



8888 University Drive,
Burnaby, BC
Canada V5A 1S6

TEL: 778.782.4636
FAX: 778.782.5876

avpcio@sfu.ca
www.sfu.ca/vpacademic

MEMORANDUM

ATTENTION	Senate	DATE	October 3, 2014
FROM	Gordon Myers, Chair Senate Committee on Undergraduate Studies	PAGES	1/1
RE:	Faculty of Science (SCUS 14-40)		

For information:

Acting under delegated authority at its meeting of October 2, 2014 SCUS approved the following curriculum revisions.

1. Department of Math (SCUS 14-40a)

(i) Description change to Math 151, 152, 441

2. Department of Earth Sciences (SCUS 14-40b)

(i) Description change to EASC 416

3. Department of Chemistry (SCUS 14-40c)

(i) New Course Proposals:

- CHEM 123-4, Enriched Chemistry I and Laboratory
- CHEM 124-3, Enriched Chemistry II

(ii) Prerequisite change to CHEM 380



TASC II 9900
8888 University Drive,
Burnaby, BC
Canada V5A 1S6

TEL 778.782.4590
FAX 778.782.3424

sfu.ca/science

MEMORANDUM

ATTENTION	Senate Committee for Undergraduate Studies, SFU	DATE	September 18, 2014
FROM	Claire Cupples, Dean, Faculty of Science	PAGES	10 documents
RE:	New Undergraduate Curriculum Business from the Faculty of Science for inclusion on the Agenda of the October 2014 SCUS Meeting		

Mathematics

- Motion: Math 151, approve description change
- Motion: Math 152, approve description change
- Motion: Math 441, approve description change

Earth Sciences

- Motion: EASC 416, approve description change

Chemistry

- Motion: CHEM 123 and CHEM 124, approve 2 new courses
- Motion: CHEM 433, approve course number, title, description, and prerequisite change
- Motion: CHEM 380, approve prerequisite change

**EXISTING COURSE, CHANGES RECOMMENDED**

Please check appropriate revision(s):

 Course number Credit Title Description Prerequisite Course deletion Learning Outcomes

Indicate number of hours for: Lecture _____ Seminar _____ Tutorial _____ Lab _____

FROM	MATH 151	TO	MATH 151
Course Subject/Number	_____	Course Subject/Number	_____
Credits	<u>3</u>	Credits	<u>3</u>

TITLE

(1) LONG title for calendar and schedule, no more than 100 characters including spaces and punctuation.

FROM: _____ **TO:** _____

(2) SHORT title for enrollment and transcript, no more than 30 characters including spaces and punctuation.

FROM: _____ **TO:** _____**DESCRIPTION****FROM:**

Designed for students specializing in mathematics, physics, chemistry, computing science and engineering. Logarithmic and exponential functions, trigonometric functions, inverse functions. Limits, continuity, and derivatives. Techniques of differentiation, including logarithmic and implicit differentiation. The Mean Value Theorem. Applications of Differentiation including extrema, curve sketching, related rates, Newton's method. Antiderivatives and applications. Conic sections, polar coordinates, parametric curves.

DESCRIPTION**TO:**

Designed for students specializing in mathematics, physics, chemistry, computing science and engineering. Logarithmic and exponential functions, trigonometric functions, inverse functions. Limits, continuity, and derivatives. Techniques of differentiation, including logarithmic and implicit differentiation. The Mean Value Theorem. Applications of differentiation including extrema, curve sketching, Newton's method. Introduction to modeling with differential equations. Polar coordinates, parametric curves.

PREREQUISITE

Does this course replicate the content of a previously approved course to such an extent that students should not receive credit for both courses? If so, this should be **noted in the prerequisite**.

FROM: _____**TO:** _____**LEARNING OUTCOMES****RATIONALE**

The purpose of the change is to increase the number of lectures on differential equations from 2 to 3 to allow time for instructors to spend on modelling. The two models which will be studied are exponential growth and decay and Newton's law of cooling and their application as well as giving students a general introduction to DEs. We have deleted the 1 lecture on "Antiderivatives and applications" to make room for the new material because antiderivatives are covered in depth in MATH 152. We have also deleted "conic sections" because this last topic is not being covered.

Effective term and year

FALL 2015

NOVEMBER 2012



EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):

Course number Credit Title Description Prerequisite Course deletion Learning Outcomes

Indicate number of hours for: Lecture _____ Seminar _____ Tutorial _____ Lab _____

FROM		TO
Course Subject/Number	MATH 152	Course Subject/Number MATH 152
Credits	3	Credits 3

TITLE

(1) LONG title for calendar and schedule, no more than 100 characters including spaces and punctuation.

FROM: _____ **TO:** _____

(2) SHORT title for enrollment and transcript, no more than 30 characters including spaces and punctuation.

FROM: _____ **TO:** _____

DESCRIPTION

FROM:

Riemann sum, Fundamental Theorem of Calculus, definite, indefinite and improper integrals, approximate integration, integration techniques, applications of integration.
First-order separable differential equations.
Sequences and series, series tests, power series, convergence and applications of power series.

DESCRIPTION

TO:

Riemann sum, Fundamental Theorem of Calculus, definite, indefinite and improper integrals, approximate integration, integration techniques, applications of integration.
First-order separable differential equations and growth models.
Sequences and series, series tests, power series, convergence and applications of power series.

PREREQUISITE

Does this course replicate the content of a previously approved course to such an extent that students should not receive credit for both courses?
If so, this should be **noted in the prerequisite**.

PREREQUISITE

TO:

FROM:

LEARNING OUTCOMES

RATIONALE

The addition of growth models reflects the change in the number of lectures on differential equations from 1 lecture to one week (3 lectures) to time to study differential equations as models instead of just one method for solving them. Details are in the accompanying course outline.

Effective term and year
FALL 2015



EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):

Course number Credit Title Description Prerequisite Course deletion Learning Outcomes

Indicate number of hours for: Lecture _____ Seminar _____ Tutorial _____ Lab _____

FROM Course Subject/Number MATH 441 **TO** Course Subject/Number MATH 441
Credits 3 Credits 3

TITLE

(1) LONG title for calendar and schedule, no more than 100 characters including spaces and punctuation.

FROM: _____ **TO:** _____

(2) SHORT title for enrollment and transcript, no more than 30 characters including spaces and punctuation.

FROM: _____ **TO:** _____

DESCRIPTION

FROM:

A study of ideals and varieties. Topics include affine varieties, ideals, the Hilbert basis theorem, resultants and elimination, Hilbert's Nullstellensatz, irreducible varieties and prime ideals, decomposition of varieties, polynomial mappings, quotient rings, projective space and projective varieties. Students who have taken this course as MATH 439 Special Topics may not complete this course for further credit.

DESCRIPTION

TO:

A study of ideals and varieties. Topics include affine varieties, ideals, Groebner bases, the Hilbert basis theorem, resultants and elimination, Hilbert's Nullstellensatz, irreducible varieties and prime ideals, decomposition of varieties, polynomial mappings, quotient rings, projective space and projective varieties. Students who have taken this course as MATH 439 Special Topics may not complete this course for further credit.

PREREQUISITE

Does this course replicate the content of a previously approved course to such an extent that students should not receive credit for both courses? If so, this should be **noted in the prerequisite**.

PREREQUISITE

TO:

FROM:

LEARNING OUTCOMES

RATIONALE

We are adding Groebner bases as a core topic and tool. Groebner bases have changed the way this subject is being taught by making it constructive. Students study properties of Groebner bases, see applications of Groebner bases, use Groebner to prove theorems, and see Buchberger's algorithm for constructing them.

Effective term and year
Fall 2015


EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):

 Course number
 Credit
 Title
 Description
 Prerequisite
 Course deletion
 Learning Outcomes

Indicate number of hours for: Lecture _____ Seminar _____ Tutorial _____ Lab _____

FROM	TO
Course Subject/Number <u>EASC 416</u>	Course Subject/Number _____
Credits <u>3</u>	Credits _____

TITLE

(1) LONG title for calendar and schedule, no more than 100 characters including spaces and punctuation.

FROM: _____ **TO:** _____

Field Techniques in Hydrogeology

(2) SHORT title for enrollment and transcript, no more than 30 characters including spaces and punctuation.

FROM: _____ **TO:** _____

DESCRIPTION
FROM:

This course is intended to complement the theoretical aspects of hydrogeology by providing students with hands-on experience using hydrogeological equipment, and implementing sampling and testing protocols. The course involves a series of pre-field session assignments consisting of the analysis and interpretation of geophysical, geochemical and surficial geology data, and a week at a hydrogeology field site on the Fraser River delta, British Columbia. After the field work, students will conduct extensive analysis and interpretation of data gathered during the field session, complete exercises and prepare a written report. The course runs for about three weeks following spring term final examinations.

DESCRIPTION
TO:

This course is intended to complement the theoretical aspects of hydrogeology by providing students with hands-on experience using hydrogeological equipment, and implementing sampling and testing protocols. The course involves a series of pre-field session assignments consisting of the analysis and interpretation of geophysical, geochemical and surficial geology data, and a week at various field sites in the Metro Vancouver area at which students collect hydrogeological and hydrochemical data. After the field work, students conduct extensive analysis and interpretation of data gathered during the field session, complete exercises, and prepare a written report. The course normally runs for about three weeks following Spring semester final examinations.

PREREQUISITE

 Does this course replicate the content of a previously approved course to such an extent that students should not receive credit for both courses?
 If so, this should be **noted in the prerequisite**.

FROM: _____

TO: _____

LEARNING OUTCOMES
RATIONALE

The course now takes place at various study sites within the Metro Vancouver area, not at one specific site as was the case in past years.

Effective term and year

 Fall
 Spring 2015


COURSE SUBJECT/NUMBER CHEM 123

COURSE TITLE

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

Enriched Chemistry I and Laboratory

AND

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

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

COURSE DESCRIPTION (FOR CALENDAR). 50-60 WORDS MAXIMUM. ATTACH A COURSE OUTLINE TO THIS PROPOSAL.

An enriched chemistry course, covering atomic and molecular structure; chemical bonding; thermochemistry; elements; periodic table; gases, liquids, solids, and solutions, focusing on current chemistry research and applications. The topics will be covered with more sophistication than in other 1st year chemistry courses, and thus a thorough mastery of high-school chemistry will be assumed. This course includes a laboratory component.

REPEAT FOR CREDIT NO YES How many times? 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 a library report and, if appropriate, confirmation that funding arrangements have been addressed.

In Progress

Library report status

RATIONALE FOR INTRODUCTION OF THIS COURSE

The highest-achieving science students tend to be insufficiently engaged and challenged by the typical 1st year CHEM 121 course offering, which by necessity of having 500-1000 students per semester in it cannot be taught to the level of the top 5% in the class. This enriched course offering will give these students the opportunity to learn about chemistry in greater depth and sophistication at the 1st year level than would be possible in CHEM 121, and in a smaller class setting.

SCHEDULING AND ENROLLMENT INFORMATION

 Indicate effective **term and year** course would first be offered and planned **frequency** of offering thereafter:

First offering in Sept. 2015 and once per year in Sept. thereafter

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

What is the probable enrollment when offered? Estimate: 20-40



CREDITS

Indicate number of credits (units): 4

Indicate number of hours for:

Lecture	Seminar	Tutorial	Lab	Other
3			1	

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

As this is a 1st year General Chemistry course, all Chem. Faculty have the expertise to offer this course.

WQB DESIGNATION (attach approval from Curriculum Office)

Quantitative, Breadth-Science (as per already-approved CHEM 121).

PREREQUISITE

Does this course replicate the content of a previously-approved course to such an extent that students should not receive credit for both courses? If so, this should be **noted in the prerequisite**.

By permission of the Department. BC high school chemistry 12 or CHEM 111. Students may not count more than one of CHEM 120, 121 or 123 for credit.

COREQUISITE

Recommended: MATH 125 (or 151 or 154) and PHYS 125 (or 120 or 101) as a corequisite.

STUDENT LEARNING OUTCOMES

Upon satisfactory completion of the course students will be able to:

- understand the basic principles of modern chemistry and their application in society
- apply this knowledge towards a wide range of problem-solving in chemistry
- gain an appreciation of cutting-edge chemical research and the challenges to be addressed
- work safely in a chemistry laboratory and use practical laboratory skills to conduct chemistry experiments

FEES

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



RESOURCES

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

NONE

OTHER IMPLICATIONS

- Articulation agreement reviewed? YES NO Not applicable
- Exam required: YES NO
- Criminal Record Check required: YES NO

APPROVALS: APPROVAL IS SIGNIFIED BY DATE AND APPROPRIATE SIGNATURE.

- 1 Departmental approval indicates that the Department or School has approved the content of the course, and has consulted with other Departments/Schools/Faculties regarding proposed course content and overlap issues.

Chair, Department/School Date

Chair, Faculty Curriculum Committee Date

- 2 Faculty approval indicates that all the necessary course content and overlap concerns have been resolved, and that the Faculty/School/Department commits to providing the required Library funds.

Dean or designate Date

LIST which other Departments, Schools and Faculties have been consulted regarding the proposed course content, including overlap issues. Attach documentary evidence of responses.

Other Faculties' approval indicates that the Dean(s) or Designate of other Faculties AFFECTED by the proposed new course support(s) the approval of the new course:

_____ Date _____

_____ Date _____

- 3 SCUS approval indicates that the course has been approved for implementation subject, where appropriate, to financial issues being addressed.

COURSE APPROVED BY SCUS (Chair of SCUS):

_____ Date _____

COURSE SUBJECT/NUMBER CHEM 124**COURSE TITLE**

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

Enriched Chemistry II

AND

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

Enriched Chemistry II

CAMPUS where course will be taught: Burnaby Surrey Vancouver Great Northern Way Off campus**COURSE DESCRIPTION (FOR CALENDAR). 50-60 WORDS MAXIMUM. ATTACH A COURSE OUTLINE TO THIS PROPOSAL.**

An enriched chemistry course, covering chemical equilibria; electrochemistry; chemical thermodynamics; kinetics, energy and nuclear science, focusing on current chemistry research and applications. The topics will be covered with more sophistication than in other 1st year chemistry courses, and thus a thorough mastery of high-school chemistry will be assumed.

REPEAT FOR CREDIT

NO

YES

How many times?

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 a library report and, if appropriate, confirmation that funding arrangements have been addressed.

In Progress

Library report status

RATIONALE FOR INTRODUCTION OF THIS COURSE

The highest-achieving science students tend to be insufficiently engaged and challenged by the typical 1st year CHEM 122 course offering. This enriched course offering will give these students the opportunity to learn about chemistry in greater depth and sophistication at the 1st year level than would be possible in CHEM 122, and in a smaller class setting.

SCHEDULING AND ENROLLMENT INFORMATIONIndicate effective **term and year** course would first be offered and planned **frequency** of offering thereafter:

First offering in Jan. 2016 and once per year in Jan. thereafter

Will this be a required or elective course in the curriculum?

Required

Elective

What is the probable enrollment when offered? Estimate:

20-40

CREDITS

Indicate number of credits (units): 3

Indicate number of hours for: Lecture Seminar Tutorial Lab Other
3**FACULTY** Which of your present CFL faculty have the expertise to offer this course?

As this is a 1st year General Chemistry course, all Chem. Faculty have the expertise to offer this course.

WQB DESIGNATION (attach approval from Curriculum Office)

Quantitative (as per already-approved CHEM 122).

PREREQUISITEDoes this course replicate the content of a previously-approved course to such an extent that students should not receive credit for both courses?
If so, this should be **noted in the prerequisite**.

CHEM 123; or CHEM 121 (or 120) and permission of the Department. Students may not count more than one of CHEM 122 or 124 for credit.

COREQUISITE

Students who intend to take further laboratory courses in chemistry should take CHEM 124 concurrently with CHEM 126. Recommended: MATH 126 (or 152 or 155) and PHYS 126 (or 121 or 102) as a corequisite.

STUDENT LEARNING OUTCOMES

Upon satisfactory completion of the course students will be able to:

- understand the basic principles of modern chemistry and their application in society
- apply this knowledge towards a wide range of problem-solving in chemistry
- gain an appreciation of cutting-edge chemical research and the challenges to be addressed

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



RESOURCES

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

NONE

OTHER IMPLICATIONS

Articulation agreement reviewed? YES NO Not applicable
 Exam required: YES NO
 Criminal Record Check required: YES NO

APPROVALS: APPROVAL IS SIGNIFIED BY DATE AND APPROPRIATE SIGNATURE.

1 Departmental approval indicates that the Department or School has approved the content of the course, and has consulted with other Departments/Schools/Faculties regarding proposed course content and overlap issues.

Chair, Department/School Date

Chair, Faculty Curriculum Committee Date

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

Dean or designate Date

LIST which other Departments, Schools and Faculties have been consulted regarding the proposed course content, including overlap issues. Attach documentary evidence of responses.

Other Faculties' approval indicates that the Dean(s) or Designate of other Faculties AFFECTED by the proposed new course support(s) the approval of the new course:

_____ Date _____

_____ Date _____

3 SCUS approval indicates that the course has been approved for implementation subject, where appropriate, to financial issues being addressed.

COURSE APPROVED BY SCUS (Chair of SCUS):

_____ Date _____



UNIVERSITY CURRICULUM AND INSTITUTIONAL LIAISON
OFFICE OF THE VICE-PRESIDENT, ACADEMIC

8888 University Drive, Burnaby, BC
Canada V5A 1S6

TEL: 778.782.3312
FAX: 778.782.5876

slrhodes@sfu.ca
www.sfu.ca/ugcr

MEMORANDUM

ATTENTION Claire Cupples, Dean, Faculty of Science **DATE** October 6, 2014

FROM Susan Rhodes, Director **PAGES** 1
University Curriculum & Institutional Liaison

RE: CHEM Q designation approvals

The University Curriculum Office has approved **Q** designations for the following new Faculty of Science courses, effective Summer 2015 (1154):

CHEM 123-4 Enriched Chemistry I and Laboratory
CHEM 124-4 Enriched Chemistry II

cc: Daniel Leznoff, Chemistry Undergraduate Chair



EXISTING COURSE, CHANGES RECOMMENDED

Please check appropriate revision(s):

- Course number
- Credit
- Title
- Description
- Prerequisite
- Course deletion
- Learning Outcomes

Indicate number of hours for: Lecture _____ Seminar _____ Tutorial _____ Lab _____

FROM **CHEM 380** **TO** **CHEM 380**
 Course Subject/Number _____ Course Subject/Number _____
 Credits _____ Credits _____

TITLE

(1) LONG title for calendar and schedule, no more than 100 characters including spaces and punctuation.

FROM: _____ **TO:** _____

(2) SHORT title for enrollment and transcript, no more than 30 characters including spaces and punctuation.

FROM: _____ **TO:** _____

DESCRIPTION

FROM: _____ **TO:** _____

PREREQUISITE

Does this course replicate the content of a previously approved course to such an extent that students should not receive credit for both courses? If so, this should be **noted in the prerequisite**.

FROM: CHEM 260 and 283 and 286, or permission of the department.
TO: CHEM 283 and 286, or permission of the department.

LEARNING OUTCOMES

RATIONALE

CHEM 260 is being removed from the pre-requisite list since this will facilitate life-sciences students that might be interested to take CHEM 380 to do so.