**Fabacademy – Notes**

**14.01.2015**

Schedule
http://fabacademy.org/archives/2015/schedule/index.html

Own website – creating and documenting progress and work
Try different editors & tools
3D programmes
Final project, needs to include electronics, input and output devices working together. Example: animated dragon – Linda
Does not have to be a finished project, but functioning.

Programme:

- principles and practices, project management (Jan 28)
- computer-aided design (Feb 4)
- computer-controlled cutting (Feb 11)
- electronics production (Feb 18)
- 3D scanning and printing (Feb 25)
- electronics design (Mar 4) - create circuit board
- embedded programming (Mar 11) – make the circuit board do something
- computer-controlled machining (Mar 17) – cutting, milling machining
- molding and casting (Mar 25) – machinable wax, mould and casting
- break (Apr 1)
- input devices (Apr 8)
- output devices (Apr 15)
- composites (Apr 22) – moulding and casting, fibrous
- networking and communications (Apr 29) – network control etc
- mechanical design, machine design (May 6) – mechanics, bearings
- interface and application programming (May 13) – microcontroller hooked up to the computer
- applications and implications (May 20) – lists, guest talks, using open source and innovation
- invention, intellectual property, and income (May 27) – legal framework, licencing, how to protect your designs, marketing
- project development (Jun 3)
- project presentation (Jun 10)

400 people doing FacAcademy at this time.
Few weeks to catch up on work, documentation etc
Team – Grading committee, going over the work to see if it meets the standards, will let know if all is completed

August – graduation

Starting week on Wednesday

12.30 – meeting on Wednesday
Lectures 9am in Boston, east standard time
Lectures start 2-5 pm, and then shift 1-4pm

**Monday:**
*Remote tutoring:* Monday morning QnA 9:00 to 10:00
*All Fab Academy Iceland:* Central progress talk and work presentation on monday at 13:00
(all students need to come/connect to Fab Lab Reykjavik.)

*Local students:* Progress talks and working on Mondays 13:00-18:00
Assistance and Student work
- this will live in the agenda as appointments describing topics

**Wednesday**
Students arrive at 12:30 for an hour introduction to the topic at hand.
Prep-meeting for instructors at 13:30.
Class, Wednesday initially from 14:00 to 17:00 later from 13:00 to 16:00

**Friday:**
*Remote tutoring:*Friday morning tutoring session 9:00 to 12:00
*Local students:* Teaching on Fridays 13:00 to 18:00

Lectured are video taped and can be revisited.

Wed – review in class
Friday – morning tutoring, afternoon machining
Mon – home work review

We'll probably joined by students from other countries in Europe

Schedule for workshop
Saturday – might be possible to work

Tuesday afternoon & Thursday evening – open workshop

Next Tuesday – talk: motion control system. 6-9pm

FabLab2014 archives – student projects 2014:
http://fabacademy.org/archives/2014/students/index.html

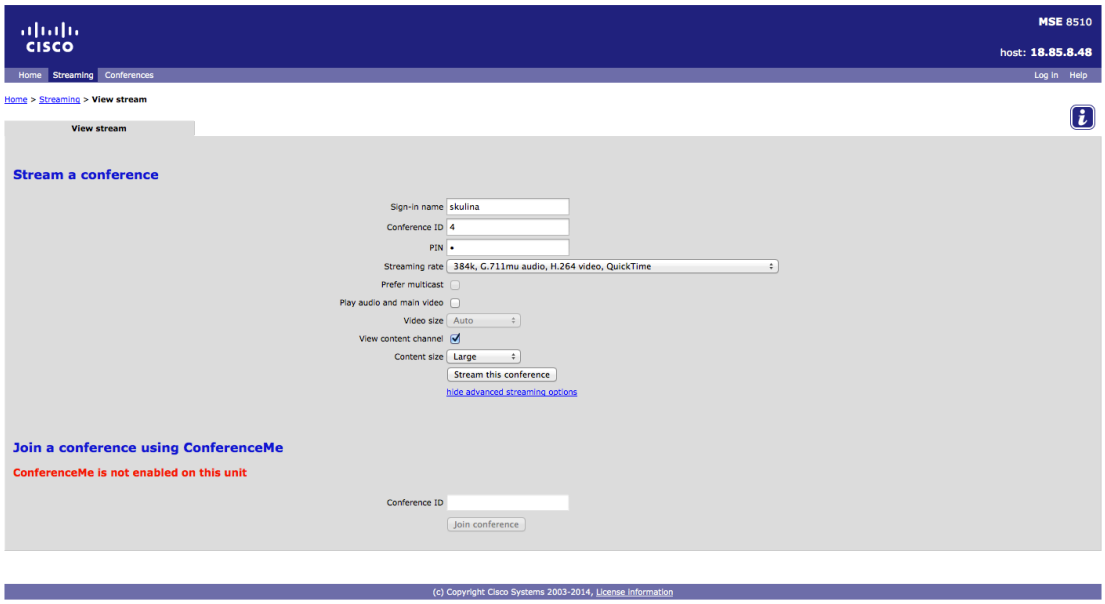
Work assignments – weekly assignments can be used towards the final projects

Unix – Ubuntu – linux, but we will be able to work on iOS, because it is Unix based.

Software on linux – for driving the machine

## 28.1.2015

Login for FabAcademy: http://mcu.fabacademy.org/streaming.html




Research – Digital Fabrication, digitizing the fabrication process itself
Burr, cut, fuse, melt, sinder, jet, infuse, link
Lego – geometry ruled by the parts.
3D machining – adding or subtracting

A hierarchical model for evolution of 23S ribosomal RNA – Bokov & Steinberg

Digtising the material themselves – the secret of life

The Science of Digital Fabrication

Roda – computers controlling machines, putting code into the machines and working on the material

FabLab 1.0 – computers – machines
See slide

Rapid prototyping of rapic prototyping-machines
Machines that make
Spin-off projects

CAD-CAM

Machines making machines

Object  oriented hardware mirroring machine operated software

Building blocks to make machines, assembling modules of software

This is to make the process easier

Turning your designs into instructions for the machines

Transition – 1.0 to 2.0

Learning to make machines

Cutting or printing, assembling or disassembling

Think of Lego – molecular lego, made out of DNA

Starting to make bigger parts, looking at electronics
Micro-Lego – start to assemble 3-dimensional electronics
Making circuits
Digikeys – with 3 part making resistors

Looking at how to make parts, make transistors, integrated circuits

Geological features, by assembling discreet parts
Coding folding

Project ARA – Google
Building smartphones
Everything configurable

Theory of self-producing automata

Mainframe computers
Recreating history – fablab, mini-computers fabrication
Personal computer – historical alignment

Mainframe – 1 million dollars
Mini computer – workgroup could use it
Personal Computer – all integrated into one system
FabLab is like a mini-computer
Machines that make machines

Research is how you take all the capabilities and make it into one machine

You don't have to wait 20 years
Sending files between people on the internet

Applications of the fablab are like games and applications on the internet

How to make (almost) anything – class at MIT
Students made various projects:  personal application
Ken Olson – he said: nobody needs a computer in the home

PDP was used to make the internet

Personal computing – personal fabrication

LAB 10.000.000 dollara tæki + meira fé
1000 dollar machine does not obsolete fablab

Mainframes are still used

FabLab - 100.000 dollara fjárfesting
Giving people the tools
Computers for design:

- electronics
- large format machining (furniture)
- computing
- 3D scanning and printing

The labs all share a common set of tools
No claims made on intellectual property
All share to learn from each other

They have been doubling every other year

Blair Evans – Detroit FabLab: working with equit-youth
Cook inlet tribal council
Kids play video games

Haystack – temple of arts and crafts

Northern Ireland – Belfast, kids can come together

Fablabil – Israel

GISA – making change

Manchester Lab – entrepreneurs, new industrial revolution, that has an interesting character. Go to market and ship the data… that can be downloaded locally. New method of production. Peers of commerce.

Protecting intellectual property

FabLab – Denmark – Bottom line

What if you can just make something?
Making things on demand locally does not replace mass manufacturing.
New economic activity – new way to think about distributed production.

FabAcademy
Students in at MIT

Model of labs all over the world
MIT is like a mainframe
Distance online learning
Massive online class

Internet – bitmap – connecting mainframe
In the FabAcademy: students have peers locally and experts
You are in the lab with the machines, lecture, content share – distributed education. Everybody talks to everybocy all around the world.

The Academy of (almost) anything

How to grow (almost) anything? BioTech

Symposium on digital fabrication and Norwegian fab lab –
Chicago, india, Amsterdam, New Zealand, Barcelona

The International FAB LAB Conference
Architect and designers project – Solarhouse
Vicente Guallart – Chief Architect
Spain youth unemployment reaches record 56.1%
Filling the city with FabLabs – produce what you consume
Counting down to self-sufficiency
Data comes in and out, but the atoms stay there
Furniture, food, energy – produce these locally
New kind of economy – you create local self-sufficiency

Google gives away search – make something and sell it
FabLab –

Mobile FabLab at the White House
Creating a new economy, coming to places you are in
National Lab out of a local lab

FAB Foundation
Each of the labs need infrastructural support
Global linking
Making a supply chain
Network
One of the learning products is skills
Local part of a global network

FAB11 (2015) – all the labs are coming back to Boston
FAB12 – In China

Foreign Affairs – grein
Neil Gerschfield

Project management

2015 Schedule

FabAcademy Diploma – skills based portfolio

Diploma Thesis

Each week there is an assignment

Example:  make something big
Mastering of tooling, speed, mastery of skills, documenting it

Final project

**assignment**
document a final project that integrates the range of units covered, answering:
what does it do?
who's done what beforehand?
what did you design?
what materials and components were used?where did they come from?
how much did they cost?
what parts and systems were made?
what processes were used?
what questions were answered?
how was it evaluated?
what are the implications?

projects can be separate or joint, but need to show individual mastery of all of the skills
where possible, you should make rather than buy the parts of your project, present your final project, weekly assignments, and tutorials

Every Week:

- understanding concepts
- basic skills
- where to go to learn more

Non-linear cloud information, the brain to assemble this
Stay with the pace, try to keep up
Later in the year some things that your learned will make sense

Completion is based on that you can finish the tasks

Some students go into advanced schooling

Lot of demand for these skills

Learning the skills and document them

Number of things are important

Some of the things will be covered – safety

Important to learn what is important

Regional Reviews – to present the work - Tuesdays
Wednesday – reviewing the regional reviews
Picking a random person that will present to the world
Very interactive, talking through problems

Questions and Answers:

Self-suffiecient citys: Barcelona, Boston, Cambridge, Reykjavík?
FabCity network – organization of those

Dense urban architecture – project

Tech Start-up: prospect for sales – passion for making things. Have you been interested in the ethics of fabrication.
Fears of unchecked technology going riot…
Obvious fear… tools for war…doing bad stuff…

Ieducation – industry – all segregated
Research is hard
A lot of work to come
What is hard here is that FabLab has to indent new organization, that technology can reinvent societies

**Project Management**

Building documentation – weekly on the final project

1 step – synchronization

rsync – synchronizes files:

Unison – file synchronizer, goes both ways:

**Version control:**

RCS
CVS
Subversion
Git GitHub (web hub that serves archives)
Mercurial Bitbucket class archive (used by FabAcademy)
Bazaar
Dropbox

Updating and merging files
Working version

Merging changes, any computer

Mercurial – more used by big companies
Bitbucket similar to GitHub

We will be using Mercurial archives
Comit
Push

Going into the archive
Multiple archives: regional for the continents
Shared documentation archive
Archive remembers the history, lets us upload and share the content
Using the regional archive to build a website

Mozilla has good documentation
GVIM – editor
Editing a raw html file
Low level solution

**Web development:**

GUIs
WISIWIG editor
LibreOffice Writer/Web
SeaMonkey – quickly switch to see the high or low level editor
Brackets 1.1. – open source text editor
Dreamweaver

**Blogs, wikis, content management systems:**

Jekyll
Docuwiki
GUIs
WISIWIG editor
LibreOffice Writer/Web
SeaMonkey – quickly switch to see the high or low level editor
Brackets 1.1. – open source text editor
WordPress
Drupal
Moodle
Security

All the content goes in, except big picture files

Archive – learning the skill

Pendulum swing – authoring

Start with the lower level tools
Exporting flat level content that goes into the archive

**Videoconferencing:**

H323 – standard
SIP – multimedia conferencing standard
H.239 – content standard, sending desktop
Codecs:
H.261
H.263 - content
H.264 –

Multipoint control unit (MCU) – easy to stream
hardware software cloud

clients

software
Jabber Video: https://www.ciscojabbervideo.com/home
RealPresence ClearSea Linphone Ekiga XMeeting hardware
speakerphone webcam Polycom LifeSize

**Remote desktop:**

TightVNC

x11vnc

**Project management programs:**

TaskJuggler
OpenProj
GanttProject

Allocate time
Paralell advancing all capabilities at the same time – spiral development

**Project management principles:**

demand- *vs* supply-side time management serial *vs* parallel development spiral development bottom-up *vs* top-down debugging hierarchy, modularity
Mythical Man-Month – bók

Assignment
Build a personal site in the class archive describing you and your final project

Mercurial – do the tutorial

TortoiseHg: http://tortoisehg.bitbucket.org/

Brew for mac

Public and private keys

Clone archive

Create your own archive

Edit . hg/hgrc

hgclone script

See individual commands

Mercurial server

**Workflow:**

You need to measure the size of what you are to commit – 1Mb

Directory of uncompressed images
The pictures that go into the archive should be compressed to go into the archive
Use Convert – to compress, resize pictures for Web and check size before you connect

Videos should go to Vimeo or YouTube – embed a link

Heads and merging – the archive can simultaneously exist in various version, you can accidentally make multiple versions when pushing.
Before you push new work, you need to merge in the work you do not have.
If 2 try to merge in the same time – you have a conflict
Merge conflicts –
Before you push you need to pull, merge and push

Some operating system differ on use of casing of letters
Stick with 7bits character – no Icelandic characters

Refresh your browser

1. Assignment
2. Mercury - tutorial
3. Experiment with the development tool

Next week: design tools

Regional reviews – regionally organised
Bitnami: https://bitnami.com/stacks - https://bitnami.com/cloud

**Friday 30.1.2015**

Installing Mercurial and quickstart: http://mercurial.selenic.com/
Basic workflows: http://mercurial.selenic.com/guide
Tutorial: http://mercurial.selenic.com/wiki/Tutorial

WiFi access code for the Siminn network ADEE51: D9B4FF4C1F

//192.168.1.67/
fablab – fablab

//fab.server/

Windows:
z:
cd

My location for fablab stuff:
cd /Users/skulina/Documents/Verkefni/2015_FabLab/eu_archive

hg clone
options source (from) or destination (to)

Populate the directory on the local machine

hg clone (takes source, then destination)

spacebar og .

```
/Volumes/FabShare/fab-academy/
.DS_Store  eu/
(clone command)

Skulinas-MacBook-Pro:eu_archive skulina$ hg clone
/Volumes/FabShare/fab-academy/eu/ .
updating to branch default
353 files updated, 0 files merged, 0 files removed, 0 files
unresolved
Skulinas-MacBook-Pro:eu_archive skulina$
(Result)
```

In user/skulina/Documents/Verkefni/2015_FabLab/eu_archive/.hg – open hgrc file.

It reads:

# example repository config (see "hg help config" for more info)

[paths]
default = /Volumes/FabShare/fab-academy/eu

# path aliases to other clones of this repo in URLs or filesystem paths
# (see "hg help config.paths" for more info)
#
# default-push = ssh://jdoe@example.net/hg/jdoes-fork
# my-fork      = ssh://jdoe@example.net/hg/jdoes-fork
# my-clone     = /home/jdoe/jdoes-clone

[ui]
# name and email (local to this repository, optional), e.g.
# username = Jane Doe <jdoe@example.com>

Change the username and insert email address – to make other user aware of user and to be able to contact

fabacademy.org/
Content of local folder – academy-archive:
.hg
eu
labs
students

hg status (gives you the current state of the archive)

hg commit  -m “homework week1” (will push the change to the local server or later to shared fablab central server)
Make sure that your update has a label that describes the update

hg pull

Skulinas-MacBook-Pro:~ skulina$ cd/
-bash: cd/: No such file or directory
Skulinas-MacBook-Pro:~ skulina$ cd /Volumes/
Skulinas-MacBook-Pro:Volumes skulina$
Skulinas-MacBook-Pro:Volumes skulina$ cd /Volumes/
Skulinas-MacBook-Pro:Volumes skulina$
Display all 1385 possibilities? (y or n)
Skulinas-MacBook-Pro:Volumes skulina$ cd
FabShare/               MobileBackups/
Macintosh HD/           mem_-mac-mg8200-1_11-ucd/
Skulinas-MacBook-Pro:Volumes skulina$ cd FabShare/fab-academy/eu/
Skulinas-MacBook-Pro:eu skulina$ ls
eu                  index.html      labs                students
Skulinas-MacBook-Pro:eu skulina$ cd ..
Skulinas-MacBook-Pro:fab-academy skulina$ cd eu

Skulinas-MacBook-Pro:eu skulina$ cd /Users/skulina/Documents/Verkefni/2015_FabLab/eu_archive
Skulinas-MacBook-Pro:eu_archive skulina$

```
Last login: Sat Jan 31 16:53:37 on console
Skulinas-MacBook-Pro:~ skulina$ hg
Mercurial Distributed SCM

basic commands:

 add           add the specified files on the next commit
 annotate      show changeset information by line for each
file
 clone         make a copy of an existing repository
 commit        commit the specified files or all outstanding
changes
 diff          diff repository (or selected files)
 export        dump the header and diffs for one or more
changesets
 forget        forget the specified files on the next commit
 init          create a new repository in the given directory
 log           show revision history of entire repository or
files
 merge         merge another revision into working directory
 pull          pull changes from the specified source
 push          push changes to the specified destination
 remove        remove the specified files on the next commit
 serve         start stand-alone webserver
 status        show changed files in the working directory
 summary       summarize working directory state
 update        update working directory (or switch revisions)

(use "hg help" for the full list of commands or "hg -v" for
details)
Skulinas-MacBook-Pro:~ skulina$ cd Do
Documents/ Downloads/
Skulinas-MacBook-Pro:~ skulina$ cd Documents/
Display all 144 possibilities? (y or n)
Skulinas-MacBook-Pro:~ skulina$ cd Documents/Verkefni/2015
2015-Samspil-Menntamiðja/ 2015_FabLab/
Skulinas-MacBook-Pro:~ skulina$ cd Documents/Verkefni/2015
2015-Samspil-Menntamiðja/ 2015_FabLab/
Skulinas-MacBook-Pro:~ skulina$ cd
Documents/Verkefni/2015_FabLab/eu_archive/
Skulinas-MacBook-Pro:eu_archive skulina$ hg clone /Volumes/
Brackets Release 1.1/ Google Chrome/        Macintosh HD/
FabShare/             Java 8 Update 31/     MobileBackups/
Skulinas-MacBook-Pro:eu_archive skulina$ hg clone /Volumes/
Brackets Release 1.1/ Google Chrome/        Macintosh HD/
FabShare/             Java 8 Update 31/     MobileBackups/
Skulinas-MacBook-Pro:eu_archive skulina$ hg clone
/Volumes/FabShare/
.DS_Store    Electronics/ Modela/      Projects/    Software/
```

```
fab-academy/
3D-printer/  Lasercutter/ Photos/      Shopbot/
Vinylcutter/
Skulinas-MacBook-Pro:eu_archive skulina$ hg clone
/Volumes/FabShare/fab-academy/
.DS_Store  eu/
Skulinas-MacBook-Pro:eu_archive skulina$ hg clone
/Volumes/FabShare/fab-academy/eu/ .
updating to branch default
353 files updated, 0 files merged, 0 files removed, 0 files
unresolved
Skulinas-MacBook-Pro:eu_archive skulina$ .hg
-bash: .hg: command not found
Skulinas-MacBook-Pro:eu_archive skulina$ hg
```