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MEMORANDUM

ATTENTION	Senate	DATE	June 6, 2014
FROM	Gordon Myers, Chair Senate Committee on Undergraduate Studies	PAGES	1/1
RE:	Faculty of Science (SCUS 14-19)		

For information:

Acting under delegated authority at its meeting of June 5, 2014 SCUS approved the following curriculum revisions effective Spring 2015.

1. Department of Physics (SCUS 14-19a)
 - (i) Upper Division requirement changes to the Mathematics Physics program
 - (ii) Upper Division requirement changes to the Physics Honours program
 - (iii) Prerequisite change to PHYS 221

2. Department of Mathematics (SCUS 14-19b)
 - (i) Lower division requirement changes to the Mathematics Major, Mathematics Honours, Applied Mathematics Major and Applied Mathematics Honours programs

3. Department of Statistics (SCUS 14-19c)
 - (i) Prerequisite change to STAT 100
 - (ii) Description change to STAT 403
 - (iii) New Course Proposal for:
 - STAT 341-1, Introduction to Statistical Computing and Exploratory Data Analysis – R
 - STAT 342-1, Introduction to Statistical Computing and Exploratory Data Analysis – SAS

To: Senate Committee for Undergraduate Studies, SFU

From: George Agnes, Associate Dean, Academic, Faculty of Science

Regarding: New Undergraduate Curriculum Business from the Faculty of Science for inclusion on the Agenda of the June 2014 SCUS Meeting

Physics

- Motion: approve changes to Calendar description for Program Mathematical Physics
(add MACM 409 - Rationale: MACM 409 – Numerical Linear Algebra is an appropriate choice for Math. Phys. students' MACM elective and has only marginal overlap with PHYS 395 - Computational Physics.)
- Motion: approve changes to Calendar description for Program Honours Physics
(add Phys 395 - Rationale: PHYS 395 - Computational Physics is an upper division elective that is missing from the list of possible elective choices.)
- Motion: approve prerequisite change to the course Physics 221 (Rationale: PHYS 221 and PHYS 321 cover essentially the same Electricity & Magnetism material for two different streams, (i) Engineering and (ii) Physics. PHYS 321 already has similar exclusionary language, and this change fixes an oversight in the prerequisites regarding the course PHYS 221.)

Mathematics

- Motions, 4 in total, all related: Changes to Calendar descriptions, updates for four programs, Mathematics Major, Mathematics Honours, Applied Mathematics Major, Applied Mathematics Honours.)

Statistics

- Motion: Stat 100, approve prerequisite change
 - Motion: Stat 403, approve description change
 - Motion: Stat 341, approve new course*
 - Motion: Stat 342, approve new course*
- * = course exists in Calendar as a temporarily approved course

Science

- Motion: approve 2 new courses, Sci 190 & Sci 390

Motion #3: To make the following changes to the upper division Mathematical Physics requirements.

**Program Change Request Form
Mathematical Physics**

FROM:

Upper Division Requirements

Students complete a minimum of 58 units, including all of

MACM 316 - Numerical Analysis I (3)

MATH 310 - Introduction to Ordinary Differential Equations (3)

MATH 320 - Introduction to Analysis II (3)

MATH 322 - Complex Variables (3)

MATH 418 - Partial Differential Equations (3)

and one of

MATH 419 - Linear Analysis (3)

MATH 424 - Complex Analysis (3)

MATH 425 - Real Analysis (3)

and one of

MATH 461 - Continuous Mathematical Models (3)

MATH 462 - Fluid Dynamics (3)

MATH 495 - Selected Topics in Applied Mathematics (3)

and one of

MACM 401 - Introduction to Computer Algebra (3)

MACM 416 - Numerical Analysis II (3)

MATH 467 - Dynamical Systems (3)

and all of

PHYS 321 - Intermediate Electricity and Magnetism (3)

PHYS 332W - Optics Laboratory (4)

PHYS 344 - Thermal Physics (3)

PHYS 384 - Methods of Theoretical Physics I (3)

PHYS 385 - Quantum Mechanics I (3)

PHYS 413 - Advanced Mechanics (3)

PHYS 415 - Quantum Mechanics II (3)

PHYS 421 - Electromagnetic Waves (3)

PHYS 445 - Statistical Physics (3)

and two of

PHYS 390 - Introduction to Astrophysics (3)

PHYS 395 - Computational Physics (3)

PHYS 432 - Undergraduate Honours Thesis (5)

PHYS 455 - Modern Optics (3)

PHYS 465 - Solid State Physics (3)

PHYS 485 - Particle Physics (3)
PHYS 490 - General Relativity and Gravitation (3)

TO:

Upper Division Requirements

Students complete a minimum of 58 units, including all of

MACM 316 - Numerical Analysis I (3)
MATH 310 - Introduction to Ordinary Differential Equations (3)
MATH 320 - Introduction to Analysis II (3)
MATH 322 - Complex Variables (3)
MATH 418 - Partial Differential Equations (3)

and one of

MATH 419 - Linear Analysis (3)
MATH 424 - Complex Analysis (3)
MATH 425 - Real Analysis (3)

and one of

MATH 461 - Continuous Mathematical Models (3)
MATH 462 - Fluid Dynamics (3)
MATH 495 - Selected Topics in Applied Mathematics (3)

and one of

MACM 401 - Introduction to Computer Algebra (3)
MACM 409 – Numerical Linear Algebra: Algorithms, Implementation and Applications (3)
MACM 416 - Numerical Analysis II (3)
MATH 467 - Dynamical Systems (3)

and all of

PHYS 321 - Intermediate Electricity and Magnetism (3)
PHYS 332W - Optics Laboratory (4)
PHYS 344 - Thermal Physics (3)
PHYS 384 - Methods of Theoretical Physics I (3)
PHYS 385 - Quantum Mechanics I (3)
PHYS 413 - Advanced Mechanics (3)
PHYS 415 - Quantum Mechanics II (3)
PHYS 421 - Electromagnetic Waves (3)
PHYS 445 - Statistical Physics (3)

and two of

PHYS 390 - Introduction to Astrophysics (3)
PHYS 395 - Computational Physics (3)
PHYS 432 - Undergraduate Honours Thesis (5 6)
PHYS 455 - Modern Optics (3)
PHYS 465 - Solid State Physics (3)
PHYS 485 - Particle Physics (3)
PHYS 490 - General Relativity and Gravitation (3)

Motion #2: To make the following changes to the upper division Physics Honours requirements.

**Program Change Request Form
Physics Honours**

FROM:

Upper Division Requirements

Students complete a minimum total of 52 units, including all of

- MATH 310 - Introduction to Ordinary Differential Equations (3)
- PHYS 321 - Intermediate Electricity and Magnetism (3)
- PHYS 332W - Optics Laboratory (4)
- PHYS 344 - Thermal Physics (3)
- PHYS 384 - Methods of Theoretical Physics I (3)
- PHYS 385 - Quantum Mechanics I (3)
- PHYS 413 - Advanced Mechanics (3)
- PHYS 415 - Quantum Mechanics II (3)
- PHYS 421 - Electromagnetic Waves (3)
- PHYS 431 - Advanced Physics Laboratory I (4)
- PHYS 432 - Undergraduate Honours Thesis (5)
- PHYS 445 - Statistical Physics (3)

and at least nine units chosen from

- PHYS 347 - Introduction to Biological Physics (3)
- PHYS 390 - Introduction to Astrophysics (3)
- PHYS 455 - Modern Optics (3)
- PHYS 465 - Solid State Physics (3)
- PHYS 485 - Particle Physics (3)
- PHYS 490 - General Relativity and Gravitation (3)

and three additional upper division credits in physics. PHYS 346 cannot be used to meet this requirement.

TO:

Upper Division Requirements

Students complete a minimum total of 52 units, including all of

- MATH 310 - Introduction to Ordinary Differential Equations (3)
- PHYS 321 - Intermediate Electricity and Magnetism (3)
- PHYS 332W - Optics Laboratory (4)
- PHYS 344 - Thermal Physics (3)
- PHYS 384 - Methods of Theoretical Physics I (3)
- PHYS 385 - Quantum Mechanics I (3)
- PHYS 413 - Advanced Mechanics (3)
- PHYS 415 - Quantum Mechanics II (3)

PHYS 421 - Electromagnetic Waves (3)
PHYS 431 - Advanced Physics Laboratory I (4)
PHYS 432 - Undergraduate Honours Thesis (5 6)
PHYS 445 - Statistical Physics (3)

and at least nine units chosen from

PHYS 347 - Introduction to Biological Physics (3)
PHYS 390 - Introduction to Astrophysics (3)
PHYS 395 - Computational Physics (3)
PHYS 455 - Modern Optics (3)
PHYS 465 - Solid State Physics (3)
PHYS 485 - Particle Physics (3)
PHYS 490 - General Relativity and Gravitation (3)

and three additional upper division credits in physics. PHYS 346 cannot be used to meet this requirement.



EXISTING COURSE, CHANGES RECOMMENDED

SCUS 14-19a(iii)

Please check appropriate revision(s):

Course number Credit Title Description Prerequisite Course deletion Learning Outcomes

Indicate number of hours for: Lecture 3 Seminar _____ Tutorial _____ Lab _____

FROM **TO**
Course Subject/Number PHYS 221 Course Subject/Number _____

Credits 3 Credits _____

TITLE

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

FROM: **TO:**
Electromagnetics

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

FROM: **TO:**
Electromagnetics

DESCRIPTION

FROM:
Electrostatics, magnetostatics, capacitance, inductance, concepts of electric and magnetic fields, Maxwell's equations.

DESCRIPTION

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: PHYS 126 or 121 or 141; MATH 251, with a minimum grade of C-. Quantitative.

PREREQUISITE

TO: PHYS 126 or 121 or 141; MATH 251, with a minimum grade of C-. Students with credit for PHYS 321 may not take this course for further credit. Quantitative.

LEARNING OUTCOMES

RATIONALE

PHYS 221 and PHYS 321 cover the same material for different Engineering and Physics streams. PHYS 321 already has similar exclusionary language, and this change fixes an oversight in PHYS 221.

Effective term and year **Fall 2014**

Legend: ~~strike through~~ font is deleted text, **Bold** text is new text, Note that text in Blue font represents Senate approved changes made to calendar entry that are not yet reflected in the current published calendar.

Motion: Update the calendar entry lower division requirements for the Mathematics Major Program

(Lower Division Requirements for Mathematics Major Program):

Students complete a minimum total of 31 units, including either one of
 CMPT 126 - Introduction to Computing Science and Programming (3)
 CMPT 128 - Introduction to Computing Science and Programming for Engineers (3)

or both of

CMPT 120 - Introduction to Computing Science and Programming I (3)
 CMPT 125 - Introduction to Computing Science and Programming II (3)

or both of

CMPT 130 - Introduction to Computer Programming I (3)
 CMPT 135 - Introduction to Computing Programming II (3)

and all of

MACM 101 - Discrete Mathematics I (3)
 MACM 201 - Discrete Mathematics II (3)
MACM 203 - Computing with Linear Algebra (2)
MACM 204 - Computing with Calculus (2)
 MATH 242 - Introduction to Analysis I (3)
 MATH 251 - Calculus III (3)
 STAT 270 - Introduction to Probability and Statistics (3)

~~and either~~

~~MACM 202 - Mathematical Modeling and Computation (4)~~

~~or two of~~

~~MACM 203 - Computing with Linear Algebra (2)~~
~~MACM 204 - Computing with Calculus (2)~~
~~MATH 294 - Computational Studies in Mathematics (2)~~

or with prior approval, one of Δ

~~MACM 401 - Introduction to Computer Algebra (3)~~

~~MACM 409 - Numerical Linear Algebra: Algorithms, Implementation and Applications (3)~~

~~MATH 439 - Selected Topics in Algebra (3)~~

~~Δ cannot be used to satisfy other upper division requirements~~

and one of

MATH 150 - Calculus I with Review (4)

MATH 151 - Calculus I (3) *

MATH 154 - Calculus I for the Biological Sciences (3) **

MATH 157 - Calculus I for the Social Sciences (3) **

and one of

MATH 152 - Calculus II (3) *

MATH 155 - Calculus II for the Biological Sciences (3) **

MATH 158 - Calculus II for the Social Sciences (3) **

and one of

MATH 232 - Applied Linear Algebra (3) **

MATH 240 - Algebra I: Linear Algebra (3) *

* strongly recommended

** with a B grade or better

The following substitutions are also permitted.

They may not also be used to satisfy the upper division requirements below.

MACM 409 - Numerical Linear Algebra: Algorithms, Implementation and Applications (3) for MACM 203.

MACM 401 - Introduction to Computer Algebra (3) for MACM 204.

MACM 442 - Cryptography (3) for MACM 204.

Rationale:

The addition of CMPT 130 and 135 has already been approved by Senate.

[These are the first year programming courses at Surrey]

The deletion of MACM 202 has already been approved by Senate.

[MACM 202 was replaced by MACM 203 and MACM 204 and has not been offered for 5 years.]

There are three changes concerning MACM 203 and MACM 204. MACM 203 is a course using Matlab and MACM 204 is a course using Maple. The department of mathematics wants all students to learn to use both software packages hence we want all students to take both MACM 203 and MACM 204 and we want them to take them early in their programs. For this reason MACM 203 and 204 have an 80-credit limit on them. There are three specific changes.

1) MATH 294 - Computational Studies in Mathematics (2) is deleted because it has never been offered (in 4 years) and it's not planned to be offered. Thus listing it here misleads students into thinking that there will be other options if they don't take MACM 203 and MACM 204 when first able.

2) MATH 439 Selected Topics in Algebra (3) as an option is replaced with MACM 442 Cryptography (3) because MACM 442 is more suitable. MACM 439 (now MATH 441 Commutative Algebra and Algebraic Geometry) has few programming exercises and many students do not do them. MACM 442 has a large number of programming exercises with a variety of mathematical objects.

3) Because of the way the previous options were set up, many students were opting for one 400 level course instead of taking MACM 203 and MACM 204 and taking that 400 level course in their last year, which defeats the purpose of having the students learn to use Matlab and Maple early in the programs. To address this and to discourage students from not taking MACM 203 and 204 we require a 400- level course as a substitute for each of MACM 203 and 204.

Legend: ~~strike through~~ font is deleted text, **Bold** text is new text, Note that text in Blue font represents Senate approved changes made to calendar entry that are not yet reflected in the current published calendar.

Motion: Change the lower division requirements for the Mathematics Honors Program

(Lower Division Requirements for Mathematics Honors Program):

Students complete a minimum total of 31 units, including either one of
CMPT 126 - Introduction to Computing Science and Programming (3)
CMPT 128 - Introduction to Computing Science and Programming for Engineers (3)

or both of

CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 125 - Introduction to Computing Science and Programming II (3)

or both of

CMPT 130 - Introduction to Computer Programming I (3)
CMPT 135 - Introduction to Computing Programming II (3)

and all of

CMPT 225 - Data Structures and Programming (3)
MACM 101 - Discrete Mathematics I (3)
MACM 201 - Discrete Mathematics II (3)
MACM 203 - Computing with Linear Algebra (2)
MACM 204 - Computing with Calculus (2)
MATH 242 - Introduction to Analysis I (3)
MATH 251 - Calculus III (3)
MATH 252 - Vector Calculus (3)
STAT 270 - Introduction to Probability and Statistics (3)

and either

~~MACM 202 - Mathematical Modeling and Computation (4)~~

~~or two of~~

~~MACM 203 - Computing with Linear Algebra (2)~~
~~MACM 204 - Computing with Calculus (2)~~
~~MATH 294 - Computational Studies in Mathematics (2)~~

~~or with prior approval, one of~~

~~MACM 401 - Introduction to Computer Algebra (3)~~

~~MACM 409 - Numerical Linear Algebra: Algorithms, Implementation and Applications (3)~~

~~MATH 439 - Selected Topics in Algebra (3)~~

~~△ cannot be used to satisfy other upper division requirements~~

and one of

MATH 150 - Calculus I with Review (4)

MATH 151 - Calculus I (3) *

MATH 154 - Calculus I for the Biological Sciences (3) **

MATH 157 - Calculus I for the Social Sciences (3) **

and one of

MATH 152 - Calculus II (3) *

MATH 155 - Calculus II for the Biological Sciences (3) **

MATH 158 - Calculus II for the Social Sciences (3) **

and one of

MATH 232 - Applied Linear Algebra (3) **

MATH 240 - Algebra I: Linear Algebra (3) *

* strongly recommended

** with a B grade or better

The following substitutions are also permitted.

They may not also be used to satisfy the upper division requirements below.

MACM 409 - Numerical Linear Algebra: Algorithms, Implementation and Applications (3) for MACM 203.

MACM 401 - Introduction to Computer Algebra (3) for MACM 204.

MACM 442 - Cryptography (3) for MACM 204.

Rationale:

The addition of CMPT 130 and 135 has already been approved by Senate.

[These are the first year programming courses at Surrey]

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[MACM 202 was replaced by MACM 203 and MACM 204 and has not been offered for 5 years.]

There are three changes concerning MACM 203 and MACM 204. MACM 203 is a course using Matlab and MACM 204 is a course using Maple. The department of mathematics wants all students to learn to use both software packages hence we want all students to take both MACM 203 and MACM 204 and we want them to take them early in their programs. For this reason MACM 203 and 204 have an 80- credit limit on them. There are three specific changes.

1) MATH 294 - Computational Studies in Mathematics (2) is deleted because it has never been offered (in 4 years) and it's not planned to be offered. Thus listing it here misleads students into thinking that there will be other options if they don't take MACM 203 and MACM 204 when first able.

2) MATH 439 Selected Topics in Algebra (3) as a option is replaced with MACM 442 Cryptography (3) because MACM 442 is more suitable. MACM 439 (now MATH 441 Commutative Algebra and Algebraic Geometry) has few programming exercises and many students do not do them. MACM 442 has a large number of programming exercises with a variety of mathematical objects.

3) Because of the way the previous options were set up, many students were opting for one 400 level course instead of taking MACM 203 and MACM 204 and taking that 400 level course in their last year which defeats the purpose of having the students learn to use Matlab and Maple early in the programs. To address this and to discourage students from not taking MACM 203 and 204 we require a 400-level course as a substitute for each of MACM 203 and 204.

Legend: ~~strike through~~ font is deleted text, **Bold** text is new text, Note that text in Blue font represents Senate approved changes made to calendar entry that are not yet reflected in the current published calendar.

Motion: Change the lower division requirements for the Applied Mathematics (APMA) Major Program

(Lower Division Requirements for APMA Major Program):

Students complete a minimum total of 36 units, including either one of
CMPT 126 - Introduction to Computing Science and Programming (3)
CMPT 128 - Introduction to Computing Science and Programming for Engineers (3)

or both of

CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 125 - Introduction to Computing Science and Programming II (3)

or both of

CMPT 130 - Introduction to Computer Programming I (3)
CMPT 135 - Introduction to Computing Programming II (3)

and all of

MACM 203 - Computing with Linear Algebra (2)

MACM 204 - Computing with Calculus (2)

MATH 242 - Introduction to Analysis I (3)

MATH 251 - Calculus III (3)

MATH 252 - Vector Calculus (3)

PHYS 211 - Intermediate Mechanics (3)

STAT 270 - Introduction to Probability and Statistics (3)

~~and either~~

~~MACM 202 - Mathematical Modeling and Computation (4)~~

~~or two of~~

~~MACM 203 - Computing with Linear Algebra (2)~~

~~MACM 204 - Computing with Calculus (2)~~

~~MATH 294 - Computational Studies in Mathematics (2)~~

~~or with prior approval, one of~~

~~MACM 401 - Introduction to Computer Algebra (3)~~
~~MACM 409 - Numerical Linear Algebra: Algorithms, Implementation and Applications (3)~~
~~MACM 416 - Numerical Analysis II (3)~~
~~MATH 461 - Continuous Mathematical Models (3)~~
~~MATH 462 - Fluid Dynamics (3)~~
~~MATH 467 - Dynamical Systems (3)~~
~~MATH 470 - Variational Calculus (3)~~
~~MATH 495 - Selected Topics in Applied Mathematics (3)~~

and one of

MATH 150 - Calculus I with Review (4)
MATH 151 - Calculus I (3)
MATH 154 - Calculus I for the Biological Sciences (3) **
MATH 157 - Calculus I for the Social Sciences (3) **

and one of

MATH 152 - Calculus II (3) *
MATH 155 - Calculus II for the Biological Sciences (3) **
MATH 158 - Calculus II for the Social Sciences (3) **

and one of

MATH 232 - Applied Linear Algebra (3) **
MATH 240 - Algebra I: Linear Algebra (3)

and one of

PHYS 120 - Mechanics and Modern Physics (3)
PHYS 125 - Mechanics and Special Relativity (3)
PHYS 140 - Studio Physics - Mechanics and Modern Physics (4)

and one of

PHYS 121 - Optics, Electricity and Magnetism (3)
PHYS 126 - Electricity, Magnetism and Light (3)
PHYS 141 - Studio Physics - Optics, Electricity and Magnetism (4)

* strongly recommended

** with a B grade or better

~~† cannot be used to satisfy other upper division requirements~~

**The following substitutions are also permitted.
They may not be used to satisfy the upper division requirements below.**

MACM 409 - Numerical Linear Algebra: Algorithms, Implementation and Applications (3) for MACM 203.

MACM 401 - Introduction to Computer Algebra (3) for MACM 204.

MACM 442 - Cryptography (3) for MACM 204.

Rationale:

The addition of CMPT 130 and 135 has already been approved by Senate.

[These are the first year programming courses at Surrey]

The deletion of MACM 202 has already been approved by Senate.

[MACM 202 was replaced by MACM 203 and MACM 204 and has not been offered for 5 years.]

The addition of PHYS 140 and PHYS 141 as alternates has already been approved by Senate.

[They are first year Surrey Physics offerings - both include a lab.]

There are three changes concerning MACM 203 and MACM 204. MACM 203 uses Matlab and MACM 204 uses Maple. The department wants all students to take both MACM 203 and 204 so they learn to use both software packages, and to do so early in their programs. For this reason MACM 203 and 204 have an 80 credit limit on them. There are three specific changes.

1) MATH 294 - Computational Studies in Mathematics (2) is deleted because it has never been offered (in 4 years) and it's not planned to be offered. Thus listing it here misleads students into thinking that there will be other options if they don't take MACM 203 and MACM 204 when first able.

2) MATH 439 Selected Topics in Algebra (3) as a option is replaced with MACM 442 Cryptography (3) because MACM 442 is more suitable. MACM 439 (now MATH 441 Commutative Algebra and Algebraic Geometry) has few programming exercises and many students do not do them. MACM 442 has a large number of programming exercises with a variety of mathematical objects.

3) Because of the way the previous options were set up, many students were opting for one 400 level course instead of taking MACM 203 and MACM 204 and taking that 400 level course in their last year which defeats the purpose of having the students learn to use Matlab and Maple early in the programs. To address this and to discourage students from not taking MACM 203 and 204 we require a 400- level course as a substitute for each of MACM 203 and 204 and we've limited the choices to those which use Matlab or Maple in a substantive way.

Legend: ~~strike through~~ font is deleted text, **Bold** text is new text, Note that text in Blue font represents Senate approved changes made to calendar entry that are not yet reflected in the current published calendar.

Motion: Change the lower division requirements for the Applied Mathematics (APMA) Honors Program

(Lower Division Requirements for APMA Honors Program):

Students complete a minimum total of 36 units, including either one of
CMPT 126 - Introduction to Computing Science and Programming (3)
CMPT 128 - Introduction to Computing Science and Programming for Engineers (3)

or both of

CMPT 120 - Introduction to Computing Science and Programming I (3)
CMPT 125 - Introduction to Computing Science and Programming II (3)

or both of

CMPT 130 - Introduction to Computer Programming I (3)
CMPT 135 - Introduction to Computing Programming II (3)

and all of

MACM 203 - Computing with Linear Algebra (2)

MACM 204 - Computing with Calculus (2)

MATH 242 - Introduction to Analysis I (3)

MATH 251 - Calculus III (3)

MATH 252 - Vector Calculus (3)

PHYS 211 - Intermediate Mechanics (3)

STAT 270 - Introduction to Probability and Statistics (3)

and one of

MATH 150 - Calculus I with Review (4)

MATH 151 - Calculus I (3)

MATH 154 - Calculus I for the Biological Sciences (3) **

MATH 157 - Calculus I for the Social Sciences (3) **

and one of

MATH 152 - Calculus II (3) *

MATH 155 - Calculus II for the Biological Sciences (3) **

MATH 158 - Calculus II for the Social Sciences (3) **

and one of

MATH 232 - Applied Linear Algebra (3) **

MATH 240 - Algebra I: Linear Algebra (3)

and either

~~MACM 202 - Mathematical Modeling and Computation (4)~~

or two of

~~MACM 203 - Computing with Linear Algebra (2)~~

~~MACM 204 - Computing with Calculus (2)~~

~~MATH 294 - Computational Studies in Mathematics (2)~~

or with prior approval, one of

~~MACM 401 - Introduction to Computer Algebra (3)~~

~~MACM 409 - Numerical Linear Algebra: Algorithms, Implementation and Applications (3)~~

~~MACM 416 - Numerical Analysis II (3)~~

~~MATH 461 - Continuous Mathematical Models (3)~~

~~MATH 462 - Fluid Dynamics (3)~~

~~MATH 467 - Dynamical Systems (3)~~

~~MATH 470 - Variational Calculus (3)~~

~~MATH 495 - Selected Topics in Applied Mathematics (3)~~

and one of

PHYS 120 - Mechanics and Modern Physics (3)

PHYS 125 - Mechanics and Special Relativity (3)

PHYS 140 - Studio Physics - Mechanics and Modern Physics (4)

and one of

PHYS 121 - Optics, Electricity and Magnetism (3)

PHYS 126 - Electricity, Magnetism and Light (3)

PHYS 141 - Studio Physics - Optics, Electricity and Magnetism (4)

* strongly recommended

** with a B grade or better

~~± cannot be used to satisfy other upper division requirements~~

The following substitutions are also permitted.

They may not be used to satisfy the upper division requirements below.

MACM 409 - Numerical Linear Algebra: Algorithms, Implementation and Applications (3) for MACM 203.

MACM 401 - Introduction to Computer Algebra (3) for MACM 204.

MACM 442 - Cryptography (3) for MACM 204.

Rationale:

The addition of CMPT 130 and 135 has already been approved by Senate.

[These are the first year programming courses at Surrey]

The deletion of MACM 202 has already been approved by Senate.

[MACM 202 was replaced by MACM 203 and MACM 204 and has not been offered for 5 years.]

The new alternates here for PHYS 120 or PHYS 140 for PHYS 125 and PHYS 121 or PHYS 141 for PHYS 126 were approved previously by Senate.

[PHYS 140 and 141 are first year Surrey Physics sequence.

PHYS 120 and 121 are the first year Burnaby Physics sequence for students with Grade 12 Physics and Grade 12 Mathematics.

PHYS 125 and 126 are first year Burnaby Physics sequence for students with a stronger preparation in Physics and Mathematics.

All three streams are appropriate for the Applied Mathematics major and honors programs.]

There are three changes concerning MACM 203 and MACM 204. MACM 203 uses Matlab and MACM 204 uses Maple. The department wants all students to take both MACM 203 and 204 so they learn to use both software packages, and to do so early in their programs. For this reason MACM 203 and 204 have an 80- credit limit on them. There are three specific changes.

1) MATH 294 - Computational Studies in Mathematics (2) is deleted because it has never been offered (in 4 years) and it's not planned to be offered. Thus listing it here misleads students into thinking that there will be other options if they don't take MACM 203 and MACM 204 when first able.

2) MATH 439 Selected Topics in Algebra (3) as a option is replaced with MACM 442 Cryptography (3) because MACM 442 is more suitable. MACM 439 (now MATH 441 Commutative Algebra and Algebraic Geometry) has few programming exercises and many students do not do them. MACM 442 has a large number of programming exercises with a variety of mathematical objects.

3) Because of the way the previous options were set up, many students were opting for one 400 level course instead of taking MACM 203 and MACM 204 and taking that 400 level course in their last year which defeats the purpose of having the students learn to use Matlab and Maple early in the programs. To address this and to discourage students from not taking MACM 203 and 204 we require a 400- level course as a substitute for each of MACM 203 and 204 and we've limited the choices to those, which use Matlab or Maple in a substantive way.

**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 3 Seminar _____ Tutorial _____ Lab _____
FROM **TO**
 Course Subject/Number STAT 100 Course Subject/Number _____
Credits 3 Credits _____**TITLE**

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

FROM: **TO:**

Chance and Data Analysis

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

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

Chance phenomena and data analysis are studied through simulation and examination of real world contexts including sports, investment, lotteries and environmental issues. Intended to be particularly accessible to students who are not specializing in Statistics. Students with credit for STAT 101, 201, 203, 270 or BUEC 232 will not receive additional credit for this course. Quantitative/Breadth-Science.

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: Students with credit for STAT 101, 201, 203, 270 or BUEC 232 will not receive additional credit for this course. Quantitative/Breadth-Science.

DESCRIPTION**TO:****PREREQUISITE**

TO: Students with credit for STAT 101, 201, 203, 270, BUEC 232, PSYC 210 or POL 201 will not receive additional credit for this course. ~~Quantitative/Breadth-Science~~

LEARNING OUTCOMES**RATIONALE**

PSYC 210 and POL 201 are both introductory statistics courses. STAT 100 B-Sci is designed to precede all other statistics courses.

**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 3
 Seminar _____
 Tutorial 1
 Lab _____

FROM		TO
Course Subject/Number	<u>STAT 403</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:** _____

Intermediate Sampling and Experimental Design

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

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

A practical introduction to useful sampling techniques and intermediate level experimental designs. Statistics minor, major and honors students may not use this course to satisfy the required number of elective units of upper division Statistics. However, they may include the course to satisfy the total number of required units of upper division credit. Intended to be particularly accessible to students who are not specializing in Statistics.

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

A practical introduction to useful sampling techniques and intermediate level experimental designs. Statistics major and honors students may not use this course to satisfy the required number of elective units of upper division Statistics. However, they may include the course to satisfy the total number of required units of upper division credit.

PREREQUISITE**TO:** _____**LEARNING OUTCOMES****RATIONALE**

This course was excluded from our old minor program since it was regarded as too easy for students with the lower division mathematics requirements. Our new minor program requires only Calculus II. This makes STAT 403 an appropriate upper division course for new minor students. The final sentence is no longer required with the new minor program in place.

Effective term and year Spring 2015

JANUARY 2012



COURSE SUBJECT/NUMBER STAT 341-1

COURSE TITLE

SCUS 14-19c(iii)

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

Introduction to Statistical Computing and Exploratory Data Analysis - R

AND

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

Intro to Stat Comp. Data An.-R

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.

Introduces the R statistical package. Data management; reading, editing and storing statistical data; data exploration and representation; summarizing data with tables, graphs and other statistical tools; and data simulation.

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.

The course is included in the list at
Library report status <http://www.lib.sfu.ca/collections/course-assessments>

RATIONALE FOR INTRODUCTION OF THIS COURSE

STAT 341 introduces the R statistical package. It covers data management; reading, editing and storing statistical data; data exploration and representation; summarizing data with tables, graphs and other statistical tools; and data simulation. Many disciplines are increasingly turning to R as a statical tool because it is free and open source. While R is free, it is not "cheap" and has a steep learning curve. This course will help students get started in R and will progress to an intermediate level.

SCHEDULING AND ENROLLMENT INFORMATION

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

First offering: Spring 2015; Planned Frequency: Once per year.

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

What is the probable enrollment when offered? Estimate: 10



CREDITS

Indicate number of credits (units): 1

Indicate number of hours for:	Lecture	Seminar	Tutorial	Lab	Other
	1		1		

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

Altman, Bingham, Campbell, Graham, Hu, Insley, Lockhart, Loughin, McNeney, Routledge, Schwarz, Swartz, Tang, Thompson

WQB DESIGNATION (attach approval from Curriculum Office)

To be obtained.

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**.

STAT 285 or STAT 302 or STAT 305 or equivalent.
Students with credit for STAT 340-3 may not take STAT 341-1 for further credit.

COREQUISITE

STUDENT LEARNING OUTCOMES

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

Students will be able to do the following:

1. Demonstrate the importing of data from a variety of sources and formats into the statistical analysis package R.
2. Apply data preprocessing such as merging, reshaping, and using SQL to query databases to augment or obtain a dataset.
3. Implement and interpret a variety of data visualization tools including figures and tables, and determine application specific modifications to emphasize key attributes.
4. Evaluate analyses using simulation modeling.
5. Demonstrate efficient software implementation by writing scripts and functions.
6. Compare resampling methods such as cross validation, bootstrapping, and permutation tests.

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. This is only part of STAT 340-3 and is offered simultaneously with STAT 340-3.

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 STAT 342-1

COURSE TITLE

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

Introduction to Statistical Computing and Exploratory Data Analysis - SAS

AND

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

Intro to Stat Comp. Data SAS

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.

Introduces the SAS statistical package. Data management; reading, editing and storing statistical data; data exploration and representation; summarizing data with tables, graphs and other statistical tools; and data simulation.

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.

The course is included in the list at
Library report status <http://www.lib.sfu.ca/collections/course-assessments>

RATIONALE FOR INTRODUCTION OF THIS COURSE

STAT 342 introduces the SAS statistical package. It covers data management; reading, editing and storing statistical data; data exploration and representation; summarizing data with tables, graphs and other statistical tools; and data simulation. SAS is a statistical tool often used in data mining and other large data applications. Unfortunately, it has a steep learning curve. The course will help students get started in SAS and will progress to an intermediate level. Completing of this course will also prepare students for the first level certification exam in SAS.

SCHEDULING AND ENROLLMENT INFORMATION

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

First offering: Spring 2015; Planned Frequency: Once per year.

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

What is the probable enrollment when offered? Estimate: 20



CREDITS

Indicate number of credits (units): 1

Indicate number of hours for:	Lecture	Seminar	Tutorial	Lab	Other
	1		1		

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

Altman, Bingham, Campbell, Graham, Hu, Insley, Lockhart, Loughin, McNeney, Routledge, Schwarz, Swartz, Tang, Thompson

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PREREQUISITE

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STAT 285 or STAT 302 or STAT 305 or equivalent.
Students with credit for STAT 340-3 may not take STAT 342-1 for further credit.

COREQUISITE

STUDENT LEARNING OUTCOMES

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

Students will be able to do the following:

1. Demonstrate the importing of data from a variety of sources and formats into the statistical analysis package SAS.
2. Apply data preprocessing such as merging, reshaping, and using SQL to query databases to augment or obtain a dataset.
3. Implement and interpret a variety of data visualization tools including figures and tables, and determine application specific modifications to emphasize key attributes.
4. Evaluate analyses using simulation modeling.
5. Demonstrate efficient software implementation by writing scripts and functions.
6. Compare resampling methods such as cross validation, bootstrapping, and permutation tests.

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. This is only part of STAT 340-3 and is offered simultaneously with STAT 340-3.

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.

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_____ 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 _____