NEWM-284-Building Physical Prototypes-3 CR  
Monday 12-2:40PM  IT Room 355  

Instructor: Associate Professor Susan Tennant  
Office Address: ICT 459  
Email: stennant@iupui.edu

Office hours: Monday 3:00pm – 4:30pm  
Or by appointment  

Email: Please use Oncourse email for ALL correspondence with instructor.

Class Description:  
Building physical prototypes is the study of inventions, gadgets and objects that involve technology and are used to assist people in a meaningful way. With this knowledge, students will facilitate through surveys, research and design principles how prototypes are utilized in the home, office or elsewhere. This class will involve discussions that involve problem solving and critically exploring the functional, aesthetic and the physical properties of these objects/services. This is a research and concept development course. Students will read articles, review media, write paper(s), develop a plan, draw models and learn how to create a physical and digital prototype.

What you will do in this class:  
• Research inventions, gadgets and objects that assist people. This ranges from discussions and research on common objects such as an ambient umbrella to wireless communication devices.  
• Students will research how digital products and services from conceptualization to dissemination to home, office and or for transportation, public and private space.  
• Students will read two books in this class  
• Students will conduct surveys  
• Students will write paper(s).  
• Students will learn how to “sketch” ideas and use image mapping for concept development.  
• Students will learn how to use Sketch-up a free software  
• Students will develop a better understanding of how the digital products they use are developed.
• Students will learn about developing new “inventions” through discussions about patents, copyrights and ownership rights.

Course Outcomes:
Through readings, discussions, assignments and activities, students will develop an insight into the principles of building physical prototypes and general knowledge of 3D design. Students should be able to demonstrate:
• Basic knowledge of physical prototype development process
• Write a research paper
• Get hand’s on experience of building a model/prototype
• Get hand’s on experience in ideation and concept development

Core Communication and Quantitative Skills learned in this class:
• Express ideas and facts to others effectively in a variety of formats;
• Comprehend, interpret, and analyze information;
• Communicate orally in one-on-one and group settings;
• Solve problems that are quantitative in nature, and
• Make efficient use of information resources and technology for personal and professional needs.

Required textbook:
Title: Design Like Apple: Seven Principles for Creating Insanely Great Products, Services and Experiences
Author(s): John Edison and Ernest Black
Publisher: John Wiley & Sons 2012
Book site: http://publisher’s website for the book
ISBN: 9781118290316
Link to Books24x7: http://www.ulib.iupui.edu/node/9054
http://iucat.iu.edu/catalog/12148853

Title: Steve Jobs
Author: Walter Issacson
ISBN: 978-1-4516-4853-9

Other resources
Free online Text by Carolyn Snyder paper Prototyping: The fast and easy way to define and refine user interfaces Chapter 7 located on Books 24x7 at the IUPUI website [http://www.iucat.iu.edu.proxy.ulib.iupui.edu/authenticate.cgi?status=start](http://www.iucat.iu.edu.proxy.ulib.iupui.edu/authenticate.cgi?status=start)
Modern Marvels
Oncourse Website listing

**Spelling and grammar**
Setting up a Grammarly@edu account is extremely easy: just instruct your students and faculty to use the access code goaGHTqrhtpApfK when registering a new account at [www.grammarly.com/edu](http://www.grammarly.com/edu), and they are ready to go.

**Equipment/Supplies**
- Equipment needed: (notebooks, disks, binders, etc.)
  - Internet access
  - Paper Pad, Scissors and other materials as needed
  - One lead pencil, Permanent black magic marker and large eraser
  - Scissor, straight edge, utility knife
  - Foam core or poster board
  - Tape or other adhesive
Software used:
In this class we will work with Sketch-up, available free at Sketchup.com. The instructor will do demonstrations in the case students have no prior experience.

Communications
All class documents including assignments and syllabus are posted on ONCOURSE. You can also email or phone me at my office anytime with concerns, assistance outside about this class or other issues related to your life in the SOI at IUPUI. I’m a good listener.

Lectures and demonstrations
The class will be a lecture and lab format. Students will also be required to do some field visits to a public space such as a museum, park and cultural site—thrown in to keep you interested. The textbook is required along with other reading or research assignment. It is up to the student to acquire any assignments and handouts. All assignments, readings, test/quizzes will be posted on ONCOURSE. If you miss a lecture, get notes from a classmate. I don’t do PowerPoint slides (Only occasionally) and my notes are not posted on ONCOURSE. It is up to you to take notes. You can use your laptop.

Assignments
All assignments will be discussed during the class and posted on ONCOURSE with deadlines. These assignments will sometimes be executed in class but not always and you will need to work on your own time to complete the assignment. IUPUI requires each class credit to assign a minimum of three hours per credit hour to each class a student is taking. So in a three-credit class such as this one, you are required to conduct three hours per credit or 9 hours of time beyond the class time. The assignments are meant to be challenging not overwhelming. Follow Instructions on each assignment word document posted to ONCOURSE carefully. If you have questions about assignments please contact the Instructor as soon as possible. All assignments are to be handed in on time; it is up to you to meet this deadline. Late work will not be accepted, unless excused for medical or other reasons discussed with the instructor prior to the due date. You will receive a zero for any assignment not turned in, with NO EXCEPTIONS. Think of it this way, if I was your boss and you didn’t do your work on time, you would most likely be fired. This is good preparation for life beyond SOI at IUPUI.

Class assignments will be given during scheduled class time but will require students to work on their own outside of class. At anytime a student may make an appointment and ask for assistance, advice or suggestions. All assignments and class handouts will be posted to ONCOURSE. All exams, if given will be posted on ONCOUSE. Students will be given ample time to complete each assignment. All your work will all be averaged into a final grade for the semester. Keep in mind that during critiques, participation in class discussions is always a factor in the grading scale.

Student Assessment
Developing communication skills is important for everyone, plus it’s a good way to share information. Each student will have an opportunity to discuss and share their research in class and be given feedback by the instructor and classmates. Feedback is part of the class assessment process, a constructive method to give students a chance to review each other’s work. This is not a reflection of you personally it’s about the work you did for this class. Always maintain professionalism about yourself and your comments.

REMEMBER: There are always areas for improvement. Do your best and your grade will reflect your class work effort.

I will give you comments on all assignments. These will be posted next to your grade on ONCOURSE. If you disagree with the grade it is your student right to address what you feel is the reason for a grade adjustment. I will discuss grades with students during a scheduled office visit. Please not in class.

Class Courtesy

<table>
<thead>
<tr>
<th>DATE</th>
<th>LECTURE</th>
<th>CLASS WORK</th>
<th>DUE</th>
<th>ASSIGNMENTS</th>
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<tbody>
<tr>
<td>1/13</td>
<td>Lecture</td>
<td>Drawing exercise</td>
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<td>Overview of class Greatest g. dgets of 20th century, and Inventions, Instructables, Prototype overview <a href="http://inventors.about.com/library/weekly/aa091297.htm">http://inventors.about.com/library/weekly/aa091297.htm</a></td>
<td>Download Sketchup.com 3D space and virtual space</td>
<td>Get the books</td>
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<td>Read the book! Read Chapter 1: Design book/Steve Jobs Chapters 1-2</td>
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<td>1/20</td>
<td>MARTIN LUTHER KING HOLIDAY</td>
<td>NO CLASS</td>
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<td>1/27</td>
<td>Problem solving /Research and visual thinking Fun Theory; New technologies, Consumer awards 2014; Ideation concept development plan</td>
<td>Problem solving Concept development Review the Design like Apple book and Steve Jobs Discuss design and achieving excellence. Standards, working together and researching floor plans</td>
<td>Microsoft parody <a href="https://www.youtube.com/watch?v=EUXnJraKM3k">https://www.youtube.com/watch?v=EUXnJraKM3k</a> with Danny Elfman Music <a href="https://www.youtube.com/watch?v=fj9OWEm_uSM">https://www.youtube.com/watch?v=fj9OWEm_uSM</a></td>
<td>Steve Jobs Chapters 3-5; Read the article under resources The art of listening</td>
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<td>Date</td>
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<td>2/3</td>
<td><strong>Low fidelity prototype</strong>&lt;br&gt;Artists who make cool things:&lt;br&gt;snibbe, Utterback Simon Sinek</td>
<td>Paper prototypes/ concept scenario and robot&lt;br&gt;Instuctables.com, 3D perspective drawing</td>
<td>#1 Scenario/Concept Paper&lt;br&gt;Chapter 3&amp;4: Design book/ Steve Jobs Ch 6-8</td>
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<td>2/10</td>
<td>Developing a project plan for development of a prototype for a product or service&lt;br&gt;“Stuff” George Carlin, snibbe, Utterback Simon Sinek TED TALK Non electric refrigerator</td>
<td>Sketchup.com overview&lt;br&gt;Quiz#1 Chapter 1&amp;2: Design book&lt;br&gt;Sketchup.com building an exterior Way finding models: directions, graphics and UI</td>
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<td>2/17</td>
<td><strong>Sketching</strong> the prototype&lt;br&gt;Surveys and getting feedback</td>
<td>Sketchup.com building interior with color&lt;br&gt;Sketchup.com overview your individual project introduced</td>
<td>#2 Scenario Development plan go to AVL at 1:30&lt;br&gt;Chapter 4&amp;5: Design book/ Steve Jobs Ch 9-13</td>
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<td>2/24</td>
<td>Surveys and getting feedback&lt;br&gt;Building layout part 1&lt;br&gt;Building the physical prototype&lt;br&gt;Materials to use, how, tools, sketches&lt;br&gt;Research floor plans</td>
<td>Field work/Asking the right questions of end users. Survey the end users.&lt;br&gt;<strong>Quiz#2</strong>: Design book Chapters 3&amp;4&lt;br&gt;Sketch-up working with floor plans</td>
<td>Chapter 4: Design book/ Steve Jobs Ch 14-17</td>
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<td>3/3</td>
<td>Building layout part 2&lt;br&gt;Building the physical prototype&lt;br&gt;Materials to use, how, tools, sketches</td>
<td>Getting all the information and planning the touch screen way finding project of ICTC&lt;br&gt;Sketchup.com</td>
<td>#3 Research floor plans; building physical and digital model&lt;br&gt;Chapter 5: Design book/ Steve Jobs Ch 18-22</td>
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<td>3/10</td>
<td><strong>Market place</strong>, consumer&lt;br&gt;Working on the touch screen map project of ICTC&lt;br&gt;Sketchup.com</td>
<td><strong>Quiz</strong>: #3: Design book Chapters 5&amp; 6</td>
<td>Chapter 6: Design book/ Steve Jobs Ch 23-26</td>
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<td>3/17</td>
<td>What is needed to complete the project?</td>
<td>Working on the touch screen map project of ICTC. WORK on #5 Individual Sketch up design. Sketchup.com. Midterm exam Steve jobs book chapters 1-21.</td>
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<td>3/24</td>
<td>Spring break</td>
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<td>3/31</td>
<td>ICTC building project feedback</td>
<td>Sketchup.com. Your design project mid term review. #4 Individual Sketch up design.</td>
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<td>4/14</td>
<td>Future of stuff, Google.</td>
<td>Discussion. Green products. Technology that makes a difference. #5 Sketch up ROUGH of way-finding map and plan for ICTC touch screen.</td>
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<td>4/21</td>
<td>What did you learn this semester?</td>
<td>In class review for exam. #5 Sketch up rough of way-finding map and plan for ICTC touch screen.</td>
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* Schedule can be adjusted during the semester. Check with instructor as needed.
• Come to class on time and be prepared.
• NEVER do homework or answer EMAIL in this class or you will be asked to leave. If you are typing, it should be the notes from my exciting lecturers.
• Turn off your cell phones and other noisy devices
• Pay attention to your classmates when they are presenting/ talking/ demonstrating.
• All students are responsible for reading the Code of Student Rights, Responsibilities, and Conduct of Indiana University Purdue University Indianapolis.
• Children are NEVER permitted to attend class with parents, guardians, or childcare providers.
• Food and drink unless with a cap is forbidden from classrooms.

Suggestions for Success in this Course

1. Attend all classes and come to class prepared and on time.
2. Read any necessary materials for the week prior to the lecture of the week.
3. Review reading assignments and participate in class discussions.
4. Always bring your textbook to class
5. DO NOT DO OTHER CLASS WORK IN THIS CLASS
6. DO NOT USE your computer for anything other than to work on material or assignments related to this class during this class time.
7. Do not leave early unless excused by the instructor.
8. Execute all assignments to the best of your ability.
9. Hand in your assignments on time
10. Read and follow the directions of the assignments
11. Ask questions if you are unclear about anything.
12. ALWAYS CHECK YOUR ONCOURSE BEFORE COMING TO CLASS AND FOR ASSIGNMENTS, GRADES AND COMMUNICATIONS.
13. DO YOUR BEST

* links will be established this week of content below and uploaded onto website for you to use.

*Assignments, schedule and topics might vary slightly at the discretion of the Instructor)
ALL ASSIGNMENTS including word documents, PPT are to be UPLOADED TO ONCOURSE EXCEPT PHYSICAL PROTOTYPE.

Assignments and Distribution of Grades:                      Points
#1 Scenario/ Concept Paper                                  05
#2 Scenario development plan                                15
#3 Research floor plans; building physical and digital models 10
#4 Individual Sketch up design/                             10
#5 Sketch up rough of way-finding map and plan for ICTC touch screen 10
Quiz #1 Design like apple chapters 1+2                      05
Quiz #2 Design like apple chapters 3+4                      05
Quiz #3 Design like apple chapters 5+6                      05
Quiz #4 Design like apple chapters 7+closing                 05
Midterm: Steve Jobs chapters 1-21                           15
Final exam; Steve Jobs chapters 22-END                       15

Total points                                                 100 points

*All grades and comments will be posted on ONCOURSE All grades and comments will be posted on ONCOURSE as soon as possible after due date.

Grades are based on points as indicated below:
| 94-100 Pts. | A | 67-69 Pts. | D+ |
| 90-93 Pts. | A- | 64-66 Pts. | D |
| 87-89 Pts. | B+ | 60-63 Pts. | D- |
| 84-86 Pts. | B | 59 and below | F |
| 80-83 Pts. | B- | Pts. |
| 77-79 Pts. | C+ |
| 74-76 Pts. | C |

University Expectations/Guidelines/Policies:
University Regulations state: “Students are expected to be present for every meeting of the classes in which they are enrolled.” Only the instructor can excuse a student from classes or course responsibilities. There are always legitimate reasons for missing class. Personal illness, accident, a death or serious illness in the immediate family, athletic trips, scheduled interviews, plant visits, and field trips, or other circumstances may make your class attendance impossible. Each of these situations will be evaluated on an individual basis. Students should make direct contact with his/her instructor preferably before a class. If the instructor cannot be reached in person, by e-mail, or by telephone, the student should leave a message in the instructor’s department mailbox. Students can only make up work from an authorized absence and permission from the instructor.

Attendance and Participation
IUPUI policy is attendance is mandatory. I take attendance at the start of each class; so make sure to sign the attendance sheet. Any student missing THREE classes without an approved excuse will receive ONE GRADE LEVEL reduction. For each additional absence your grade will drop an additional grade level. Please be on time to class. A sign-in sheet will be distributed during each class period; it is your responsibility to sign it. If you are consistently late to class, 15 minutes or more, you will receive ONE WARNING and then if you continue you will receive ONE GRADE LEVEL reduction. If you are unable to attend, please send me a notice through ONCOURSE before class. Absences may be excused with valid doctor’s documentation or other extenuating circumstances. Students are expected to actively participate in class by asking questions and sharing any relevant experiences.

Snow or cancellation policy:
I will adhere to IUPUI’s school policy of cancellation due to bad weather. If for some reason I cannot make it to school I will post a message on ONCOURSE so please check it before you leave for class.
Other Policies

Students will be expected at all times to maintain the university’s standards of academic honesty and integrity. All students are responsible for reading the Code of Student Rights, Responsibilities and Conduct of IUPUI. Plagiarism will be considered to have occurred when a student presents as original, in either written or oral form, any idea that the student has acquired from an outside source. Because of the rapidly evolving nature of new media concepts, and the very wide range of cross-referenced possible sources, and to the extent that good ideas are often “in the air,” so to speak, it is acknowledged that ideas may form independently in students’ minds when clear sources or even nearly identical iterations of those ideas may be available in external sources. To that extent, and to the extent that innovation in new media is often judged by the slightest variation, and to the extent the instructor does not wish to inhibit the often spontaneous processes by which ideas grow and flower in an individual’s mind while the seed of that idea may be forgotten in the rush of development, plagiarism will be judged by degree and intent rather than a strict letter of the law. If it is determined, however, that plagiarism has occurred, it will be considered grounds for dismissal from class and other sanctions as stated in the Code of Student Rights, Responsibilities and Conduct of IUPUI. Work may be turned in any time prior to the due date. Work will be considered late if not turned in by the end of the class on the date expected.

Incompletes

The IUPUI Campus Bulletin presents the campus policy on incompletes, noting that a grade of incomplete may be assigned by an instructor when exceptional circumstances, such as illness, prevent students from finishing all works required in a course. The grade of I will be awarded only if the work is mostly complete, generally 75 to 80 percent, and of passing quality. The key decision in deciding whether or not to give an incomplete involves assessing whether or not the student has completed, at a passing level, enough of the course and whether "exceptional circumstances" apply. Exceptional circumstances can include the serious illness of the student, Note: that an incomplete is never warranted as a remedy for procrastination.

Academic Honesty

All students in New Media should aspire to high standards of academic honesty. This class encourages cooperation and the exchange of ideas. However, students are expected to do their own work.

Plagiarism (adapted from the definition by the School of Liberal Arts)
Plagiarism is the use of the work of others without properly crediting the actual source of the ideas, words, sentences, paragraphs, entire articles, music or pictures. Using other students’ work (with or without their permission) is still plagiarism if you don’t indicate who initially did the work. Plagiarism, a form of cheating, is a serious offense and will be severely punished. When an instructor
suspects plagiarism, he/she will inform the student of the charge; the student has the right to respond to the allegations. Students whose work appears to be plagiarized may be asked to produce earlier drafts of the work. Students should, for this reason and as a protection in cases of lost papers, diskettes, retain rough drafts, notes and other work products for 2 or 3 weeks after the end of each semester. The penalties for plagiarism include reprimands, being failed for a particular exam, paper, project or the entire course, disciplinary probation, or dismissal. Faculty, after consulting with their chair and or the dean must notify students in writing of their decision. Students have the right to appeal such decisions by the submitting a petition. All students are responsible for reading the Code of Student Rights, Responsibilities, and Conduct of Indiana University Purdue University Indianapolis.

**Liability Warning**
Your student ID and password are private! Under no circumstance are you to give them out to anyone. If another person uses your ID or password you will be held personally responsible for any and all activity on your computer account. If plagiarism is involved you run the risk of being dismissed from the school. If a computer or software is damaged you are responsible for repair and replacement. Loaning out your ID or password involves too much risk.

“A student must not violate course rules as contained in a course syllabus, which are rationally related to the content of the course or to the enhancement of the learning process in the course.” [Code of Student Rights, Responsibilities, and Conduct, page 29]

**Resources:**

**Times list of 100 best gadgets**
[http://www.time.com/time/specials/packages/0,28757,2023689,00.html](http://www.time.com/time/specials/packages/0,28757,2023689,00.html)

Gadgets:
[http://gajitz.com/meta/gadgets/](http://gajitz.com/meta/gadgets/)

Gadget competition:

History channel about gadgets:

**Administrative Withdrawal:**
A basic requirement of this course is that you will participate in all class meetings and conscientiously complete all required course activities and/or assignments. Keep in touch with me if you are unable to attend, participate, or
complete an assignment on time. If you miss more than half of the required activities within the first 25% of the course without contacting me, you may be administratively withdrawn from this course. Example: *Our course meets once/twice per week; thus if you miss more than two/four classes in the first four weeks*, you may be withdrawn. Administrative withdrawal may have academic, financial, and financial aid implications. Administrative withdrawal will take place after the full refund period, and if you are administratively withdrawn from the course you will not be eligible for a tuition refund. If you have questions about the administrative withdrawal policy at any point during the semester, please contact me.