	Topics	Activity	Outcomes	Items due	Reading to be completed before this class
1	Welcome, Course Introduction;	Design for X (small, tall, aging, etc.) project in groups. Each group will redesign the same product to meet the needs of a particular user group.	Understand that the design and functionality of a product reflects the explicit or implicit understanding of who the user will be.		
2	Who works on this problem (computer scientists, web designers, industrial designers, ergonomists, rehab engineers, mechanical engineers, architects, manufacturing, military).	Short presentations on DfX solutions. Assessment of current products.	There are many groups, organizations, kinds of designers working on this problem. Understand that they each have goals, perspectives.	short presentation on new design	
3	Methods by which accommodation is achieved. Tradeoffs involved, including cost and adjustabililty.	Accidental accessibility: items designed to make things easier for one population that benefit many	Students will understand that there are multiple solutions to a problem, the mechanisms by which accommodation can be achieved, and that satisfying all users is often not possible.	current products assessment	
4	Populations (i.e., GI generation, Silent, Baby Boomer, Gen-X, Gen-Y or Millenial, Cyber, people with disabilities, truck drivers, pilots, etc.)	Create posters that describe, in pictures, each population. What they like, what they do, what's cool.		accidental accessibility	
5	Population characteristics: anthropometry. Available databases (ANSUR, NHANES, athro-kids, Zatsiorsky/Dempster/de Leva)		Learn how anthropometrics are gathered, correlations on measures, and what databases are available.	population posters	
6	Population characteristics: strength and capability. Available databases.		Learn how strength and other capability data are gathered and what databases are available.	group anthropometry	
7	Analysis using templates, Drillis and Contini	Introduce class project: bicycle design. Perform bike analysis and design using traditional methods. HW: Analyze a product using population data. Analyze a task using population data.	Learn how ergonomic assessments are typically performed.		

8	traditional analysis methods continued				
9	Boundary manikins. Problems with templates, boundary manikins, etc. The myth of the 5th percentile female and 95th percentile male.		Understand how people have attempted to solve the limitations of templates and the subsequent difficulties.	Product / Task analyses	
10	Designing experiments to measure variability. Gathering experimental data.	Design bicycle experiment; train student teams on measurement techniques.	Experimental design and setup; design experiment		
11	Statistics review	class anthropometry, results from bicycle experiment	Regression, variance, normality assumptions, and benefits of data transformation are necessary for subsequent activities.		schedule time for student teams to meet for data collection
12	Creating population models that are driven by experimental data	Create models of bicycle experiment data that are driven by population characteristics (i.e., anthropometry)			
13	Digital human models and CAD; importance of posturing	Perform assessments using built-in capabilities of manikin--how does posture affect results.			
14	Tradeoff analyses, class project. Digital human models and CAD (continued)	Bicycle design project: tradeoff analysis example. Students will use results of manikin assessments to create trade-off analyses: cost/adjustability vs. accommodation		CAD-based product/task analysis	
15	Digital human models and CAD (continued)	Students continue assessments, analysis.		Tradeoff analysis	

16	Digital human models and CAD (continued)		
17	Empathic or experiential design; "shoes"	Ford's "Third Age" suit, empathy belly; performance of tasks while inhibited to mimic difficulties encountered under different conditions (elderly, disabilities, pregnant, big, small)	One approach to designing for human variability is to imagine or otherwise experience the interaction with a design from a different perspective than your own.
18	Empathic design (continued)		
19	Empathic design (continued)	VR lab on campus: alter perspective to small or big	
20	mid-term exam		
21	Preference measurement: direct (scales, surveys, experimental design, etc.) and indirect (residual variance)		The type of survey or measurement instrument often determines what information participants provide and what can be done with it later.
22	Application-specific models, reduced models	Examine models that are specific to industries: driver posture, garment industry, etc.	
23	Optimization; variability in environment or product; Allocation of adjustability		Understand general principles of optimization and how it can be used with Exce/Matlab/etc. to help with problems in boundary manikin approach.

24	Optimization (continued)			
25	Assistive Technology	Try various AT devices: sip and puff, screen readers, Naturally Speaking, etc.	Become familiar with the many devices that have been created to improve accessibility for people with disabilities.	student-prepared reports on AT
26	the ADA, web design	Evaluate popular and student sites for accessibility, screen readers	Students all have created websites for other courses--it is likely that these are not accessible to screen readers.	
27	user-interface design, intuitive control	Evaluate different control systems and other items.	Poor performance and accidents can be caused by poorly designed user-interfaces.	Modify student websites to be accessible to screen readers, etc. Email link to instructor.
28	team projects			
29	team projects			
30	team project reports			Product prototype and in-class presentation