

2.75J (H) 6.525J(H), 2.750J (H), 6.025J (UG CI-M AUS) Medical Device Design - Fall 2017 Syllabus

Units: 3 - 0 – 9

Prerequisites: [2.008](#), [6.111](#), [6.115](#), [2.678](#), [22.071](#), or permission of instructor

Updated: 11 September 2017

From the catalogue this course: Provides an intense project-based learning experience around the design of medical devices with foci ranging from mechanical to electro mechanical to electronics. Projects motivated by real-world clinical challenges provided by sponsors and clinicians who also help mentor teams. Covers the design process, project management, and fundamentals of mechanical and electrical circuit and sensor design. Students work in small teams to execute a substantial term project, with emphasis placed upon developing creative designs - via a deterministic design process - that are developed and optimized using analytical techniques. Instruction and practice in written and oral communication provided. Students taking graduate version complete additional assignments. Enrollment limited.

To take this class, all students are required to read this syllabus in its entirety and print and sign the last page indicating they have read and understood all the requirements, and turn it in second class.

Teaching Staff

ME Instructor	EE Instructor	Instructor/Coordinator	Comm. Instructor	IMES Instructor
Prof. Alex Slocum Room: 3-445 Phone: 253-0012 slocum@mit.edu	Gim P. Hom Room: 38-644 Phone: 324-3373 gim@mit.edu	Dr. Nevan Hanumara Room: 3-470 Phone: 258-8541 hanumara@mit.edu	Dave Custer Room: 24-611 Phone: 253-2872 custer@mit.edu	Prof. Ellen Roche Room: E25-334 Phone: 258-6024 etr@mit.edu
MechE TA	EE TA	Admin. Guru	Mentor	Mentor
Thomas Cervantes Room: 3-443 tmcneb@mit.edu	Alexander T Jaffe Room: 36-886 jaffea@mit.edu	Irina Gaziyeva Room: 3-461 Phone: 253-5592 igaziye@mit.edu	Maulik Majmudar, MD mmajmudar@partners.org	Jay Connor, MD jcmdhandsurg@comcast.net

Industry Mentors

Aparna Bhawe, PhD, Fellow Interventional Cardiology, Research and Development, Boston Scientific

Cliff Emmons, MBA, Senior Medical Device Leader, Former VP R&D Medtronic.

Website: <http://web.mit.edu/2.75/>

Lecture: **Monday & Wednesday 1:00 - 2:30 PM in 1-190**

The room is reserved for an additional 30 minutes (until 3:00 PM) after class to facilitate meetings & discussions.

Teams looking for spur of the moment meeting locations are recommend to use:

<https://classrooms.mit.edu/classrooms/#/quickroom>

This class seeks to emulate a real world product development effort, with students working in fast paced, professional R&D teams. Attendance is a must at all lectures: Blank looks when issues are raised in design reviews indicate that the student was not in lecture/not paying attention/not doing the reading and will be reflected accordingly in the student's grade. (In real life this puts you at the top of the list to be fired/replaced/outsourced). This big plus is that projects often result in published papers and sometimes real products, which is a huge boost to one's resume!

Course e-mail lists

Students agree that these e-mail lists will be strictly limited to course use only.

2.75-2017@mit.edu Contacts the entire course students and staff

2.75-staff@mit.edu Contacts the course teaching staff

Teams are welcome to create their own internal e-mail lists with or without their clinician; please post them to the Wiki.

Team Term Project

The goal of the class project is to rapidly and efficiently develop a proof-of-concept prototype device that addresses a real need. Prototypes are demonstrated during the final presentation and documented in a written paper.

Students will work in small teams (3 - 5 people) to execute a substantial project, spanning the entire term on a health-focused topic. Students *must* attend potential project presentations by project proposers and then rank those they are most interested in. Teams are then assembled by the staff based on student preference. Students should sign up for a project based on their passion for the

idea, NOT based on what their friends are doing. This is a great opportunity to make NEW friends and future professional connections. Staff will facilitate team formation as needed, once everyone has signed up for their top projects, and given the wide array of student interests and expertise, there have been few past difficulties in satisfying everyone.

These projects will be proposed by members of the local clinical community and industry. They have been selected competitively to present and are eager to work with you! The proposers have committed to being accessible and are ready to engage with you substantially on a regular basis and truly be part of the team.

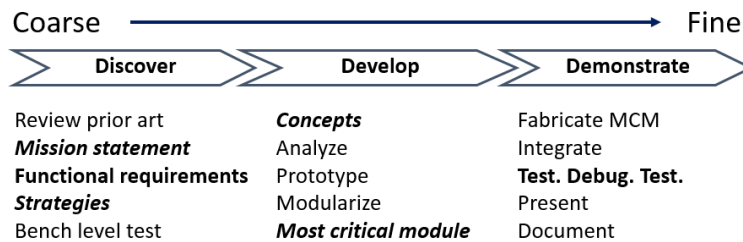
To help maintain a fair pace, consistent with the units for the class, each week tasks for each person to complete before the next meeting will be set and recorded on paper. At the next meeting progress made by each team member will be recorded by the team mentor. This will help all members stay focused, ensure work balance between team members, and help achieve grading fairness.

Please understand that given the project-clinician/proposer relationship, small teams and aggressive schedule, signing up for a project constitutes an implicit agreement NOT to drop the class.

Because full participation in the project is integral to the class, listeners cannot be accommodated. Students CANNOT take 2.75 and another major lab/product development class in the same semester, nor may students take another class that overlaps time wise with 2.75. (2.75 is routinely oversubscribed and there are plenty of other students willing to fully commit.)

Teams will follow a deterministic design process which fosters creativity, but eschews shoot-from-the-hip design. (This is NOT a hackathon class.) The project process is roughly broken up into thirds:

1. Discover – Problem presentation by client, team formation, detailed problem understanding, investigation of prior art, definition of functional requirements and exploration of possible solution *strategies*.
2. Develop – With a specific *strategy* selected, specific *concepts* are developed, analyzed and tested. The design is divided into modules and attention focused on the *most critical*.
3. Demonstrate – The entire system is fabricated, integrated and tested. Proper documentation is an important, oft shortchanged, step that begins the *design history file*, essential for any quality product and especially with medical.



Three phase, 14 week deterministic design process

Throughout the deterministic process, all decisions must be backed up by appropriate analysis, experiments, and [PREP – Peer Review Evaluation Process](#), where each person keeps a detailed design notebook and peers review each other’s notebooks.

Failure is defined as a non-working prototype and no idea why it failed. Failure is *NOT* defined as a prototype that functions, but conclusively demonstrates that a concept will not meet clinical requirements. The former is lack-of-focus and the latter is research.

As part of this process teams are expected to meet, with a minimum frequency of every two weeks, with their project proposer at a mutually convenient time. Look upon them as bringing the clinical/need expertise to the project and you the technical talent! You each have separate, but equally important skills.

Weekly Team Mentor Meetings

Each team will be assigned a course staff mentor who will meet with student teams weekly for an hour to review progress, brainstorm/solve project design problems and locate resources. To maximize productivity and minimize frustration, it is thus *critical* that teams be prepared with a discussion agenda and that each student *must* bring their design notebook, which has been peer reviewed by teammates *before* the meeting!

Every week, one or more overall project milestones will be due and reviewed with mentors. These should be posted to the team’s secure Wiki page. At the end of each mentor meeting, teams will together identify and assign the action items for the following week and record them in their notebooks. It is important to realistically estimate what can be accomplished and plan accordingly.

As stated above, and restated here to emphasize the importance, *to help maintain a fair pace consistent with the units for the class, each week tasks for each person to complete before the next meeting will be set and recorded on paper. At the next meeting progress made by each team member will be recorded by the team mentor.*

Project proposers do not need to attend weekly mentor meetings, however they are welcome on an ad hoc basis. Additionally, your team mentor (class staff) can help teams to realize productive interactions with their project proposer.

Teamwork

Teamwork is central to functioning of this class and any modern engineering endeavor and it is expected that students will work together in a *safe, professional, and collegial manner* as defined in MIT's policies and procedures, especially 9.0 "Relations and Responsibilities Within the MIT Community," <http://web.mit.edu/policies/9/>. During the first weeks of teamwork, identify any perceived problems with your team's dynamics promptly, and bring them to the attention of your team members and/or course staff, who will help resolve issues. This process itself is an invaluable part of education, because in the real world, especially internationally, where all business happens these days, there are no "safe spaces" to retreat to. We can help 1/☺ = ☺.

Peer Evaluations & Midterm Review

At midterm an anonymous peer review will be conducted and the results reviewed by the course staff. Grades, as an indicator of performance thus far, will then be provided to each student along with individual, constructive feedback. Consider this a professional performance review – it does not define your final grade but can help with focus and direction if needed.

At the end of the course, team members will have the opportunity to formally review each other and your combined ratings can be used to adjust your grade by up to a full letter.

Quizzes

In order for your projects to succeed, it is critical to learn the principles presented in the readings and lectures. Hence short (5 - 10 min) in-class quizzes will be given at the beginning of lectures to help keep folks focused and sharp! Questions will draw upon the assigned readings, which should be done in advance, and as well as highlights of the preceding lecture. Real time, in class design exercises may also count as quizzes. Please note, quizzes are essential to helping us gauge the effectiveness of our teaching.

Quiz grades will range from 0 (absent physically or mentally) → 10 (got it!).

There are no excused quizzes, however, but the lowest two will be dropped. This parallels a work environment where occasional absences are excused, but makeups don't exist.

Labs

At the onset of the course there will be two lab assignments:

1. Design, build, and test a kinematic coupling (KC) which demonstrates the principles of exact constraint design, important for any mechanical device. This will be primarily accomplished in the Hobby Shop, but you are welcome to use your own resources.
2. Design, build, and test two simple, non-invasive electronic heart monitors - the PPG, which uses optics to determine a heart rate, and the ECG, which uses electrodes and circuitry to observe the electrical signal of the heart to determine heart rate and also detect arrhythmias.

The objective of both labs is to help familiarize students with knowledge, tools, equipment, and hands-on skills needed for R&D.

The Hobby Shop and lab space in EECS will be made available; safety training and a signed acknowledgment is required for both. There are many students from different departments, and students are encouraged to use maker spaces available to them. There are no dedicated fabrication / lab spaces set aside for this course – teams must be resourceful, though course staff provide recommendations.

Standard materials for the two lab assignments will be provided, though students are welcome to use their own supplies and be creative! Because good design demands a process (measure twice, cut once) the labs will be completed in two parts: First a written proposal with engineering drawings must be submitted, and then following build and test, a brief lab report and in-class demonstration. Both can also be posted on your personal websites, and in the past they have had a very positive impact on student's ability to get the good job they were hoping for. Accordingly labs will count as substantial portion of the course grade.

Optional Labs for Extra Learning

Attending both labs will earn you the equivalent of 1 extra dropped quiz.

Hands-on Medical Device Design Prototyping Lab: This lab will offer an opportunity for students to learn some common medical device design manufacturing and prototyping techniques. These will include introductions to (and in some cases demonstrations or hands-

on activities) in catheter bonding, heat welding, nitinol forming, in silico reconstruction of anatomy and implants from clinical data, 3D printing and soft robotic moulding techniques.

Surface Mount Technology (SMT) Lab: Electronic devices today are manufactured using surface mount technology. In this lab you will assemble a surface mount two channel 2 watt audio amplifier powered by the USB port. Attach a pair of speakers, plug in your audio source with a 3.5mm jack and enjoy music.

Prototyping & Budget

Each team will have a budget of about \$4K (exclusive of MIT overhead) net to develop, prototype, and test their solution. Legitimate expenses include: components, machine shop services (must get an estimate for cost of job), local travel (mileage), etc. You cannot charge food under any circumstances.

Your mentor will guide you in efficient use of your budget. Remember, your time has value, thus there is a tradeoff between your fabricating and sourcing outside components. Remember the three D's: Deliverables – Deadlines – Dollars!

Irina Gaziyeva will administer team accounts and oversee purchasing procedures and guidelines. Students will be asked to use standard class ordering procedures and are *required to provide all order confirmations and packing slips to Irina Gaziyeva*. Please appoint a single person to manage the budget and coordinate with Irina. Teams are required to track their expenses on their Wiki.

If you buy something local you need to use the MIT tax exempt number, as you cannot be reimbursed for sales expenses. Any purchasing questions, ask Irina! This is an MIT requirement for audit purposes. *No packing slip, no grade!*

The course staff has many contacts with helpful vendors that are able to accommodate the needs of prototype projects (the cheapest vendor is not always the best ...) and we are happy to have new suggestions. When in doubt, ask!

Many teams will want to fabricate their own parts, particularly during the initial project stages. Some available resources include:

[MIT Hobby Shop](#) – Semester membership provided to students in 2.75, safety training required

[Edgerton Center Student Shop](#) (44-023) – Open to all MIT students, safety and machine operation training required via a special course as required by the shop.

[MakerWorks](#) - LMP (35-122) – Restricted to Mechanical Engineering students (and students in this class), safety training required

[EECS Lab](#) (38-601, 38-530) – bench space, instruments, tools, and proto boards available. Safety form signature required.

[Mobius](#) - Can help you locate and access some of the campus' 45 major maker spaces.

Projects requiring cell / tissue / BL2 work should coordinate with Ellen Roche for access to appropriate IMES facilities in E25.

Teams are responsible for keeping all workspaces clear and returning equipment to the proper storage otherwise access will be revoked. As each project is different, staff will work individually with teams to ensure that they obtain the necessary resources. Teams are welcome to use any other lab / fabrication facilities that they have access to.

Note: At no time can animal tissue be used in non-bio workspaces.

If there are any questions / doubts regarding fabrication or safety - please ask the course staff.

Documentation

Students are expected to maintain bound design notebooks with sketches, calculations, pasted in pictures, etc., which are informally reviewed during meetings and factor into grading. However, their primary function is to document the design process, especially with regards to building a design history file and establishing inventorship. The instructors also keep notebooks which they update during meetings and presentations and use them to help manage the teams and document their own contributions.

Other documentation, in addition to the design notebook, **MUST** be posted to the class (secure) Wiki, which will document the development and progress of your project. This Wiki will be viewable by other teams and the staff and will be consulted during class. It is especially important for grading, because if the Wiki is not up to date, we cannot determine if any work was actually done and by who!

Teams will write a publication-quality final paper, which they are then encouraged to submit to a conference or journal; many have been selected for publication in the past (see the course website). Write early and write often: It is critical to document (write) as-you-go and in order to prevent teams from waiting until the last minute, sections of the paper will be due through the course and posted to the Wiki. Therefore, ideally by the end of the term only editing will remain. In addition to the paper, teams will be expected to turn in their PowerPoint presentations and a one-page executive summary project description.

Intellectual Property

IP is often generated in this course, and thus it is essential that all team members (clinicians and instructors included) keep bound, signed, dated and witnessed design notebooks to record individual contributions. Not everyone will necessarily be an inventor, but the more engaged a team member is, the greater the likelihood that he or she will contribute specific features (claims) to the IP and, thus, be formally considered an inventor. Whether or not you are an inventor has no effect on your grade, because you can be a person who helps reduce an idea to practice and thus be a critical team member and journal paper author even though you might not in the legal sense be an inventor. IP and any royalties will be shared amongst the inventors and their institutions. IP created by students in an MIT course is considered property of the students; however the inventors may decide it is best for it to be assigned to the MIT Technology Licensing Office for prosecution. If a staff member is an inventor, then MIT policy states that the IP belongs to MIT and inventors share any future royalties in accordance with [MIT TLO policy](#).

Communication

2.75 is a graduate course that requires students to communicate as professionals (weekly design reviews and a term paper of journal quality). 2.750 is a CI-M course for undergraduates (that can be used in place of 2.009) and hence requires significant development/demonstration of communication skills, which is also excellent professional practice for graduate students. The communication requirements for both graduates and undergraduates are actually equivalent and are really useful, because they are all done in the context of the team's project. They include:

- Weekly peer review of each other's work in design review meetings (with the instructors).
- 15 minute presentation by the team to the class of top solution strategies ("best" selected if possible).
- 15 minute presentation by the team to the class of top solution concepts ("best" selected if possible).
- 15 minute presentation by the team to the class of top solution designs ("best" selected if possible).
- 20 minute final presentation by the team to the class, clinicians and invited visitors
- The team is responsible for submitting a final report in the form of a journal article suitable for the [ASME Journal of Medical Devices](#) or [ASME Journal of Mechanical Design](#) or [IEEE Transactions on Biomedical Engineering](#). (Recommended: 20 pages double-spaced plus figures; details go in Appendices.) An "A" grade project is one that is presented in form and content that is actually ready to be submitted to a peer-reviewed journal. *Many of the final reports are either published in a journal or at a conference and a patent application may be filed.*

By the end of the course, we expect every student to become comfortable talking about their work and be ready to give a podium presentation at a conference. Dave Custer is a resource to help each team and individual to develop their communication skills, please reach out as needed.

Following the final presentations and filing of any patents that may be required, deliverables (or a subset thereof) may be posted to the course website to serve as a record and example for future teams.

Recommended Texts

1. "[FUNdaMENTALS of Design](#)", A.H. Slocum, posted to the course website. This is a MUST download and read (as well as the design spreadsheets). Carefully reading and comprehending this design knowledge will lead the greatly enhanced design happiness in the class and in your professional design career.
2. [Precision Machine Design](#), A.H. Slocum, for the serious deep thought machine designer. Copies are available from Irina at the author price.
3. "Fundamentals of Electronics" Lectures, posted on course Wiki.
4. "The Art of Electronics 3rd Edition", Horowitz and Hill, Cambridge University Press.

Grading

This is an advanced design course for students who are ready to step up to act as professional engineers! Therefore, as in industry, we will not be giving detailed weekly grade feedback nor a detailed midterm expected grade. We have quizzes, conduct a mid-term review and often assign project action items to individuals. Together, these should provide a good sense of your progress and instructors are available to provide feedback as needed.

Work hard and efficiently and you will do great! Remember — the grade is not nearly as important as learning a design process and developing a prototype and documenting what YOU did with the team to bring it to life, so you can be proud and show your work to potential employers. Many past 2.75 students have told us that it was going over their design notebook or their website with an interviewer that led to their good job.

The course grade is based on: A = 90-100; B = 80-90; C = 70-80

Term Project – Team Grade Execution of the design process Meeting scheduled milestones Use of time and \$ Quality of design & execution (details & execution)	45%
Formal Communications Team Presentations Final Paper	15%
Individual Performance Contributions to project (monitored via weekly check offs) Use of lab notebook PREP effectiveness	15%
Preparation: In-Class Short Quizzes and FUNZEES	15%
Individual EKG lab & KC Labs	10%
Total:	100%

Grades are posted online (<https://scripts-cert.mit.edu/~6.525/f2017/records.py>) and can be viewed with your MIT certificate.

Post semester, should there be any grade concerns, students must present their design notebook for review, be prepared to discuss all the materials covered in the class and then accept that their grade may go up or down.

Student Disability Services:

MIT values an inclusive environment. If you need a disability accommodation to access this course, please communicate with us (the faculty/teaching staff) early in the semester. If you have your accommodation letter, please meet with the faculty so that we can understand your needs and implement your approved accommodations. If you have not yet been approved for accommodations, please contact Student Disability Services at uaap-sds@mit.edu to learn about their procedures. We encourage you to do so early in the term to allow sufficient time for implementation of services/accommodations that you may need.

Student Support Services: *If you are worried about (or do) fall behind...*

If you are dealing with a personal or medical issue that is impacting your ability to attend class, complete work, or take an exam, please discuss this with [Student Support Services](#) (S3). The deans in S3 will verify your situation, and then discuss with you how to address the missed work. Students will not be excused from coursework without verification from Student Support Services. You may consult with Student Support Services in 5-104 or at 617-253-4861. Also, S3 has walk-in hours Monday-Friday 9:00 - 10:00am.

Graduate Students: Please reach out to the [deans for personal support](#) in the Office of the Dean for Graduate Education.

Other Concerns

If you have significant travel or personal needs that you believe may impact your ability to work effectively in a fast paced team, please be aware that 2.75 may not be a good choice. If you have a concern, please meet with a member of the course staff to discuss alternatives, such as UROPs. Unfortunately, due to space constraints, listeners cannot be accommodated, however 2.75 materials are on line and can be used for self-study.

We are committed to making this a positive learning experience for all of us, so please come and talk to us.

Schedule

Please note that the schedule may be modified as circumstances demand during the course of the term.

Wk #	Start Date (Mon)	Monday	Wednesday	Weekly Tasks & Project Milestones
1	9/4	No Class	<ul style="list-style-type: none"> Welcome Course introduction & deterministic design process (Nevan) Communications intro (Dave) FUNdaMENTALS Topic 2 (Alex) 	<ul style="list-style-type: none"> Install Solid Works and practice as needed Fill team member pre-survey - link on Wiki (due Friday) Begin reading course material - Real engineers prepare for known forthcoming meetings, events, design reviews, etc...! Sign up for Hobby Shop training - link on Wiki Review and sign Hobby Shop form in advance
2	9/11	<ul style="list-style-type: none"> Clinician Presentations 	<ul style="list-style-type: none"> Clinician Presentations 	<ul style="list-style-type: none"> Team formation open Thursday 14 - 8 AM – 6 PM - link on Wiki Teams Announced (e-mail by Friday) Hobby Shop safety training: Monday 3-4 PM; Tuesday 4-5 PM
3	9/18	<ul style="list-style-type: none"> Medical Device Design (Ellen) Lit and Patent Search (Courtney Crummett, MIT Libraries, crummett@mit.edu) Team dynamics (Dave) Intro to KC lab 	<ul style="list-style-type: none"> FUNdaMENTALS Topics 4, 9 (Alex) Teams schedule regular meeting time with mentor KC Proposal Due 	<ul style="list-style-type: none"> Teams formed and weekly meetings scheduled Begin to research prior art including products, literature and patents Document literature and prior art search findings (include references) Extract functional requirements Begin to research strategy options Team Wikis functional
4	9/25	<ul style="list-style-type: none"> EE Design Process (Gim) EE PreLab Announced (Gim) ECG Lab Announced (Alex J.) Communication (Dave) 	<ul style="list-style-type: none"> EE Design Process (Gim) Questions on EE or ECG Lab On board Mission Statements (Nevan) 	<ul style="list-style-type: none"> Create mission statement Top 3 strategies selected, and described with FRDPARRC table(s) KC Fabrication begun Review and sign EECS lab safety form
5	10/2	<ul style="list-style-type: none"> Teams' Strategy Presentations (begin with your mission statement) 	<ul style="list-style-type: none"> Teams' Strategy Presentation (post slides to Wiki) Prelab Writeup Due (upload) ECG Proposal Due (upload) 	<ul style="list-style-type: none"> Conduct bench level experiments to help select strategy
6	10/9	<ul style="list-style-type: none"> Columbus Day – Holiday Complete Peer Evaluation 	<ul style="list-style-type: none"> FUNdaMENTALS Topics 6, 8 (Alex) KC Writeup Due & Expo (upload, 30 min) 	<ul style="list-style-type: none"> Best Strategy Selected with its FRDPARRC table complete Design and make sketch models / experiments EKG Fabrication begun Draft of <i>introduction</i> section of 2.75 final paper/journal article Peer Evaluation #1 completed Optional Lab: Hands on Prototyping (Ellen)
7	10/16	<ul style="list-style-type: none"> EE Design Process (Gim) Communications (Dave) 	<ul style="list-style-type: none"> FUNdaMENTALS Topics 10, 11 (Alex) 	<ul style="list-style-type: none"> Develop concepts, run bench level experiments Report experimental results Top 3 Concepts selected, and described with their FRDPARRC tables completed

			<ul style="list-style-type: none"> Human Centered Design – Aaron Ross, MGH Ergonomist Midterm grade review 	<ul style="list-style-type: none"> Create detailed schedule to completion Draft of <i>background</i> section of 2.75 final paper/journal article Optional Lab: SMTs (Gim & Alex J.)
8	10/23	<ul style="list-style-type: none"> Teams’ Concept Presentations 	<ul style="list-style-type: none"> Teams’ Concept Presentations (Post slides to Wiki) ECG Writeup Due 	<ul style="list-style-type: none"> “Best concept” should be selected, and good sketch model done and tested so as to enable “real parts” to be made Create solid model of “Best Concept”
9	10/30	<ul style="list-style-type: none"> Ellen Roche – Medical Device Case Studies (class to select) 	<ul style="list-style-type: none"> FUNdaMENTALS Topics 5, 7 (Alex) 	<ul style="list-style-type: none"> Most Critical Module (MCM) engineering complete Begin engineering of other modules Final paper abstract, first paragraph & structure outline
10	11/6	<ul style="list-style-type: none"> FUNdaMENTALS Review & Details (Alex) 	<ul style="list-style-type: none"> EE Review & Details (Gim) 	<ul style="list-style-type: none"> MCM complete and demonstrable (ready for the Design Reviews) Prepare to send remaining parts out for fabrication!
11	11/13	<ul style="list-style-type: none"> Teams’ in-class Design Reviews (last chance for class feedback ...) 	<ul style="list-style-type: none"> Teams’ in-class Design Reviews (last chance for class feedback ...) 	<ul style="list-style-type: none"> Engineering for other modules complete Send parts out for fabrication! (later and they will not arrive on time) Final manufacturing begun Draft of <i>design/methods</i> section of 2.75 final paper/journal article; the <i>methods</i> draft can be in the form of a testing proposal
12	11/20	<ul style="list-style-type: none"> Live Stream Surgery 	<ul style="list-style-type: none"> Happy Thanksgiving 	<ul style="list-style-type: none"> Final manufacturing complete Integration of modules started
13	11/27	<ul style="list-style-type: none"> Course surveys Intellectual Property – Ben Rockney, MIT TLO Med school war stories (Tom) 	<ul style="list-style-type: none"> Reimbursement 101, Charles Mathews, Boston Health Care Professional case study Staff help session 	<ul style="list-style-type: none"> Prototype complete & ready for testing Presentation dry run Final paper draft
14	12/4	<ul style="list-style-type: none"> Team working session Fabricate to finish! 	<ul style="list-style-type: none"> Team working session Fabricate to finish! 	<ul style="list-style-type: none"> Testing complete and documented, tweaked & ready to present PowerPoint slide deck
15	12/11	<p>Staff in classroom during class hours for presentation dry runs</p> <p>Final Presentations Tuesday December 12*</p> <p>Presentations loaded on class laptop in 3-461 (Irina) by midday.</p> <p>Room 3-270</p> <p>6:00 – 6:45 Yummy dinner (for student presenters only)</p> <p>6:45 – 7:00 Doors open</p> <p>7:00 – 10:30 Presentations</p> <p>(Note 2.009 presentations on Monday night)</p>		<p><u>Final Deliverables</u> – Uploaded to Wiki, by Monday 19</p> <ul style="list-style-type: none"> Final presentation in PDF and PowerPoint Paper following a known Journal format in PDF and Word One page concise description in PDF and Word Any video media that you may have created Complete Peer Evaluation #2 Final Wiki update for archival purposes
	12/18	Done!		Whew!

*If the final presentations conflicts with your regularly scheduled evening class you MUST attend that class. In this case, missing (or arriving late to the) the final presentations is acceptable. Be sure to advise the instructors and work with your team to ensure that you pull your weight on preparing the final presentation and final deliverables.

Student Acknowledgment 2.75 2017 Syllabus

I have read the 2.75 syllabus in its entirety and by my signature below agree that I have read the syllabus and understand and agree to all the requirements for this class:

Name: _____

Signature: _____

Date: _____