

The Hong Kong University of Science and Technology

UG Course Syllabus

Computer Engineering Final Year Thesis in ELEC

CPEG 4912

6 Credits

Course Description

Each student taking the Research Option of the Computer Engineering program is required to complete an individual thesis before graduation. The student is expected to conduct a research on a topic related to Computer Engineering and/or its application. The thesis is conducted under the supervision of faculty members from the Department of Electronic and Computer Engineering. Credit load will be spread over the year. Instructor's approval is required for enrollment in the course. For CPEG students only.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Recognize the importance and difficulties in applying learned skills/knowledge to solve research problems.
2. Understand the steps in solving a research problem from literature review to problem solution.
3. Execute a complete project from problem formulation, design/optimization, up to verification, thesis preparation and presentation.
4. Identify the novelty/contribution of the thesis.

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. During Summer and Fall semesters, students who have fulfilled the supervisor's requirements and submitted required deliverables will receive a "PP" (Permitted to Proceed) grade. The "PP" grades are superseded by letter grades (from A+ to F) at the end of the FYP period in Spring semester.

Assessments:

Assessment Task	Contribution to Overall Course grade (%)	Due date
Proposal Report	10%	~September (Fall semester)
Execution (Progress)	30%	~January (Spring semester)
Execution (Final)	40%	~April (Spring semester)
Oral Presentation / Thesis Defense	20%	~May (Spring semester)

Note: Proposal Report is graded by the faculty supervisor (10%). Execution (Progress) is graded by the supervisor (20%) and the communication tutor/reader (10%). Execution (Final) is graded by the supervisor (20%), two judges (5% each), and the communication tutor/reader (10%). Oral Presentation/Thesis Defense is graded by two judges (10% each). Overall: 50% from Supervisor, 15% from Judge 1, 15% from Judge 2, 20% from Reader. Monthly reports and video/poster presentations must be submitted/completed but do not directly contribute to the overall grade. Penalties apply for late submissions including monthly reports.

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Proposal Report	ILO1, ILO2	The proposal report assesses students' ability to recognize the importance of applying learned skills to research problems (ILO1) and to understand the steps in solving a research problem from literature review to solution (ILO2).
Execution (Progress and Final)	ILO1, ILO2, ILO3	The progress report and final thesis assess students' ability to apply knowledge to research problems (ILO1, ILO2) and to execute a complete research project from formulation to verification and thesis preparation (ILO3).
Oral Presentation / Thesis Defense	ILO3, ILO4	The thesis defense assesses students' ability to present and defend a complete research project (ILO3) and to identify and articulate the novelty and contribution of the thesis (ILO4).

Grading Rubrics

Program Outcome	Component	Percentage	Exemplary (A- to A+)	Competent (B- to B+)	Needs Work (C- to C+)	Unsatisfactory (D, F)
Proposal Report						
	Thesis objective formulation, methodology to be followed, background	60%	The objectives are well defined and prioritized. All relevant information and constraints are obtained and accurately analyzed. Decision and design recommendation are well supported by the information.	All major objectives are identified. Sufficient information is obtained. Appropriate analyses are selected. Decision and design recommendation are reasonable and mostly supported by the information.	Most major objectives are identified but one or two minor ones are missing or priorities are not established. Most constraints are identified; some are not adequately addressed or accurately analyzed. Decision and design recommendation is reasonable.	Many major objectives are not identified. Information is collected but without any analysis. Only one solution is considered or other solutions were ignored or incompletely analyzed. Many constraints and criteria were ignored.
	Clarity and presentation of the report (organization, use of English)	30%	Report is well organized and clearly written. The underlying logic is clearly articulated and easy to follow. Words are chosen that precisely express the intended meaning and support reader comprehension. Diagrams or analyses enhance and clarify presentation of ideas. Sentences are grammatical and free from spelling errors.	Report is organized and clearly written for the most part. In some areas the logic or flow of ideas is difficult to follow. Words are well chosen with some minor exceptions. Diagrams are consistent with the text. Sentences are mostly grammatical and only a few spelling errors are present but they do not hinder the reader.	Report is organized via topic/flow, but in some areas it is difficult to follow the flow of ideas. Words can be further improved. Some diagrams are not well explained. Grammar errors that impede the flow of communication.	Report lacks an overall organization. Reader has to make considerable effort to understand the underlying logic and flow of ideas. Diagrams are absent or inconsistent with the text. Grammatical and spelling errors make it difficult for the reader to interpret the text in places.
	Planning of future work	10%	Complete and well analyzed task list. Detailed well-around plan of future work. Reasonable timing and labor allocation.	Well-defined task list. Good plan of future work. Practical timing and labor allocation.	A possibly incomplete task list without priority. Plan of future work but not well justified. Time and labor allocation is not well thought.	No clear task list. Future work is not well considered. No time and labor allocation.

Program Outcome	Component	Percentage	Exemplary (A- to A+)	Competent (B- to B+)	Needs Work (C- to C+)	Unsatisfactory (D, F)
Progress Report						
	Work completed	60%	Progress exceeds expectations with respect to plan. Highly detailed discussions on milestones completed.	Progress is highly satisfactory with respect to plan. Detailed discussions on milestones completed.	Progress is mostly satisfactory with respect to plan. Some discussions on milestones completed.	Progress is not satisfactory with respect to plan. No discussions on milestones completed.
	Clarity and presentation of the report (organization, use of English)	30%	Report is well organized and clearly written. The underlying logic is clearly articulated and easy to follow. Words are chosen that precisely express the intended meaning and support reader comprehension. Diagrams or analyses enhance and clarify presentation of ideas. Sentences are grammatical and free from spelling errors.	Report is organized and clearly written for the most part. In some areas the logic or flow of ideas is difficult to follow. Words are well chosen with some minor exceptions. Diagrams are consistent with the text. Sentences are mostly grammatical and only a few spelling errors are present but they do not hinder the reader.	Report is organized via topic/flow, but in some areas it is difficult to follow the flow of ideas. Words can be further improved. Some diagrams are not well explained. Grammar errors that impede the flow of communication.	Report lacks an overall organization. Reader has to make considerable effort to understand the underlying logic and flow of ideas. Diagrams are absent or inconsistent with the text. Grammatical and spelling errors make it difficult for the reader to interpret the text in places.
	Use of research approaches related to electronic and computer discipline (literature review, system/algorithm design, mathematical analysis, modeling, simulation, system prototyping are included here)	10%	Employ appropriate analytical tools and/or engineering methodologies. Clearly demonstrates mastery of several areas of the curriculum.	Employ appropriate analytical tools and/or engineering methodologies acquired in his course of study to the project at hand.	Employ some analytical tools and/or engineering methodologies acquired.	Does not make use of analytical tools and/or engineering methodologies relevant to the project

Program Outcome	Component	Percentage	Exemplary (A- to A+)	Competent (B- to B+)	Needs Work (C- to C+)	Unsatisfactory (D, F)
Final Report						
	Results obtained	60%	Perform competently and in addition notice improvements that can be made to the design spec. Deliver a prototype of exceptional quality and well-conceived architecture. Plan and execute thorough list of test cases.	Deliver a prototype with a sound architecture and required design specs. Plan and execute list of test cases with expected result specified.	Deliver a prototype that meets the design specs, but can be further improved. Plan and execute some test cases, but not covering all possible cases.	Fail to deliver a prototype that meets the design specs and/or proper methodology. Perform minimal testing, concentrating exclusively on the simplest, most obvious cases.
	Clarity and presentation of the report (organization, use of English)	30%	Report is well organized and clearly written. The underlying logic is clearly articulated and easy to follow. Words are chosen that precisely express the intended meaning and support reader comprehension. Diagrams or analyses enhance and clarify presentation of ideas. Sentences are grammatical and free from spelling errors.	Report is organized and clearly written for the most part. In some areas the logic or flow of ideas is difficult to follow. Words are well chosen with some minor exceptions. Diagrams are consistent with the text. Sentences are mostly grammatical and only a few spelling errors are present but they do not hinder the reader.	Report is organized via topic/flow, but in some areas it is difficult to follow the flow of ideas. Words can be further improved. Some diagrams are not well explained. Grammar errors that impede the flow of communication.	Report lacks an overall organization. Reader has to make considerable effort to understand the underlying logic and flow of ideas. Diagrams are absent or inconsistent with the text. Grammatical and spelling errors make it difficult for the reader to interpret the text in places.
	Use of research approaches related to electronic and computer engineering discipline (optimization, analysis, simulation, result verification are included here)	10%	Employ appropriate analytical tools and/or engineering methodologies. Clearly demonstrates mastery of several areas of the curriculum and is able to propose innovative solutions to the technical challenges posed by the project.	Employ appropriate analytical tools and/or engineering methodologies acquired in his course of study to the project at hand. Clearly demonstrate mastery of many areas of the curriculum and is able to successfully complete the proposed project.	Employ some analytical tools and/or engineering methodologies acquired. Make progress towards addressing the technical challenges of the project. Complete most of the major tasks in the proposed project.	Does not make use of analytical tools and/or engineering methodologies relevant to the project. Does not demonstrate requisite command of the material covered in the curriculum. Unable to finish the proposed project.

Program Outcome	Component	Percentage	Exemplary (A- to A+)	Competent (B- to B+)	Needs Work (C- to C+)	Unsatisfactory (D, F)
Thesis Defense						
	Result presentation	40%	Present a fully functioning working prototype with several original/inventive elements. Show strong effort was made in breaking new ground and building excitement about the application. The demonstration techniques are imaginative and effective in conveying ideas to the audience.	Present a working prototype with support to all desired functions. Offer some new information or approach about the application. The demonstration techniques are effective in conveying main ideas.	Present a working prototype but some desired functions are not supported or malfunctioned. Simply shows how the application works. The demonstration only conveys main ideas.	The prototype is incomplete or does not work. Show little effort in building the application. The demonstration failed to capture the interest of the audience and/or is confusing in what was communicated.
	Delivery: Oral delivery, contact with audience, slides, timing	40%	Slides cover complete, accurate description of important outcomes. Effective use of charts, graphs, figures etc. Use of fluent English and confident. Hold attention by direct eye contact and nature hand gestures. Excellent timing and smooth transition among different parts.	Slides cover accurate description of most of important outcomes. Use of charts, graphs, figures etc. Fair use of English. Hold attention by consistent use of direct eye contact. Presentation runs with desired pace and finishes within allocated time.	Slides cover some of the outcomes. Limited use of charts, graphs, figures etc. Use of English with noticeable errors. A few eye contacts only. Presentation pace is not well planned but finished within allocated time.	Information is arranged in confused and unstructured way. Student lacks of confidence. Poor use of English. Does not attempt to look at audience at all. Read notes or looks at computer screen only. Presentation is too short or too long for the allocated time.
	Quality of answers	20%	Student has presented full knowledge of both problem and solution. Answers to questions are strengthened by rationalization and explanation.	Student has competent knowledge and is at ease with information. Can answer questions.	Student is uncomfortable with information. Seems novice and can answer basic questions only.	Student has no or very less knowledge of both problem and solution. Cannot answer questions.

Final Grade Descriptors:

Grades	Short Description	Elaboration on subject grading description
A+/A/A-	Excellent Performance	Demonstrates exceptional project execution with significant originality and technical depth. The final report and presentation are of outstanding quality, clearly articulating the problem, methodology, results, and contributions. Exhibits strong independent thinking, effective time management, and excellent collaboration with supervisor and team members.
B+/B/B-	Good Performance	Shows a solid understanding of the project scope and delivers a well-executed project with good technical quality. The final report and presentation are well-organized and clearly written. Demonstrates good problem-solving ability, effective project management, and the capacity to work well within a team.
C+/C/C-	Satisfactory Performance	Completes the project with adequate technical execution. The final report and presentation meet the basic requirements but may lack depth in analysis or originality. Shows sufficient effort and persistence to achieve the learning goals with some guidance from the supervisor.
D	Marginal Pass	Meets the minimum threshold requirements for project completion. The final report and presentation show limited depth and may have notable gaps. Demonstrates basic understanding but requires significant supervisor guidance throughout the project.
F	Fail	Fails to complete the project to an acceptable standard. The final report and/or presentation are incomplete or of insufficient quality. Shows inadequate effort, poor time management, or inability to apply learned knowledge to the project.

Course AI Policy

Students may use generative AI tools as assistive tools for their research work (e.g., coding assistance, literature review support). However, the core intellectual contribution, research methodology, analysis, and writing must be the student's own work. Any use of AI tools must be properly disclosed and acknowledged in the thesis. The final thesis and defense must demonstrate the student's own understanding of the research.

Communication and Feedback

Assessment marks and feedback will be communicated via Canvas. Feedback from supervisors is provided through regular meetings throughout the project. Students who have further questions about the feedback including marks should consult their supervisor or the FYP coordinator within five working days after the feedback is received.

Resubmission Policy

Resubmission of reports is generally not permitted. Late submissions will incur grade penalties as specified by the FYP coordinator.

Required Texts and Materials

No required textbook. Research-specific references will be recommended by individual thesis supervisors.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to [Academic Integrity | HKUST – Academic Registry](#) for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

[Optional] Additional Resources

FYP Management System (FYPMS): <https://fypms.ece.ust.hk/>