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**MEMORANDUM**

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

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**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



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**MEMORANDUM**

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

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**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 \_\_\_\_\_

<b>FROM</b>	<b>MATH 151</b>	<b>TO</b>	<b>MATH 151</b>
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** Course Subject/Number MATH 152      **TO** 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**.

**FROM:** \_\_\_\_\_

**TO:** \_\_\_\_\_

**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 \_\_\_\_\_

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

\_\_\_\_\_ Date \_\_\_\_\_  
Chair, Department/School

\_\_\_\_\_ Date \_\_\_\_\_  
Chair, Faculty Curriculum Committee

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.

\_\_\_\_\_ Date \_\_\_\_\_  
Dean or designate

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 INFORMATION**Indicate 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).

**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**.

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

**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.

\_\_\_\_\_ Date \_\_\_\_\_  
Chair, Department/School

\_\_\_\_\_ Date \_\_\_\_\_  
Chair, Faculty Curriculum Committee

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.

\_\_\_\_\_ Date \_\_\_\_\_  
Dean or designate

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 \_\_\_\_\_



