HABIB UNIVERSITY

Engineering Innovation and Design
EE-391

Spring 2019
Playground / Power Lab
T 1:30 – 2:20 pm
TR 8:30 – 11:30am

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Office Hours: Will be posted later.
Course LMS URL:
Course Prerequisites:
Content Area: This course meets requirements for EE major.

I. Rationale:
It has been said that engineers are people who can design effective solutions to meet social needs, and we would all readily agree that a significant portion of an engineer's time will be spend on design. While the students have already experienced the design process in the course of their various design projects, it is argued that studying the thought processes that lead to successful synthesis or design is critical to improving design methodologies. This course aims to present and discuss these design methodologies and provide an avenue to practice them.

II. Course Aims and Outcomes:
Aims.

This course aims to cultivate skills needed to produce great designs, be a more effective engineer, and communicate with high emotional and intellectual impact. This is a project-based course and students are expected to develop a solution to their identified problem by the end of semester. During the course of the semester, students will study and apply

techniques suited for various steps of the design process. Students will come to appreciate that a design problem involves multiple stakeholders, come to terms with the ambiguity that shows up in design problems, make decisions in presence of multiple conflicting objectives and constraints, handle uncertainty, think as part of a team, learn how to manage the progress of their project, and communicate their design effectively.

S. No.	Program Learning Outcomes (PLOs)	Level of Emphasis of PLO (1=High; 2=Medium; 3=Low)
1	Engineering Knowledge	
2	Problem Analysis	
3	Design/Development of Solutions	1
4	Investigation	
5	Modern Tool Usage	
6	The Engineer and Society	2
7	Environment and Sustainability	2
8	Ethics	
9	Individual and Team Work	
10	Communication	1
11	Project Management	1
12	Lifelong Learning	

Specific Learning Outcomes:

Course Learning Outcomes		
After the completion of the course students should be able to:		Learning domain-level
CLO 1	Empathize and interview users or clients to understand latent and expressed needs	Cog-3
CLO 2	Identify and understand the social, environmental, political, and economic context of the problem	Cog-4
CLO 3	Formulate a problem statement and test possible solutions with users using soft prototyping	Cog-5
CLO 4	Practice the engineering design process on the problem at hand	Cog-3
CLO 5	Discover some project management techniques and apply them to control project's progress	Cog-3
CLO 6	Structure information strategically and communicate effectively about their work visually and verbally	Cog-5

	Program Learning Outcomes (PLOs) mapped to EE 391 CLOs
	CLOs of the course are designed to cater following PLOs:
	PLO 3: Design/Development of Solution
	PLO 6: The Engineer and the Society
	PLO 7: Environment and Sustainability
	PLO 10: Communication
	PLO 11: Project Management

PLOs	Distribution of CLO weightages for each PLO					
	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5	CLO 6
PLO 3	33%		33%	33%		
PLO 6		100%				
PLO 7		100%				
PLO 10						100%
PLO 11					100%	

III. Format and Procedures:

This class is taught as a design studio, rather than in traditional lecture format. This means that the course will involve classroom discussions and design exercises, in which the students are expected to actively participate. You only learn design by applying it yourself. So, this class will be structured such that the students learn by doing and observing the results of their peers. The aim for this class is for the students to identify a problem within the outlined problem domain and develop an innovative technological solution to this problem, actively involving the client(s) and users in the design process. The former half of the semester will be spent discussing and learning about design through various activities and exercises. With the help of these activities, the students will identify a problem of interest, formulate a clear problem statement, devise possible solutions to the problem, build low fidelity prototypes, evaluate the possible alternative solutions on different fronts, and decide on a final solution. The latter half of the semester will be utilized by the students for building their chosen solutions. Most of the exercises, activities, and the semester long design project will all be conducted as teams. The problem domain for this year's class is "Healthcare".

IV. Course Requirements:

Course readings: There is no required text for this class. Reading will be provided on LMS.

V. Grading Procedures: Grades will be based on:

NUMBER	DATE	PERCENTAGE	SUBMISSION
Submission # 1	17th January		Selection of readings
Submission # 2	22nd January		Reflection on readings
Submission # 3	27th January		Your Interview Template
Submission # 4	5th February	5%	Filled Interview templates with insights
Submission # 5	7th February	5%	Synthesis with 1 more relevant reading

Submission # 6	26th February	15%	Upload updated Presentations + Template based on given feedback.
Submission # 7	7th March	25%	Project Plan + Technical Specifications Chart
Submission # 8	26th March	20%	Mid- Review, Prototype
Submission # 9	25th April		Poster
Submission # 10	30th April	30%	Final Submission - Poster, Presentation & Prototype

GRADING SCALE		
LETTER GRADE	GPA POINTS	PERCENTAGE
A+	4.00	96 – 100
A	4.00	90 – 95
A-	3.67	85 – 89
B+	3.33	80 – 84
B	3.00	75 – 79
B-	2.67	70 – 74
C+	2.33	67 – 69
C	2.00	63 – 66
C-	1.67	60 – 62
F	0.00	0 – 59

VI. Attendance Policy:

Habib University requires that all freshmen and sophomores must maintain at least 85% attendance and all juniors and seniors must maintain at least 75% attendance for each class in which they are registered. Non-compliance with minimum attendance requirements will result in automatic failure of the course and may require the student to repeat the course when next offered. This policy is at a minimum. Departments, schools, and individual faculty members may alter this policy to include stronger attendance requirements and/or implement them for all levels of students. It is the responsibility of the student to keep track of their own attendance and speak with their faculty member or the Office of the Registrar for any clarification.

VII. Accommodations for students with disabilities

In compliance with the Habib University policy and equal access laws, I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first two weeks of the semester, except for unusual circumstances, so arrangements can be made.

Students are encouraged to register with the Office of Academic Performance to verify their eligibility for appropriate accommodations.

VIII. Inclusivity Statement

We understand that our members represent a rich variety of backgrounds and perspectives. Habib University is committed to providing an atmosphere for learning that respects diversity. While working together to build this community we ask all members to:

- share their unique experiences, values and beliefs
- be open to the views of others
- honor the uniqueness of their colleagues
- appreciate the opportunity that we have to learn from each other in this community
- value each other's opinions and communicate in a respectful manner
- keep confidential discussions that the community has of a personal (or professional) nature
- use this opportunity together to discuss ways in which we can create an inclusive environment in this course and across the Habib community

IX. Office hours:

Office hours have been scheduled, circulated, and posted. During these hours the course instructor will be available to answer questions or provide additional help. Every student enrolled in this course <u>must meet individually with the course instructor during course office hours</u> at least once during the semester. The first meeting should happen within the first five weeks of the semester but must occur before midterms. Any student who does not meet with the instructor may face a grade reduction or other penalties at the discretion of the instructor and will have an academic hold placed by the Registrar's Office.

X. Academic Integrity

Each student in this course is expected to abide by the Habib University Student Honor Code of Academic Integrity. Any work submitted by a student in this course for academic credit will be the student's own work.

Scholastic dishonesty shall be considered a serious violation of these rules and regulations and is subject to strict disciplinary action as prescribed by Habib University regulations and policies. Scholastic dishonesty includes, but is not limited to, cheating on exams, plagiarism on assignments, and collusion.

PLAGIARISM: Plagiarism is the act of taking the work created by another person or entity and presenting it as one's own for the purpose of personal gain or of obtaining academic credit. As per University policy, plagiarism includes the submission of or incorporation of the work of others without acknowledging its provenance or giving due credit according to established academic practices. This includes the submission of material that has been appropriated, bought, received as a gift, downloaded, or obtained by any other means. Students must not, unless they have been granted permission from all faculty members concerned, submit the same assignment or project for academic credit for different courses.

CHEATING: The term cheating shall refer to the use of or obtaining of unauthorized information in order to obtain personal benefit or academic credit.

COLLUSION: Collusion is the act of providing unauthorized assistance to one or more person or of not taking the appropriate precautions against doing so.
All violations of academic integrity will also be immediately reported to the Student Conduct Office.

You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, a diskette, or a hard copy.

Should copying occur, the student who copied work from another student and the student who gave material to be copied will both be in violation of the Student Code of Conduct.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

XI. Tentative Course Schedule

WEEK	DATE	CLASS	SUBMISSIONS	ACTIVITY TEMPLATES
WEEK # 1	15th January	<u>INTRODUCTION TO HEALTHCARE</u> Presentation giving overview on 3 Themes + Group division 1. Global Surgery: (the 2 sub-themes may be identified during the global surgery hackathon) 2. Child Health 3. Emergency Care: First response and in- hospital emergency care.		Presentation 1. Themes 2. Critical/ Speculative Design Exercise on SD
	SEMINAR	AKU Expert - Talk		
	17th January	In depth research on the given themes in groups.	1 per person - Selection of Readings	Insights from reading template?

WEEK # 2	22nd January	DESIGN THINKING METHODS Empathy. Human-Centered Design. Interview Taking Methods & Skills. Students will learn how to gain deep insights to generate innovative and human-centered solutions. Exercise conducted with all teams to generate and frame the right questions to ask during their interview sessions that lead to inspiration for their projects.	Reflection on readings	Interview Guideline Template
	SEMINAR	Storytelling/Asking Questions - Talk Journalist/Khaula Jamil/Hassan Habib		
	24th January	CREATE YOUR OWN INTERVIEW TEMPLATE		
	27th January		Your Interview Template	
WEEK # 3	29th January	RESEARCH TRIP TO AKU Students visit AKU and talk to relevant people at AKU- CCIT to provide Initial medical perspective (proxy or else) + stakeholder stories + one expert per theme. * Get more details from AKU		
	31st January	RESEARCH TRIP TO AKU * Get more details from AKU		
WEEK # 4	5th February	SYNTHESIZING INFORMATION Identify themes & Patterns	Filled I.templates with insights	Template for insights
	SEMINAR	In class discussion on readings + work on submission	I reading per group	
	7th February	GAINING INSIGHTS Good understanding of the present scenario.	Synthesis with 1 more relevant reading	

WEEK # 5	12th February	IDENTIFYING OPPORTUNITIES FOR DESIGN - SPECULATIVE DESIGN		Project Proposal Template
	SEMINAR	TEMPLATE		
	14th February	PROBLEM FRAMING AKU mentors possibly stop by HU and offer comments to students while they're brainstorming.		
WEEK # 6	19th February	PROJECT PROPOSALS CCIT- Identification of multiple specific mentors (depending on the scope of the solution) that CCIT will then connect teams to.		
	SEMINAR	AKU TALK / Overview of the Coming Weeks/ Innovative Projects		
	21st February	PROJECT PROPOSALS		
WEEK # 7	26th February	INTRODUCTION TO PROJECT FRAMEWORKS	Upload updated Presentations + Template based on given feedback.	Framework Templae
	SEMINAR	How to create your own effectively		
	28th February	CREATING PROJECT FRAMEWORKS		
WEEK # 8	5th March	DESIGN DEVELOPMENT Feedback and in class working session.		

		SEMINAR	6 groups - presentation 5 mins per group		
	7th March	DESIGN DEVELOPMENT Feedback and in class working session.	Project Plan with Framework/S pecifications Chart	
WEEK # 9	19th & 21st March	DESIGN DEVELOPMENT Feedback and in class working session.		
	SEMINAR	6 groups - presentation 5 mins per group		
WEEK # 10	26th & 28th March	MID - REVIEW HU + CCIT can (a) take up the role of generalist mentors, and (b) act as first pass to effectively connect teams to people most relevant to specific needs for the team.	Prototype	
WEEK # 11	2nd & 4th April	DESIGN DEVELOPMENT Feedback and in class working session.		
	SEMINAR	6 groups - presentation 5 mins per group		Comment Card
WEEK # 12	9th & 11th April	DESIGN DEVELOPMENT Feedback and in class working session.		
	SEMINAR	6 groups - presentation 5 mins per group		
WEEK # 13	16th & 18th April	COMMUNICATION STRATEGIES Feedback and in class working session.		Poster Template
	SEMINAR			

WEEK # 14	23rd & 25th April	DESIGN DEVELOPMENT/ COMMUNICATION STRATEGIES Feedback and in class working session.	Poster	
	SEMINAR			
WEEK # 15	30th April & May 2nd	FINAL DISPLAY Can be run as an Innovation and Beyond 2.0 event either within AKU or HU.	FINAL REVIEW - Poster, Presentation & Prototype	

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