



**Engineering Faculty Council
Faculty of Engineering and Applied Science**

**Motions EFC_2016_04 and EFC_2016_05
APPROVED**

Motion: To approve Minor Program Modifications to the Nuclear Engineering Program

- a. Replacement of four ENGR course codes to program-specific course codes for the Nuclear Engineering Program (NUCL) (**ECC_2016_04**)
- b. Course description changes to ENGR 4994U: Capstone Design I and ENGR 4998U: Capstone Design II (**ECC_2016_05**)

Motion moved by: Hossam Kishawy

Seconded: Scott Nokleby

In Favour: 28

Against: 0

Abstention: 2

The motion was approved with a friendly amendment to add the following:

- For ENGR 4520U: Nuclear Plant Safety Design, to adjust the credit restriction to be “NUCL 4520U or ENGR 4520U”
- For ENGR 4620U: Radioactive Waste Management Design, to adjust the credit restriction to be “NUCL 4620U or ENGR 4620U”



Faculty of Energy Systems and Nuclear Science

Nuclear Engineering Program

Minor Program Modifications

October, 2016

Prepared by:

Glenn Harvel (FESNS Associate Dean and NEPCC Chair)

Eleodor Nichita (NEPCC member)

Matthew Kaye (NEPCC member)

Igor Pioro (NEPCC member)

Summary

Course code changes from ENGR to NUCL course codes are underway. In January of 2015, the majority and simplest cases were processed. This package includes course code changes for 4 courses where the code was changed from ENGR to NUCL. In two cases, the number was also modified due to conflicts in the calendar and in the case of the second capstone thesis course, 12 weeks of 1 hour lectures has been added to improve flexibility in delivery of information related to capstone and graduate attribute assessment.

NOTE: AU impact is increase of 12 units for NUCL-4998U. No change in AU or graduate attributes for the remaining courses.

Proposed Change

Course Code Changes:

In keeping with the practice established with the other engineering programs, those course codes that are currently ENGR need to migrate to a new course code unless they are common to many programs. At a spring 2014 Faculty Council of FESNS, the faculty had reviewed a full list of course code changes for all programs within FESNS and have approved the code changes.

Table 1 is a list of the proposed course code changes ready for approval.

- For ENGR 4994U, only the course code is changed. Minor changes to wording of academic calendar entry to reflect nuclear aspects of course.
- For ENGR 4998U, the course code is changed and 12 weeks of 1 hour lectures is added. This adds 12 AUs and allows flexibility for dealing with graduate attributes. Minor changes to wording of academic calendar entry to reflect nuclear aspects of course. Removal of Dean permission from pre-req as it is superfluous. Course must follow NUCL 4994U.
- For ENGR 4520 and ENGR 4620 only the course code and number is changed. The last digit is changed to 5 to avoid calendar conflicts with a course code already approved that has a similar purpose, i.e. the non-design version.

Table 1: Course Code Changes for Approval

| Current Code | Course Title | Proposed Code |
|---------------------|-------------------------------------|----------------------|
| ENGR 4994U | Capstone Design I | NUCL 4994U |
| ENGR 4998U | Capstone Design II | NUCL 4998U |
| ENGR 4520U | Nuclear Plant Safety Design | NUCL 4525U |
| ENGR 4620U | Nuclear Waste Management and Design | NUCL 4625U |

COURSE CHANGE TEMPLATE*For new courses see New Course Template*

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|---|--|
| Faculty: Faculty of Energy Systems and Nuclear Science | |
| Course number: ENGR 4520U | Current course title: Nuclear Plant Safety Design |
| <input checked="" type="checkbox"/> Core <input type="checkbox"/> Elective | |

COURSE CHANGES (check all that apply)

| | | | |
|---|---------------------------------|---|---------------------|
| | Course title | | Credit weighting |
| | Course description | | Contact hours |
| X | Course number | | Prerequisites |
| | Course design | | Co-requisites |
| | Learning outcomes | | Cross-listings |
| | Mode of delivery | X | Credit restrictions |
| | Teaching and assessment methods | | Credit exclusions |

REASON FOR CHANGE AND WAYS IN WHICH IT MAINTAINS/ENHANCES COURSE OBJECTIVES

Change course code name to NUCL 4525U to reflect discipline content of course. Unique to Program.

Note: ENGR4520U can be removed from the Calendar as no longer required.

Note: NUCL 4520U already exists and is associated with a non-design version of the course. Add course restriction for NUCL 4520U.

CHANGE TO CALENDAR ENTRY

| Current | Proposed |
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| <p>ENGR 4520U Nuclear Plant Safety Design This course describes the regulatory requirements and the principles guiding the protection of workers and the general public from being harmed as a result of nuclear plant operations. Topics include: worker and public safety requirements; codes and standards; sources of radioactive release; defence in depth; principle of control, cool, contain; accident prevention, mitigation and accommodation; separation and independence; redundancy; common mode events; inherent safety features; plant safety systems; safety culture, management of plant safety; design basis accident; accident</p> | <p>NUCL 4525U Nuclear Plant Safety Design This course describes the regulatory requirements and the principles guiding the protection of workers and the general public from being harmed as a result of nuclear plant operations. Topics include: worker and public safety requirements; codes and standards; sources of radioactive release; defence in depth; principle of control, cool, contain; accident prevention, mitigation and accommodation; separation and independence; redundancy; common mode events; inherent safety features; plant safety systems; safety culture, management of plant safety; design basis accident; accident</p> |

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| <p>analysis; quantitative and probabilistic risk assessment; examples of nuclear accidents; online and off-line computer codes for the design and safety analysis of nuclear plants.</p> <p>Credit hours: 3</p> <p>Lecture hours: 3</p> <p>Tutorial hours: 1</p> <p>Prerequisite(s): ENGR 4640U or NUCL 4640U; ENGR 4660U; ENGR 4700U or NUCL 4700U</p> <p>Credit restriction(s): NUCL 4520U</p> | <p>analysis; quantitative and probabilistic risk assessment; examples of nuclear accidents; online and off-line computer codes for the design and safety analysis of nuclear plants.</p> <p>Credit hours: 3</p> <p>Lecture hours: 3</p> <p>Tutorial hours: 1</p> <p>Prerequisite(s): ENGR 4640U or NUCL 4640U; ENGR 4660U; ENGR 4700U or NUCL 4700U</p> <p>Credit restriction(s): NUCL 4520U or ENGR 4520U</p> |
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CONSULTATION AND FINANCIAL IMPLICATIONS, WHERE APPROPRIATE

Presented at ECC Committee for impact on accreditation

APPROVAL DATES

| | |
|--------------------------------------|---|
| Date of submission | October 10, 2016 |
| Curriculum Committee approval | Nuclear Engineering Program Curriculum Committee: October 14, 2016 Engineering Curriculum Committee: October 26, 2016 FESNS Faculty Council: October 27, 2016 |
| Engineering Faculty Council approval | November 9, 2016 |
| Date of submission to CPRC | November 9, 2016 |

COURSE CHANGE TEMPLATE*For new courses see New Course Template*

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|--|--|
| Faculty: Faculty of Energy Systems and Nuclear Science | |
| Course number: ENGR 4620U | Current course title: Radioactive Waste Management Design |
| <input checked="" type="checkbox"/> Core <input type="checkbox"/> | |
| <input type="checkbox"/> Elective | |

COURSE CHANGES (check all that apply)

| | | | |
|---|---------------------------------|--|---------------------|
| | Course title | | Credit weighting |
| | Course description | | Contact hours |
| X | Course number | | Prerequisites |
| | Course design | | Co-requisites |
| | Learning outcomes | | Cross-listings |
| | Mode of delivery | | Credit restrictions |
| | Teaching and assessment methods | | Credit exclusions |

REASON FOR CHANGE AND WAYS IN WHICH IT MAINTAINS/ENHANCES COURSE OBJECTIVES

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| <p>Change course code name to NUCL 4625U reflect discipline content of course. Unique to Program</p> <p>Note: ENGR 4620U can be removed from the Calendar as no longer required.</p> <p>Note: NUCL 4620U already exists and is associated with a non-design version of the course.</p> |
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CHANGE TO CALENDAR ENTRY

| Current | Proposed |
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| <p>ENGR 4620U Radioactive Waste Management Design</p> <p>Students will study: nature of radioactive waste; origin of low, intermediate and high activity waste; characteristics, forms and quantity of radioactive waste; production of radioactive waste at each stage of the nuclear cycle: mining, fuel fabrication, reactor operation and maintenance, spent fuel, reactor structural components; medical and industrial waste; handling, transporting, storing and disposing technologies for each type of waste; on-site and off-site storage; spent fuel reprocessing and disposal methods; radioactive waste management plans and practices in various countries; public concerns and perception of</p> | <p>NUCL 4625U Radioactive Waste Management Design</p> <p>Students will study: nature of radioactive waste; origin of low, intermediate and high activity waste; characteristics, forms and quantity of radioactive waste; production of radioactive waste at each stage of the nuclear cycle: mining, fuel fabrication, reactor operation and maintenance, spent fuel, reactor structural components; medical and industrial waste; handling, transporting, storing and disposing technologies for each type of waste; on-site and off-site storage; spent fuel reprocessing and disposal methods; radioactive waste management plans and practices in various countries; public concerns and perception of</p> |

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| <p>radioactive waste management. Two field trips will be arranged. Credit hours: 3 Lecture hours: 3 Tutorial hours: 1 Prerequisite(s): ENGR 3570U or RADI 3570U; ENGR 3930U or NUCL 3930U; ENGR 4610U or NUCL 4610U Credit restriction(s): NUCL 4620U</p> | <p>radioactive waste management. Two field trips will be arranged. Credit hours: 3 Lecture hours: 3 Tutorial hours: 1 Prerequisite(s): ENGR 3570U or RADI 3570U; ENGR 3930U or NUCL 3930U; ENGR 4610U or NUCL 4610U Credit restriction(s): NUCL 4620U or ENGR 4620U</p> |
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CONSULTATION AND FINANCIAL IMPLICATIONS, WHERE APPROPRIATE

Presented at ECC Committee for impact on accreditation

APPROVAL DATES

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| Date of submission to CPRC | November 9, 2016 |

COURSE CHANGE TEMPLATE*For new courses see New Course Template*

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|--|--|
| Faculty: Faculty of Energy Systems and Nuclear Science | |
| Course number: ENGR 4994 | Current course title: Capstone Design I |
| <input checked="" type="checkbox"/> Core <input type="checkbox"/> | |
| Elective | |

COURSE CHANGES (check all that apply)

| | | | |
|---|---------------------------------|--|---------------------|
| X | Course title | | Credit weighting |
| | Course description | | Contact hours |
| X | Course number | | Prerequisites |
| | Course design | | Co-requisites |
| | Learning outcomes | | Cross-listings |
| | Mode of delivery | | Credit restrictions |
| | Teaching and assessment methods | | Credit exclusions |

REASON FOR CHANGE AND WAYS IN WHICH IT MAINTAINS/ENHANCES COURSE OBJECTIVES

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| Change course code name to reflect discipline content of course. Unique to Program. |
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CHANGE TO CALENDAR ENTRY

| Current | Proposed |
|---|---|
| <p>ENGR 4994U Capstone Design Project I The capstone design project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study. Through completion of their design project, students working in a team, will demonstrate an understanding of the design engineering process and the ability to apply it. The project topic will typically be selected to include some aspects of the student specialization. Students will be required to organize and conduct a design project with a significant analytical component and demonstrate understanding of several aspects such as technical, economic, environmental and</p> | <p>NUCL 4994U Capstone Design I The capstone design provides nuclear engineering students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study. Through completion of their design, students working in a team, will demonstrate an understanding of the design engineering process and the ability to apply it. The topic will be selected to include aspects of nuclear energy. Students will be required to organize and conduct a design with a significant analytical component and demonstrate understanding of several aspects such as technical, economic, environmental and other societal impacts. Capstone Design I, will typically be a group</p> |

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| <p>other societal impacts. Capstone Design Project I, will typically be a group design project, but with each student having clearly defined roles, objectives and outcomes.</p> <p>Credit hours: 3 Lecture hours: 1 Laboratory hours: 4 Tutorial hours: 1 Prerequisite(s): Dean's or dean's designate's permission. Students must have completed all courses up to and including third year and be in clear standing.</p> | <p>design, but with each student having clearly defined roles, objectives and outcomes.</p> <p>Credit hours: 3 Lecture hours: 1 Laboratory hours: 4 Tutorial hours: 1 Prerequisite(s): Dean's or dean's designate's permission. Students must have completed all courses up to and including third year and be in clear standing.</p> |
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CONSULTATION AND FINANCIAL IMPLICATIONS, WHERE APPROPRIATE

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| <p>Presented at ECC Committee for impact on accreditation</p> <p>No impact on accreditation units</p> |
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APPROVAL DATES

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|--------------------------------------|---|
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| Date of submission to CPRC | November 9, 2016 |

COURSE CHANGE TEMPLATE*For new courses see New Course Template*

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|--|---|
| Faculty: Faculty of Energy Systems and Nuclear Science | |
| Course number: ENGR 4998 | Current course title: Capstone Design II |
| <input checked="" type="checkbox"/> Core <input type="checkbox"/> | |
| Elective | |

COURSE CHANGES (check all that apply)

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|---|---------------------------------|---|---------------------|
| X | Course title | | Credit weighting |
| X | Course description | X | Contact hours |
| X | Course number | X | Prerequisites |
| | Course design | | Co-requisites |
| | Learning outcomes | | Cross-listings |
| | Mode of delivery | | Credit restrictions |
| | Teaching and assessment methods | | Credit exclusions |

REASON FOR CHANGE AND WAYS IN WHICH IT MAINTAINS/ENHANCES COURSE OBJECTIVES

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| <p>Change course code name to reflect discipline content of course. Unique to Program Add 1 hour per week lecture to the course for invited industrial speakers and additional feedback on graduate attributes</p> |
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CHANGE TO CALENDAR ENTRY

| Current | Proposed |
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| <p>ENGR 4998U Capstone Design Project II The capstone design project provides students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study, to satisfy specific objectives and requirements. The project topic will be selected to include some aspects of the student specialization. Students will be required to organize and conduct a design project with a significant analytical and/or experimental component, typically including aspects such as technical, economic, environmental and other societal impacts. Capstone Design Project II will typically be an individual design project progressing an aspect of the work done in ENGR</p> | <p>NUCL 4998U Capstone Design II The capstone design provides nuclear engineering students with the opportunity, under the supervision of a faculty member, to integrate and synthesize knowledge gained throughout their program of study, to satisfy specific objectives and requirements. The topic will be selected to include aspects of nuclear energy. Students will be required to organize and conduct a design with a significant analytical and/or experimental component, typically including aspects such as technical, economic, environmental and other societal impacts. Capstone Design II will typically be an individual design project progressing an aspect of the work done in NUCL 4994U unless specifically approved</p> |

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| <p>4994U unless specifically approved by the supervising faculty member. With approval of the supervising faculty member, a clearly delineated individual contribution to a group design project is acceptable. The requirements include a written project report and an individual presentation of the project outcomes.</p> <p>Credit hours: 3 Laboratory hours: 6 Prerequisite(s): ENGR 4994U and dean or dean designate permission</p> | <p>by the supervising faculty member. With approval of the supervising faculty member, a clearly delineated individual contribution to a group design is acceptable. The requirements include a written report and an individual presentation of the outcomes.</p> <p>Credit hours: 3 Lecture hours: 1 Laboratory hours: 6 Prerequisite(s): NUCL 4994U</p> |
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CONSULTATION AND FINANCIAL IMPLICATIONS, WHERE APPROPRIATE

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| <p>Presented at ECC Committee for impact on accreditation</p> <p>Addition of 12 accreditation units</p> |
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APPROVAL DATES

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