Course Outline

Term 3 2019

MMAN2100

Engineering Design 2

Contents

1. Contact details

Course Convenor: Dr. Ang Liu
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Consultation Hours: 9:00am-

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In addition to the weekly consultation hours, all students and groups are encouraged to schedule additional face-to-face meetings with the lecturer. Given the large class size (i.e., 500 students), a meeting appointment via email beforehand is required for additional consultation meetings.

Learning Outcome		EA Stage 1 Competencies
1	Conduct collaborative product planning to formulate a unique design problem by translating customer needs to functional requirements	PE1.1, PE1.5, PE3.6, PE2.1 - PE2.4
2	Perform collaborative conceptual design to generate, evaluate, and select the functionally simple and physically certain concepts	PE1.2, PE1.5, PE3.6, PE2.1 - PE2.4
3	Document the design process and present the design outcome through presentation, report, logbook, and CAD drawing.	PE3.2, PE3.4, PE3.6
4	Design mechanical components to satisfy the target functional requirements against design constraints	PE1.1, PE1.2, PE1.6

4. Teaching strategies

Design is the hallmark of human creativity in general and the essence of the engineering profession in particular.

given the large class size of 450 students, the team formation will be conducted within each demonstration session. No teams can be formed across different demonstration sessions.

5.

Week[a]	Lecture Topic	Tutorial Topic
1	Course introduction and motor selection	Team building and logbook writing Assignment Introduction & Motor selection
2	Belt and chain drive, as well as fly wheels	Belt drive selection Chain drive selection
3	Shaft design and couplings	Shaft design Flywheel inertia calculations
4	Solicit customer voices and identify an innovation opportunity	Demonstrate functional design process
5	Formulate a unique design problem as functional requirements	Demonstrate QFD and report writing
6	Generate design concepts by systemic design methods	Demonstrate concept generation and sketching Demonstrate CAD drawing
7	Organize design concepts based on the independence axiom	Demonstrate concept organization
8	Evaluate design concepts based on the information axiom	Demonstrate concept evaluation
9	Improve design concepts by resolving contradictions	Demonstrate cconcept improvement
10	Emerging technologies on engineering design	Team design presentation

6. Assessment

Assessment overview

Assessment	Group Project? (# of students per group)	Length	Weight	Learning Outcomes Assessed	Assessment Criteria	Submission	Due Date	Deadline of Absolute Fail	Return Marks

Assignments

Design Logbook

Every student is required to create an individual design logbook, which is intended to keep a record of your individual contribution to the design project. In industry, logbook serves as a professional document that indicates the complete research, planning, and thinking process of a certain engineer working on a particular project, such that if a new engineer takes over the project, the logbook would allow him/her to smoothly resume from where the previous engineer finished.

The logbook is a comprehensive documentation of the design project, in which your unique contributions should be highlighted. A good logbook is characterized by a general (but complete) description of the whole project, with detailed explanations of your individual work. Note that you are required to add new entries to the logbook on a highly regular and consistent basis (at least twice a week). The logbook is not a document that can be made up overnight in a retrospective fashion. A detailed logbook marking guideline will be published on Moodle. Note that the logbook must be prepared and submitted as the original copy in your own handwriting, with dates added, and signed off. No digital copy is allowed, unless pre-approved. Your logbook will be collected, marked during the demonstration sessions in week 6 and 10. The logbook counts 25% of the final grade.

Component Design Report

resubmission counts for the other half. If a team received 70% in the initial submission and 90% in the resubmission, then the final grade that shows in the gradebook is 80%. In other words, the initial submission is equally important as the resubmission. Resubmission must be treated as an extra opportunity to polish your work instead of a buffer to lessen the negative effect of the initial submission. Note that, together with the resubmitted report, each team must provide a detailed rebuttal document that clearly outlines where, how, to what extent, and in what ways the report has been revised, in correspondence to the comments and suggestions raised by the reviewer. If a team is satisfied with the grade for the report submitted in Week 9, there is no need for resubmission in Week 12.

Design Presentation

Every team will be required to make one public presentation about the conceptual design process and outcome. The presentations are made in front of the lecturers, demonstrators, and classmates. The presentation is scheduled in Week 10 and organised within the demonstration sessions. The design presentations count 15% of the final grade (i.e., 10% team performance and 5% individual performance).

Peer Evaluation

In correspondence to the design reports and the design presentations, a total of four (4) peer evaluations will be conducted to assess
teamwork. Every student will be asked to fill out a confidential questionnaire that is designed to evaluate other team member

Submission

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of 20 percent (20%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day.

be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These are clearly indicated in the course outline, and such assessments receive a mark of zero if not completed by the specified date. Examples include:

a. Weekly online tests or laboratory work worth a small proportion of the subject mark, or
b. Online quizzes where answers are released to students on completion, or
c. Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date, or
d. Pass/Fail assessment tasks.

Marking

Marking guidelines for assignment submissions will be provided at the same time as assignment details to assist with meeting assessable requirements. Submissions will be marked according to the marking guidelines provided.

Examinations

There are no examinations in this course.

Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to submitting an assessment or sitting an exam

7. Expected resources for students

No textbook is required for this course; however, you are encouraged to gain easy access to some recommended reference books as the following:

If plagiarism is found in your work when you are in first year, your lecturer will offer you assistance to improve your academic skills. They may ask you to look at some online

Competencies

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