaboration, i.e. meeting space and open working space. The key value of these spaces is in their ability to integrate specific resources that enable programmed, curriculum-based learning.

- **Community makerspaces** - Prioritizes fostering unrestricted making via a community effort. The community serve as stewards of the space/resources and educate users in safe making practices. The key value of these spaces is the communities' ability to facilitate access to more users, particularly early/novice users.

Recent News

- **Project Manus Joins Social Media**
  Fri, 04/28/2017

- **Get Mobius and win a chance to go to the Diablo Glass School**
  Wed, 04/12/2017

- **ISAM 2016 Highlight Video**
  Wed, 04/12/2017

Contact Us

Project Manus Central Office
MIT Mobile Möbius
By Massachusetts Institute of Technology
Open iTunes to buy and download apps.

Description
MIT Mobius is an app that enables students and staff to locate and use laboratory resources on the MIT campus. Users are granted access based on training/authorization levels and requirements.

MIT Mobile Möbius Support

What's New in Version 2.0
- Added the ability to make purchases with Credit
- Bug fixes and improvements

Shops Nearest Me

Hobby Shop
CLOSES AT 12:00 PM
You must purchase an annual membership.

What Do You Need?

Materials
- wood
- plastic
- steel
- foam
- copper
- iron
- paper

Capabilities
- cutting
- sanding
- printing
- etching
- sand blasting
- lathing
- bending
- shaping

General Information
OPEN:
- 9:00 AM - 12:00 PM
- 1:00 PM - 11:00 PM
- (123) 456 - 7890

Authorization
You must purchase an annual membership.
Cambridge Hackspace

what
We are a growing maker space in the center of Somerville, MA. We have a 1200sqft space catering to enthusiastic makers, and hold weekly meetings where we get together and make things. We have a Laser cutter, CNCs, 3D printers, and a range of other tools for our members to use.

why
We’ve started the Cambridge Hackspace to provide a physical space where people can gather and work on their projects, have access to larger or expensive tools (like the 3D printers, and laser cutter), and provide a place where the community can share their knowledge.

who
Anyone and everyone is welcome. Whether your thing is software, electronics, woodwork, or knitting, we provide a space where you can meet fellow makers, to learn, and be inspired. We hold workshops every month so you can learn new skills.

where
We are located in Union Square, Somerville [address]. We hold events every week, our next meeting is on Tuesday, 29 Aug @ 06:30pm - Check our events page for future events. You can also like our Facebook page and follow us on Twitter (@HackCambridge)

Join Cambridge Hackspace
Become a Cambridge Hackspace member, join us and help support our efforts to get bigger and better.

Become a Member
if you try a new space,
please tell us about your experience :).
sign the safety hand out
sign the safety hand out first
setup your 2D drawing program
document color mode::
RGB is correct, CMYK is wrong

line color::
red
R = 255
G = 0
B = 0
#FF0000
wrong, if control panel shows black color
correct, if control panel shows red color

this is red (I know it’s hard to see)
Adobe Illustrator:

stroke thickness = 0.0001
Inkscape::
everything correct, use as is

OpenDraw (Open Office)::
everything correct, use as is
If you want to use text, you need to convert it to a path first.
how can I test my settings?
Windows only!

you can also test on Jared's machine

ulsinc.com -> Support -> Software Downloads

Download Drivers for VLS, PLS and ILS Platforms

UCP Installer

Items to Download

Download UCP Installer
**line is red?** you are ready to laser cut!  
**line black?** your drawing settings need adjustment
in groups of 5, let’s laser cut
friday::
we will be at EDS (38-501)

• augmented reality
• some laser cutting tips & tricks for your home work