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MEMORANDUM

ATTENTION Senate
FROM Peter Hall, Chair
Senate Committee on Undergraduate
Studies
RE: New Course Proposals (SCUS 23-8-)

DATE October 13, 2023

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A handwritten signature in black ink, appearing to be 'Peter Hall', with a small 'c' and a superscript '2' at the end.

For information:

Acting under delegated authority at its meeting of October 12, 2023 SCUS approved the following curriculum revisions effective Summer 2024.

a. Faculty of Applied Sciences (SCUS 23-80)**1. School of Mechatronic Systems Engineering****(i) New Course Proposals:**

- MSE 453-3, Hybrid Thermal Electric Microgrids I
- MSE 454-3, Hybrid Thermal Electric Microgrids II

Senators wishing to consult a more detailed report of curriculum revisions may do so on the Senate Docushare repository at <https://docushare.sfu.ca/dsweb/View/Collection-12682>.

COURSE SUBJECT MSE

NUMBER 453

COURSE TITLE LONG — for Calendar/schedule, no more than 100 characters including spaces and punctuation

Hybrid Thermal Electric Microgrids I

COURSE TITLE SHORT — for enrollment/transcript, no more than 30 characters including spaces and punctuation

Hybrid Microgrids I

CAMPUS where course will be normally taught: Burnaby Surrey Vancouver Great Northern Way Off campus

COURSE DESCRIPTION — 50 words max. Attach a course outline. Don't include WQB or prerequisites info in this description box.

Introduces hybrid microgrids, including i) hybrid microgrid concepts, modeling and analysis; ii) energy storage and conversion technologies; iii) distributed energy resources; iv) energy policy and politics; v) lean entrepreneurship; and vi) microgrid management, control and stability. This is a co-taught online course with strong practical training components. MSE 453 & MSE 454 are distinct, complementary courses that can be taken in any sequence.

REPEAT FOR CREDIT YES NO Total completions allowed Within a term? YES NO**LIBRARY RESOURCES**

NOTE: Senate has approved (S.93-11) that no new course should be approved by Senate until funding has been committed for necessary library materials. Each new course proposal must be accompanied by the email that serves as proof of assessment. For more information, please visit www.lib.sfu.ca/about/overview/collections/course-assessments.

RATIONALE FOR INTRODUCTION OF THIS COURSE

There is a need for a holistic training that covers engineering as well as business, techno-economical, environmental, social (engagement, awareness, acceptance, participation), and policymaking aspects of emerging sustainable energy grids. Hybrid microgrids are needed to enable integration of distributed renewable energy resources into electric grids and thermal networks. In addition to stand-alone microgrids for remote, island and northern communities, in urban settings, HyTEM systems can integrate renewables and waste-heat energy from industry, computing centres and even sewers into the overall energy infrastructure and supply.

The proposed undergraduate special topics course would be combined with the annual graduate special topics course, MSE 895 Thermal Electric Microgrids, which was first offered in 2022. The project-oriented course covers the entire spectrum of sustainable hybrid microgrids research and development to provide students with interdisciplinary training needed to integrate distributed energy resources into electric and thermal networks to work in harmony for the reliable supply of clean and sustainable energy

The course is co-taught by Mechatronic professors Majid Bahrami, Behraad Bahreyni, and Patrick Palmer, as well as Terri Griffith (SFU Business), and 6 professors from partnering universities, all part of the NSERC CREATE HyTEM research and training program. The lectures and tutorials will be complemented with invited lectures from (inter)national experts, site visits from leading-edge facilities, and the direct participation of the (inter)national research labs and industry partners. This course is mandatory for all graduate students and postdoctoral fellows (PDFs) participating in the NSERC CREATE Hybrid Thermal Electric Microgrid (HyTEM) program, and would significantly benefit senior undergraduate students.



SCHEDULING AND ENROLLMENT INFORMATION

Effective term and year (e.g. FALL 2016) Summer 2024

Term in which course will typically be offered [X] Spring [] Summer [] Fall

Other (describe) []

Will this be a required or elective course in the curriculum? [] Required [] Elective

What is the probable enrollment when offered? Estimate: 20

UNITS Indicate number of units: 3

Indicate no. of contact hours: 3 Lecture [] Seminar [] Tutorial [] Lab [] Other; explain below

OTHER

[]

FACULTY

Which of your present CFL faculty have the expertise to offer this course?

Majid Bahrami, Behraad Bahreyni, Patrick Palmer, Terri Griffiths

WQB DESIGNATION

(attach approval from Curriculum Office)

[]

PREREQUISITE AND / OR COREQUISITE

80 units.



EQUIVALENT COURSES [For more information on equivalency, see Equivalency Statements under [Information about Specific Course components.](#)]

1. SEQUENTIAL COURSE [is not hard coded in the student information management system (SIMS).]

Students who have taken (*place relevant course(s) in the blank below (ex: STAT 100)*) **first** may not then take this course for further credit.

2. ONE-WAY EQUIVALENCY [is not hard coded in SIMS.]

(*Place relevant course(s) in the blank below (ex: STAT 100)*) will be accepted in lieu of this course.

3. TWO-WAY EQUIVALENCY [is hard coded and enforced by SIMS.]

Students with credit for (*place relevant course(s) in the blank below (ex: STAT 100)*) may not take this course for further credit.

Does the partner academic unit agree that this is a two-way equivalency? YES NO

Please also have the partner academic unit submit a course change form to update the course equivalency for their course(s).

4. SPECIAL TOPICS PRECLUSION STATEMENT [is not hard coded in SIMS.]

FEEES

Are there any proposed student fees associated with this course other than tuition fees? YES NO

COURSE - LEVEL EDUCATIONAL GOALS (OPTIONAL)



RESOURCES

List any outstanding resource issues to be addressed prior to implementation: space, laboratory equipment, etc:

OTHER IMPLICATIONS

Final exam required YES NO

Criminal Record Check required YES NO

OVERLAP CHECK

Checking for overlap is the responsibility of the Associate Dean.

Each new course proposal must have confirmation of an overlap check completed prior to submission to the Faculty Curriculum Committee.

Name of Originator

Majid Bahrami

COURSE SUBJECT MSE

NUMBER 454

COURSE TITLE LONG — for Calendar/schedule, no more than 100 characters including spaces and punctuation

Hybrid Thermal Electric Microgrids II

COURSE TITLE SHORT — for enrollment/transcript, no more than 30 characters including spaces and punctuation

Hybrid Microgrids II

CAMPUS where course will be normally taught: Burnaby Surrey Vancouver Great Northern Way Off campus

COURSE DESCRIPTION — 50 words max. Attach a course outline. Don't include WQB or prerequisites info in this description box.

Covers hybrid microgrids, including i) microgrid energy conversion and distribution; ii) entrepreneurial mindsets; iii) bioenergy production and natural gas networks; iv) thermal energy storage materials and processes; v) thermal energy grids; vi) sensing and communication systems; and vii) energy policy. This is a co-taught online course with strong practical training components. MSE 453 & MSE 454 are distinct, complementary courses that can be taken in any sequence.

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