Northeastern University London

Cornerstone of Engineering II Course Descriptor

Course Code	LENGR4128	Discipline	Physics and Engineering
UK Credit	15	US Credit	4
FHEQ level	4	Date approved	November 2022
Core attributes	ER		
Pre-requisites	LENGR4117 Cornerstone of Engineering I		
Co-requisites	N/A		

Course Summary

This course continues training the students by using the engineering design process and algorithmic thinking, using a combination of lectures and hands-on projects, while encouraging critical thinking. It builds on the foundation of Cornerstone I, where students have developed creative problem-solving skills used in engineering design, to structure software, and to cultivate effective written and oral communication skills. During the course, students will go more deeply into how to implement programming and execution of a design through the interactive design process using authentic hands-on design projects including graphical design. They will expand their design projects to solve open-ended problems they choose, focusing on challenging and impactful global problems. They expand their technical skill set from C++, AutoCAD, autonomous robots and the design process to bring in Solidworks and Matlab, plus ethical reasoning. Students will integrate value-sensitive design (qualitative assessment of design impact on users and society), ethical principles, and professional responsibilities into engineering design. Overall, the course enables students to further develop problem-solving skills in algorithmic thinking through computer programming.

Learning Outcomes

On successful completion of the course, students will be able to:

Knowledge and Understanding

K1a Demonstrate an understanding of the engineering design process.

K2a Research the scientific principles and technical background required to understand the problem to be solved, and benchmark existing or related products.

K3a Demonstrate an understanding of risk management in engineering practices.

Subject Specific Skills

S1a Implement the desired design solutions using appropriate engineering techniques(Including ethical engineering practices).

S2a Analyse and interpret computational and experimental results as part of engineering practice (using Array in C++ and Matlab programming).

S3a Practice the concept of engineering design by using modern drawing (3D graphics using Solidworks) and or sketching software tools and the principles of orthographic projection.

Transferable and Professional Skills

T1a Communicate effectively with specialist and non-specialist audiences.

T2a Apply problem-solving skills to the conception of a particular solution.

T3a Display a developing technical proficiency in written English and an ability to communicate clearly and accurately in structured and coherent pieces of writing.

T3a Display a developing technical proficiency of written scientific and technical nomenclature that demonstrates an ability to communicate clearly and accurately when producing structured and coherent scientific or technical pieces.

Teaching and Learning

Teaching and learning strategies for this course will include:

A minimum of 40 contact hours, typically to include interactive group teaching, co-curriculars, individual meetings, in-class presentations and exams.

Course information and supplementary materials are available on the University’s Virtual Learning Environment (VLE).

Students will receive individualised developmental feedback on their work for this course.

Students are required to attend and participate in all the formal and timetabled sessions for this course. Students are also expected to manage their directed learning and independent study in support of the course.

Assessment

Formative

Students will be formatively assessed in class through class activities, and during office hours. Formative assessments are ones that do not count towards the final grade but will provide students with developmental feedback.

Summative

AE:	Assessment Activity	Weighting (%)	Duration	Length
1	Design Projects	30	15-25 hours to Complete	N/A
2	Examination	20	1hour 45 mins	N/A
3	Examination	20	1hour 45 mins	N/A
4	Portfolio	30	10-20 hours to Complete	N/A

Further information on the structure of summative assessment elements can be found in the Summative Assessment Briefs.

Feedback

Students will receive feedback in a variety of ways: written (including via email correspondence); oral (within office hours or on an *ad hoc* basis) and indirectly through class discussion.

Feedback on examinations is provided through generic internal examiners' reports and are made available to the student on the VLE.

For all other summative assessment methods, feedback is made available to the student either via email, the VLE or another appropriate method.

Indicative Reading

Note: Comprehensive and current reading lists for courses are produced annually in the Course Syllabus or other documentation provided to students; the indicative reading list provided below is used as part of the approval/modification process only.

Books

- "Cornerstone of Engineering", TopHat

Electronic Resources

- Matlab
- Solidworks
- AutoCAD
- TOP HAT VLE
- Arduino IDE
- CLion / C++ complier

Indicative Topics

- C++ and Arduino Programming
- Matlab programming
- AutoCAD and Solidworks design skills
- Orthography Technical Communication
- Creative self-led design projects

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Version number	**Date approved**	**Date published**	**Owner**	**Proposed next review date**	**Modification (As per AQF4) & category number**
2.1	July 2023	August 2023	Dr Susan Freeman	November 2027	Category 1: Corrections/clarifications to documents which do not change approved content or learning outcomes.
2.0	October 2022	January 2023	Dr Susan Freeman	November 2027	Category 1: Corrections/clarifications to documents which do not change approved content or learning outcomes. Category 3: Changes to Learning Outcomes.
1.0	November 2022	November 2022	Dr Susan Freeman	November 2027	