Class Syllabus 15/FA

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How to Build Almost Anything

Prefix/Section: 15/FA_INFO_1955_5A

Class Identification

TITLE: How to Build Almost Anything
Class Syllabus 15/FA
PREFIX/SECTION: 15/FA_INFO_1955_5A
CREDIT HOURS: 4.50
CLASS BEGINS/ENDS: 09/09/15 - 11/18/15
MEETING DAY(S)/TIMES: W / 06:00PM - 09:40PM
NO CLASS DAYS: None

WITHDRAWAL DATE: 11/04/15
CLASS LOCATION: Fort Omaha Campus, Building 008, Room 203

Contact Information

INSTRUCTOR NAME: Jason Webb
OFFICE LOCATION:
OFFICE TELEPHONE:
TOLL-FREE NUMBER:
1-800-228-9553 (Use only during instructor's MCC office hours. Identify yourself as a student and give the operator your instructor's office number.)

OFFICE HOURS: By appointment.

EMAIL ADDRESS: jwebb13@mccneb.edu
ACADEMIC AREA: Information Technology & E-Learning (IE)

Course Information

This course covers the safe use of hand and power tools. Focus is on the proper setup and use of tools. In this class, students learn basic concepts of prototype construction using tools and materials found in the FABLAB laboratory. Students take part in a laboratory project involving all stationary and power tools. Material costs for projects are additional.

MINIMUM TECHNICAL SKILLS:

- Use a standard computer for basic functions such as internet research

COURSE OBJECTIVES:

1. Demonstrate safe operation of all tools found in the lab.
2. Categorize the proper use and maintenance of stationary equipment and hand tools.
3. Recognize prototype construction processes and explain how it affects the production of an object.

4. Analyze a proposed product and select the appropriate software to design and manufacture prototypes.
5. Demonstrate how to evaluate and select the appropriate materials for construction based on structure and proposed use.
6. Analyze a proposed project creating a materials list including supplier, cost, and steps required to complete with target dates for each step of production.
7. Plan and construct a project.

REQUIRED & SUPPLEMENTAL MATERIALS:

1. USB drive
2. Additional materials over $50 are students responsibility.

SUPPLEMENTAL MATERIALS:

None.

COMPUTER REQUIREMENTS:

The computer you use for MCC online courses must be able to run one of the Blackboard-compatible web browsers listed on the Browser Support Page: www.mccneb.edu/online/browsers.asp.

SOFTWARE/FILE SUBMISSION REQUIREMENTS:

Metropolitan Community College uses Microsoft products as part of its standard software and encourages students to do the same. You may save word-processed documents for file attachments in Microsoft Word .doc or .docx format. If your software does not allow either of these, then save files in Rich Text Format (.rtf).

BLACKBOARD-ENHANCED ON-CAMPUS COURSES:

This course uses Blackboard Learn (blackboard.mccneb.edu). Blackboard provides online tools that complement traditional materials and classroom interaction. Students will use their MCC username and password to access Blackboard on the first day of class. The instructor will provide an orientation to Blackboard and the online tools students are expected to use.

CLASS STRUCTURE:

The first couple weeks will be largely lecture and discussion-based and are meant to immerse you in the mindset of making and thinking creatively. However I will be making as strong of an effort as I can to make these classes interesting and fun and may therefore have spontaneous small, hands-on projects.

After the first couple weeks, most class sessions will follow a similar structure:

1. *Discussion of Curiosity Handbook activity since last week* - talk about what's interesting to you, ask questions about things that may still be unclear and share any projects or information that excite you with the class
2. *Introduction to a new machine* - how it works, along with strengths and weaknesses and related machines to be aware of.
3. *Discussion and demonstration of materials* - find out what is compatible with the machine, what is dangerous and where you can find good stuff.
4. *Discussion of relevant design principles* - general tips about things to avoid or try when designing something for particular machine, shown through samples.
5. *Sampler project activity* - use what you've learned during the class session to design and make something unique on the machine, with as much guidance from the instructor as you'd like.

After all machinery and important information has been discussed, multiple class sessions at the end of the term will be dedicated entirely to hands-on execution of a final project of your design.

Throughout every class session you will be expected to continually use your Curiosity Handbook to capture thoughts, questions, curiosities and critical information. Outside of class you are expected to expand on whatever

information you feel is most interesting or useful for you, which may be shared through informal discussions in the next class session.

During all class sessions you are highly encouraged to indulge your curiosities and ask any questions that come to you, so long as they don't disrupt the class or significantly divert focus from the major themes of the class session.

Once the major topics of the night have been covered and independent hands-on work has begun you are more than welcome to talk with me about more advanced knowledge, trends or resources you can use to go beyond what has been presented on your own. However, any students who need help with their project take precedence over these advanced discussions.

Assessment of Student Work

TYPES OF ASSESSMENTS/ASSIGNMENTS:

1. *Safety test* - administered on the first night. Must get 90% or better and can be taken multiple times.
2. *Curiosity Handbook* - weekly input and discussion, graded throughout the term.
3. *Sampler project* - on-going project and presentation, graded according to rubric.
4. *Final project* - project and presentation, graded according to rubric.
5. *Tutorial-style documentation of final project* - Instructable tutorial guiding other Makers through the entire process of creating your project, graded according to rubric.

Each of these assignments and their various requirements will be discussed more thoroughly in class as they are assigned.

GRADING POLICY:

A = 92%+

B = 82-91%

C = 72-81%

D = 62-71%

F = 61% and below

ASSESSMENT OF STUDENT LEARNING PROGRAM:

Metropolitan Community College is committed to continuous improvement of teaching and learning. You may be asked to help us to accomplish this objective. For example, you may be asked to respond to surveys or questionnaires. In other cases, tests or assignments you are required to do for this course may be shared with faculty and used for assessment purposes.

USE OF STUDENT WORK:

By enrolling in classes offered by Metropolitan Community College, the student gives the College license to mark on, modify, and retain the work as may be required by the process of instruction, as described in the course syllabus. The institution shall not have the right to use the work in any other manner without the written consent of the student(s).

Instructor's Expectations of Students

ATTENDANCE/PARTICIPATION POLICY:

ATTENDANCE/PARTICIPATION REPORTING:

To confirm each student's eligibility to remain registered for the class, the instructor will officially report attendance/participation on or before the Census Date.

COMMUNICATION EXPECTATIONS:
When you communicate with others in this course, you must follow the Student Conduct Code (mccneb.smartcatalogiq.com/en/current/Course-Catalog/Student-Services/Student-Conduct), which calls for responsible and cooperative behavior. Please think critically, ask questions, and challenge ideas, but also show respect for the opinions of others, respond to them politely, and maintain the confidentiality of thoughts expressed in the class. You may also wish to review information at www.albion.com/netiquette.

ACADEMIC HONESTY STATEMENT:
Students are reminded that materials they use as sources for classwork may be subject to copyright protection. Additional information about copyright is provided on the library website at www.mccneb.edu/library or by your instructor. In response to incidents of student dishonesty (cheating, plagiarism, illegal peer-to-peer file sharing, etc.), the College imposes specific actions that may include receiving a failing grade on a test, failure in the course, suspension from the College, or dismissal from the College. Disciplinary procedures are available in the Advising/Counseling Centers or at www.mccneb.edu/procedures/V-4_Student_Conduct_and_Discipline.pdf.

STUDENT WITHDRAWAL:
If you cannot participate in and complete this course, you are encouraged to contact your instructor and consult an MCC advisor, counselor, or the Financial Aid Office to evaluate the consequences of dropping the class. You can officially withdraw through My Services on the MCC My Way portal at myway.mccneb.edu or by calling Central Registration at 402-457-5231 or 1-800-228-9553. The last date to withdraw is noted in the CLASS IDENTIFICATION section of this syllabus.

Learning Support

MCC's Learning and Tutoring Centers, Math Centers, and Writing Centers offer friendly, supportive learning environments that can help students achieve educational success. Staff members in these centers provide free drop-in assistance with basic computing, reading, math, and writing skills. Self-paced, computer-assisted instructional support in reading, vocabulary, typing, English as a Second Language, and online course orientation is also available.

Detailed information about the Learning and Tutoring, Math, and Writing Centers is in the My Way portal, the College Catalog, and online at www.mccneb.edu/ltc/.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES:
Metropolitan Community College will provide reasonable accommodations for persons with documented qualifying disabilities. It is the student's responsibility to request accommodations from Disability Support Services (DSS) located in each Student Services Office. After students have arranged for accommodations with DSS, the student and instructor should privately discuss these accommodations. For further information, please contact DSS or visit www.mccneb.edu/dss/.

Technology Support

TECHNOLOGY RESOURCES:
By using the information technology systems at MCC (including the computer systems and phones), you acknowledge and consent to the conditions of use as set forth in the Metropolitan Community College Procedures Memorandum on Acceptable Use of Information Technology and Resources. It is your responsibility as a student to be familiar with these procedures. The full text of the Procedures Memorandum may be found at the following website: www.mccneb.edu/procedures/X-15_Technology_Resources_Use.pdf.

Schedule

NOTICE: This syllabus sets forth a tentative schedule of class topics, learning activities, and expected learning outcomes. However, the instructor reserves the right to modify this schedule to enhance learning for students. Any modifications will not substantially change the intent or objectives of this course and will conform to the policies and guidelines of Metropolitan Community College.

Week 1 - *the basics*

- Syllabus review
- Curiosity Handbook introduced and discussed
- Safety material presentation
- Lab tour with safety review
- Safety test
- Show-and-tell samples
- *Laser-cut keychain activity*

Week 2 - *what it means to be a Maker and introduction to tinkering*

- Makers, hackers and tinkerers - an introduction to the history and implications of the Maker's Movement
- Intellectual property and licensing for creative work
- Introduction to fabrication and prototyping techniques
- *Sampler project activity- visualization and rapid prototyping*

Week 3 - *laser cutting*

- Generalized introduction to CAD/CAM workflow
- In-depth tour of laser cutter and usage
- Material compatibility and sourcing discussion (including fun experimental materials!)
- *Sampler project activity - laser cut object*

Week 4 - *3D printing and 3D scanning*

- Introduction to 3D scanning methods - photogrammetry, depth-based cameras and laser-scanning methods
- *Sampler project activity - 3D scanning activity*
- In-depth tour of FDM 3D printers and usage
- Basic introduction to full-color 3D printing
- Discussion of current 3D printing trends and developments
- Designing for 3D printing
- *Sampler project activity - 3D printed object*

Week 5 - *CNC milling and routing*

- In-depth tour of CNC machine
- Material compatibility and sourcing discussion
- Designing for CNC machines
- *Sampler project activity - CNC milled or routed object*

Week 6 - *vinyl cutting*

- In-depth tour of vinyl cutter
- Designing for the vinyl cutter
- *Sampler project activity - vinyl project*

Week 7 - *introductory electronics*

- Crash course in basic circuit concepts for tinkerers (reading schematics, gathering parts, breadboarding, soldering and testing)
- *Sampler project activity - electronics project*

Week 8 - *interactive electronics and basic coding*

- Introduction to Arduino (what it is, how it works and why it's awesome)
- Demonstration and discussion of sensors and useful modules
- *Sampler project activity - Arduino project*
- *Optional:* creative coding on the computer using Processing

Week 9 - *final project studio time*

- Group presentations of sampler projects
- *Final project assigned*
- Dedicated studio time for final project

Week 10 - *final project studio time*

- Dedicated final project studio time

Week 11 - *final project presentations*

- Group presentations of final projects

Important Dates

ENROLLMENT:
myway.mccneb.edu/StudentServices/Pages/default.aspx

ACADEMIC CALENDAR:
www.mccneb.edu/academics/calendar.asp