SFU GRADUATE STUDIES AND POSTDOCTORAL FELLOWS

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MEMORANDUM

ATTENTION	Senate	DATE	February 18, 2016
FROM	Wade Parkhouse, Dean of Graduate Studies	No.	GS2016.03
RE:	Faculty of Science		

For information:

Acting under delegated authority at its meeting of February 1, 2016, SGSC approved the following curriculum revisions, effective **Fall 2016**.

Faculty of Science

Department of Physics

New course: PHYS 849 Topics in Nanophysics

SFU

MEMO

Faculty of Science

ATTENTION **Wade Parkhouse** Dean, Graduate Studies

FROM Carl Lowenberger, Associate Dean, Faculty of Science

RE New Course Request – Physics 849

DATE January 15, 2016

TIME 9:54 AM

The graduate program in the Department of Physics seeks to initiate a new course, Phys 849, "Topics in Nanophysics". This course has been taught for a number of years as a Special Topics Course and the Department of Physics would like to make this an official course. The Department seeks to make the course available to graduate students for credit. This course is highly relevant and should continue to be very popular and successful.

I have sought comments from other Faculties and no overlaps or concerns have been reported to me. This new course has my approval and that of the Faculty of Science Graduate Committee.

Carl Lowenberger

C. Lowenberger

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GRADUATE STUDIES & POSTDOCTORAL FELLOWS

New Graduate Course Proposal

Please save the form before filling it out to ensure that the information will be saved properly.

Course Subject (eg. PSYC)	Number (eg. 810)	Units (eg. 4)
PHYS	849	3

Course title (max 100 characters including spaces and punctuation)
Topics in Nanophysics

Short title (for enrollment/transcript - max 30 characters)
Nanophysics

Course description for SFU Calendar *
Topics in nanophysics including: growth and fabrication of nanostructures, mechanical constraints on nanostructure formation, electronic and optical properties of reduced dimensional structures, quantum wells, molecular nanostructures, nanowires and quantum dots, ballistic transport and diffusive transport, tunneling, magneto-transport, interference effects. Applications to various nanodevice structures will illustrate key concepts.

Rationale for introduction of this course
We have been offering this course for a number of years as a special topics course and feel that it now belongs in the calendar.

Effective term and year	Course delivery (eg 3 hrs/week for 13 weeks)
Fall 2016 (1167)	3 hrs/week
Frequency of offerings/year: 1 x per 2 years	Estimated enrollment/offering

Equivalent courses (These are previously approved courses that replicate the content of this course to such an extent that students should not receive credit for both courses.)

Prerequisite and/or Corequisite **
PHYS 365 (Semiconductor devices) or equivalent or PHYS 465 (Solid State Physics) or equivalent, or permission of the instructor.

Criminal record check required? ☐ Yes ☑ No If yes, then add this requirement as a prerequisite.

Campus where course will be taught ☑ Burnaby ☐ Surrey ☐ Vancouver ☐ Great Northern Way ☐ Off campus

Course Components ☑ Lecture ☐ Seminar ☐ Lab ☐ Research ☐ Practicum ☐ Online ☐ _____

Grading Basis	Capstone course?
☑ Letter grades ☐ Satisfactory/Unsatisfactory ☐ In Progress/Complete	☐ Yes ☑ No

Repeat for credit? ***	Total completions allowed?	Repeat within a term?
☐ Yes ☑ No	_____	☐ Yes ☑ No

Required course?	Final exam required?	Additional course fees?
☐ Yes ☑ No	☑ Yes ☐ No	☐ Yes ☑ No

Combined with an undergrad course? ☐ Yes ☑ No If yes, identify which undergraduate course and what the additional course requirements are for graduate students:

* Course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description.
** If a course is only available to students in a particular program, that should be stated in the prerequisite.
*** This mainly applies to a Special Topics or Directed Readings course.

RESOURCES

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course
George Kirczenow, Simon Watkins
Additional faculty members, space, and/or specialized equipment required in order to offer this course

CONTACT PERSON

Department / School / Program	Contact name	Contact email
Physics	Eldon Emberly	eemberly@sfu.ca

DEPARTMENTAL APPROVAL

REMINDER: New courses must be identified on a cover memo and confirmed as approved when submitted to FGSC/SGSC. Remember to also include the course outline.

Non-departmentalized faculties need not sign

Department Graduate Program Committee Eldon Emberly	Signature	Date Dec 10, 2015
Department Chair Jeff Sonier	Signature	Date Dec. 10, 2015

LIBRARY REVIEW

Library review done? ☑ YES

Course form, outline, and reading list must be sent by FGSC to lib-courseassessment@sfu.ca for a review of library resources.

OVERLAP CHECK

Overlap check done? ☑ YES ☐ N/A

The course form and outline must be sent by FGSC to the chairs of each FGSC (fgsc-list@sfu.ca) to check for an overlap in content. An overlap check is not required for some courses (ie. Special Topics, Capstone, etc.)

FACULTY APPROVAL

This approval indicates that all the necessary course content and overlap concerns have been resolved, and that the Faculty/Department commits to providing the required Library funds and any other necessary resources.

Faculty Graduate Studies Committee (FGSC)	Signature	Date
Carl Schwarz		Jan 15/2016

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee (SGSC)	Signature	Date
W Parkhouse	W Parkhouse	Feb 16/2015

ADMINISTRATIVE SECTION (for DGS office only)

Course Attribute: _____
Course Attribute Value: _____
Instruction Mode: _____
Attendance Type: _____

If different from regular units:
Academic Progress Units: _____
Financial Aid Progress Units: _____

Phys 849: Topics in Nanophysics

DESCRIPTION:

Nanostructures are condensed matter systems some or all of whose dimensions are in the range between about 1 nanometer and a few hundred nanometers. They are quantum systems whose properties differ markedly from both single atoms and macroscopic objects. Because of this they are of fundamental scientific interest. They are also currently attracting a great deal of attention because the miniaturization of electronic devices continues to progress, following Moore's Law. This course will introduce students to semiconducting nanostructures of various kinds, their properties, their commonalities and differences, the underlying physics, and the important principles and theoretical tools used to understand them.

Topics will be selected from the following: growth and fabrication of nanostructures; mechanical constraints on nanostructure formation; electronic and optical properties of reduced dimensional structures such as 2-dimensional materials, quantum wells, nanowires, molecular nanostructures, quantum dots; ballistic transport and diffusive transport; tunneling; magneto-transport; interference effects etc. The choice of topics is optional depending on the interest of the students. Applications to various device structures will be presented to illustrate key concepts.

The course will consist of lectures, assigned readings, a term paper, assignment questions, a midterm, and a final exam.

TEXTBOOK: no required text. Material will come from research papers and lecture notes.

GRADING:
- Assignments 70%
- Midterm 10%
- Final Exam 20%

PREREQUISITES:
PHYS 365 (Semiconductor devices) or equivalent or PHYS 465 (Solid State Physics) or equivalent, or permission of the instructor.