MMAN2100

ENGINEERING DESIGN 2

Contents

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design problem using relevant engineering knowledge, but also to formulate a unique design problem in the first place.

Design thinking is a fundamental skill that every engineer must have for the 21st Century. It is one of the key skills that profoundly distinguish human intelligence from artificial intelligence, and it greatly impacts an engineer's long-term career success in the workplace. Therefore, this course aims to equip you with the domain-independent design thinking and the spirit of life-long learning, which can be applied to whatever

After successfully completing this course, you should be able to:

Learning Outcome		EA Stage 1 Competencies
1	Follow a systemic process to conduct engineering design	PE 1.1 and PE 2.4
2	Ask intelligent questions to interview customers and solicit their voices	PE 2.3
3		

Before you attend a demonstration session, it's critical that you thoroughly reflect the lecture content and purposefully prepare a set of lead-in questions. Demonstration is not intended to repeat the content that's already covered during the lectures.

Project-based learning: the best way to learning design thinking is through design practicing on a specific project, together with other designers. The class will be divided into 60-70 independent project teams, and these teams will employ the design principles and/or methods learnt from the lectures to collaboratively accomplish a design project and its associated assignments (more details are specified in the Section 5.3-5.5). Note that, provided the large class size, the team formation will be performed bounded by each demonstration session of the 60-67 enrolled students. Details of team formation will be announced in the week 1. You are encouraged to ask questions or clarify confusions about the team project during the demonstration sessions.

Personalized learning: everything is becoming customized in the 21st Century, learning should be no exception. Various kinds of interactions, student-content interaction, student-teacher interaction, and student-student interaction are the key to achieve a personalized learning of design thinking. Firstly, you should frequently revisit and reflect the past learning content to develop new understandings, in particular, with respect to how different modules are interrelated. Secondly, as much as possible, you are encouraged to approach the lecturer and demonstrators to discuss any course-related matters. Thirdly, you should not only collaborate with your team members for the design project, but also interact with your peer classmates for social constructions of a design culture.

Life-long and 24/7 Learning: it used to be that the knowledge a student learns in college for four years can secure him/her a high-salary job for 40 years. Nowadays, as knowledge becomes a commodity that everyone can easily access on the Internet, it is critical that you develop a habit of life-long and 24/7 learning. This is especially true for the learning of design thinking. Therefore, as much as possible, you are encouraged to discover the design opportunities (e.g., good and/or bad products

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Your final mark will be determined based on assessment your performance in the following assignments, which are associated with different weights of importance:

Throughout the semester, e

averaged in order to find each student's contribution and the weighting factor is made proportional to the average. The peer evaluation result is intended to reward the active contributors and penalise the inactive ones. The peer evaluation determines 10% of your final mark.

5.7 Policy of late submission

According to the School Guideline, late submissions will be penalised 5 marks (i.e., 5% of the assignment's total mark) per calendar day (or part thereof, including weekends). An extension may only be granted in exceptional circumstances. Where an assessment task is worth less than 20% of the total course mark and you have a compelling reason for being unable to submit your work on time, you must seek approval for an extension from the course convenor ***before the due date***. Special consideration for assessment tasks of 20% or greater must be processed through student.unsw.edu.au/special-consideration. On the other hand, it is always worth submitting late assessment tasks when possible. Completion of the work, even late, may be taken into account in cases of special consideration.

5.8 Examinations

There is NO examination for course, based on the assumptions that every design problem should be formulated in a unique fashion, while there is no unique solution to the same design problem.

5.9 Special consideration and supplementary assessment

For details of applying for special consideration and conditions for the award of supplementary assessment, see the School intranet, and the information on UNSW's Special Consideration page.

6. Textbook and Resources

No required textbook is assigned, while students are encouraged to gain easy accesses to some recommended reference books as following:

[1] "Axiomatic Design – advances and applications", by Nam Suh, Oxford University Press.
[2] "The sciences of the artificial", by Herbert Simon, MIT press.
[3] , Daniel Kahneman, Macmillan.
[4] "Engineering design – A systematic approach", G. Pahl and W. Beitz, Springer-Verlag.
[5] "A more beautiful question: the power of inquiry to spark breakthrough ideas", by Warren Berger, Bloomsbury Publishing.
[6] "Hooked: How to build habit-forming products", by Nir Eyal, Penguin Canada.
[7] "The life-changing magic of tidying up: The Japanese art of decluttering and organizing", by Marie Kondo, Shannon Stacey.
[8] "Systematic Innovation – an introduction to TRIZ", by John Terninko, Alla Zusman, and Boris Zlotin, St. Lucie Press.
[9] "Complexity: theory and applications", by Nam P. Suh, Oxford University Press.

[10] “Universal principles of design, revised and updated: 125 ways to enhance usability, influence perception, increase appeal, make better design decisions, and teach through

resources, attend the Learning Centre, or sometimes resubmit your work with the problem fixed. However more serious instances in first year, such as stealing another student's work or paying someone to do your work, may be investigated under the Student Misconduct Procedures.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis) even suspension from the university. The Student Misconduct Procedures are available here:
www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Further information on School policy and procedures in the event of plagiarism is available on the intranet.

Administrative Matters

All students are expected to read and be familiar with School guidelines and polices, available on the intranet. In particular, students should be familiar with the following:

- Attendance, Participation and Class Etiquette
- UNSW Email Address
- Computing Facilities
- Assessment Matters

10. Appendix A: Engineers Australia (EA) Stage 1 Competencies for Professional Engineers

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
PE2: Engineering Application Ability	PE2.1 Application of established engineering methods to complex problem solving
	PE2.2 Fluent application of engineering techniques, tools and resources
	PE2.3 Application of systematic engineering synthesis and design processes
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects
PE3: Professional and Personal Attributes	PE3.1 Ethical conduct and professional accountability
	PE3.2 Effective oral and written communication (professional and lay domains)
	PE3.3 Creative, innovative and pro-active demeanour
	PE3.4 Professional use and management of information
	PE3.5 Orderly management of self, and professional conduct
	PE3.6 Effective team membership and team leadership