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MEMORANDUM

ATTENTION	Senate	DATE	January 12, 2018
FROM	Daniel Leznoff, Chair Senate Committee on Undergraduate Studies	PAGES	1/1
RE:	Program Changes		

For information:

Acting under delegated authority at its meeting of January 11, 2018 SCUS approved the following curriculum revisions effective Fall 2018.

a. Faculty of Health Sciences (SCUS 18-02)

- (i) Requirement changes to the Health Sciences Major-Bachelor of Arts and Bachelor of Sciences – Life Sciences Concentration and Population and Quantitative Health Sciences Concentration

b. Faculty of Science (SCUS 18-03)**1. Department of Biomedical Physiology and Kinesiology (SCUS 18-03a)**

- (i) Upper division requirement changes to the Biomedical Physiology Major and Honours programs
- (ii) Upper and lower division requirement changes to the Kinesiology Minor program
- (iii) Upper division requirement changes to the Kinesiology Major and Honours programs

2. Department of Mathematics (SCUS 18-03b)

- (i) Lower division requirement changes to the Mathematics and Computing Science Joint Honours program

3. Department of Physics (SCUS 18-03c)

- (i) Upper division requirement changes to the APPH Majors and Honours programs
- (ii) Upper division requirement changes to the BPPH Majors and Honours programs
- (iii) Upper division requirement changes to the MAPH Honours program
- (iv) Requirement changes to the PHYS Honours program

4. Department of Statistics and Actuarial Science (SCUS 18-03d)

- (i) Upper and Lower division requirement changes to the STAT minor



**Calendar Entry Change
Faculty of Health Sciences**

SCUS 18-02

Rationale for change:

A significant percentage of the students in the Faculty of Health Sciences pursue professional training in health careers, where the admission requirements for these professional programs require a minimum of 90 academic units. This proposal allows students in the Faculty of Health Sciences to take advantage of a similar policy in the Faculty of Science. For students who leave SFU before completion of their degree to enter competitive professional programs, this policy will ensure that they will be considered SFU alumni without compromising their academic training.

Effective term and year: **Fall 2018**

The following program(s) will be affected by these changes:

Health Sciences major- Bachelor of Arts

Health Sciences major – Bachelor of Science – Life Sciences Concentration and Population and Quantitative Health Sciences Concentration

Calendar Change: “to” and “from” sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

Transfer Credit and Baccalaureate Degrees for Students Who Successfully Complete Second Year of Professional Training in Health Careers.

Students who complete at least 90 units in a Faculty of Health Sciences degree program and are accepted into an approved program in medicine, dentistry, optometry, or veterinary medicine are eligible for a Simon Fraser University baccalaureate degree from the Faculty of Health Sciences after successful completion of the second professional study year. To be acceptable, courses completed in the professional program must not duplicate those already completed at Simon Fraser University and must be acceptable for transfer credit in a major, joint major, or honours program. Candidates must apply for transfer credit by requesting a Letter of Permission (LOP) and apply to graduate. As an official transcript of the work completed in the first two years of the approved program is required for transfer credit, application for graduation should be made in the summer term following the completion of program.

Calendar Entry Change

Name of Program Biomedical Physiology Major

Rationale for change:

Since BPK 417 or 417W have a strong physiological component they are appropriate to include in to the upper division electives list for Biomedical Physiology Major

Effective term and year: Fall 2018

The following program(s) will be affected by these changes:

Biomedical Physiology Major

Calendar Change: “to” and “from” sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

Biomedical Physiology Major

Program Requirements

and five of

BPK 301 - Biomechanics Laboratory (3)

BPK 308 - Experiments and Models in Systems Physiology (3)

BPK 310 - Exercise/Work Physiology (3)

BPK 336 - Histology (3)

BPK 340 - Active Health: Behavior and Promotion (3)

BPK 401 - Muscle Biomechanics (3)

BPK 402 - Mechanical Behavior of Biological Tissues (3)

BPK 412 - Molecular Cardiac Physiology (3)

BPK 415 - Neural Control of Movement (3)

BPK 417 or 417W Obesity, Adipocyte Function and Weight Management

BPK 420 - Selected Topics in Kinesiology I (3) *

BPK 421 - Selected Topics in Kinesiology II (3) *

BPK 422 - Selected Topics in Kinesiology III (3) *

BPK 423 - Selected Topics in Kinesiology IV (3) *

BPK 426 - Neuromuscular Anatomy (3)

BPK 430 - Human Energy Metabolism (3)

BPK 431 - Integrative Cancer Biology (3)

BPK 432 - Physiological Basis of Temperature Regulation (3)

BPK 444 - Cardiac Disease: Pathophysiology and Assessment (3)
BPK 446 - Neurological Disorders (3)
BPK 448 - Rehabilitation of Movement Control (3)
BPK 458 - Prevention and Management of Cardiovascular Disease (3)
BPK 484 - Altitude and Aerospace Physiology (3)

A maximum of six units from the following may be used towards the above requirements

BPK 496 - Directed Study Literature (3) *
BPK 498 - Directed Study Experiential (3) *

Calendar Entry Change

Name of Program Biomedical Physiology Honours

Rationale for change:
Since BPK 417 or 417W have a strong physiological component they are appropriate to include in to the upper division electives list for Biomedical Physiology Honours

Effective term and year: Fall 2018

The following program(s) will be affected by these changes:
Biomedical Physiology Honours

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

Biomedical Physiology Honours

Program Requirements

and five of

- BPK 301 - Biomechanics Laboratory (3)
- BPK 308 - Experiments and Models in Systems Physiology (3)
- BPK 310 - Exercise/Work Physiology (3)
- BPK 336 - Histology (3)
- BPK 340 - Active Health: Behavior and Promotion (3)
- BPK 401 - Muscle Biomechanics (3)
- BPK 402 - Mechanical Behavior of Biological Tissues (3)
- BPK 412 - Molecular Cardiac Physiology (3)
- BPK 415 - Neural Control of Movement (3)

BPK 417 or BPK 417W Obesity, Adipocyte Function and Weight Management

- BPK 420 - Selected Topics in Kinesiology I (3) *
- BPK 421 - Selected Topics in Kinesiology II (3) *
- BPK 422 - Selected Topics in Kinesiology III (3) *
- BPK 423 - Selected Topics in Kinesiology IV (3) *
- BPK 426 - Neuromuscular Anatomy (3)
- BPK 430 - Human Energy Metabolism (3)
- BPK 431 - Integrative Cancer Biology (3)
- BPK 432 - Physiological Basis of Temperature Regulation (3)
- BPK 444 - Cardiac Disease: Pathophysiology and Assessment (3)



BPK 446 - Neurological Disorders (3)
BPK 448 - Rehabilitation of Movement Control (3)
BPK 458 - Prevention and Management of Cardiovascular Disease (3)
BPK 484 - Altitude and Aerospace Physiology (3)

A maximum of six units from the following may be used towards the above requirements

BPK 496 - Directed Study Literature (3) *
BPK 498 - Directed Study Experiential (3) *



SCUS 18-03a(iii)

Calendar Entry Change

Name of Program Kinesiology Minor

Delete BPK 111, 212 and 461 from the calendar

Rationale: None of these courses have been offered recently and there are no plans to offer them in the future

Add 304W to the list of elective courses from which 4 courses can be selected.

Also include Lower Division and Upper Division requirements headings and the indication that extra prerequisite courses may be required, both of which are present in the BIF Minor listing but not in the KIN Minor listing.

Additions to the KIN Minor listing in the table below are indicated by bold font and underlining of the text.

Rationale: KIN Minors are now being approved to do Directed Studies when the BPK 304W or equivalent prerequisite is in place. BIF Minors already have BPK 304W listed in their list from which 2 courses can be selected.

This change would also facilitate Minors acquiring their upper division writing course requirement.

Effective term and year: Fall 2018

The following program(s) will be affected by these changes:

Kinesiology Minor

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

Kinesiology Minor

Note that students cannot combine a kinesiology minor with any other major or minor in the areas of biomedical physiology and behavioural neuroscience.

Program Requirements KIN minor

Lower Division Requirements

Students complete

BPK 142 - Introduction to Kinesiology (3)

and one of

BPK 105 - Fundamentals of Human Structure and Function (3)

BPK 205 - Introduction to Human Physiology (3)
 BPK 208 - Introduction to Physiological Systems (3)
 and three of the following, one of which must be a 200 division course

BPK 110 - Human Nutrition: Current Issues (3)

~~BPK 111 - Food and Food Safety (3)~~

BPK 140 - Contemporary Health Issues (3)

BPK 143 - Exercise: Health and Performance (3)

BPK 180W - Introduction to Ergonomics (3)

BPK 201 - Biomechanics (3)

BPK 207 - Sensorimotor Control and Learning (3)

~~BPK 212 - Food and Society (3)~~

BPK 241 - Sports Injuries - Prevention and Rehabilitation (3)

Upper Division Requirements

and one of

BPK 325 - Basic Human Anatomy (3) +

BPK 342 - Active Health (3) +

and four of

(note that some classes may require additional pre-requisites):

BPK 301 - Biomechanics Laboratory (3)

BPK 303 - Kinanthropometry (3)

BPK 304W - Inquiry and Measurement in Biomedical Physiology and Kinesiology (3) ++

BPK 305 - Human Physiology I (3)

BPK 306 - Human Physiology II (3)

BPK 310 - Exercise/Work Physiology (3)

BPK 311 - Applied Human Nutrition (3)

BPK 312 - Nutrition for Fitness and Sport (3)

BPK 325 - Basic Human Anatomy (3) +

BPK 340 - Active Health: Behavior and Promotion (3)

BPK 342 - Active Health (3) +

BPK 375 - Human Growth and Development (3)

BPK 381 - Psychology of Work (3)

BPK 382 - Workplace Health (3)

BPK 402 - Mechanical Behavior of Biological Tissues (3)

BPK 420 - Selected Topics in Kinesiology I (3)

BPK 421 - Selected Topics in Kinesiology II (3)

BPK 422 - Selected Topics in Kinesiology III (3)

BPK 423 - Selected Topics in Kinesiology IV (3)

BPK 431 - Integrative Cancer Biology (3)

BPK 458 - Prevention and Management of Cardiovascular Disease (3)

~~BPK 461 - Physiological Aspects of Aging (3)~~

GERO 407 - Nutrition and Aging (3)

HSCI 312 - Health Promotion: Individuals and Communities (3)



Calendar Entry Change

Name of Program Kinesiology Major

Rationale for change:
BPK 461 is being deleted from the calendar
This course has not been offered recently and there are no plans to offer it in the future

Effective term and year: Fall 2018

The following program(s) will be affected by these changes:

Kinesiology Major

Calendar Change: “to” and “from” sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

Kinesiology Major

Program Requirements

Active Health and Rehabilitation Concentration

This program option requires a total of at least 60 upper division units, which is composed of the upper division core courses shown above and the following additional requirements.

Students who choose this concentration will complete additional BPK units as specified below, including all of

[BPK 303 - Kinanthropometry \(3\)](#)

[BPK 343 - Active Health: Assessment and Programming \(3\)](#)

and four of

[BPK 307 - Human Physiology III \(3\)](#)

[BPK 308 - Experiments and Models in Systems Physiology \(3\)](#)

[BPK 311 - Applied Human Nutrition \(3\)](#)

[BPK 312 - Nutrition for Fitness and Sport \(3\)](#)

[BPK 375 - Human Growth and Development \(3\)](#)

[BPK 381 - Psychology of Work \(3\)](#)

[BPK 382 - Workplace Health \(3\)](#)



[BPK 401 - Muscle Biomechanics \(3\)](#)
[BPK 402 - Mechanical Behavior of Biological Tissues \(3\)](#)
[BPK 408W - Cellular Physiology Laboratory \(3\)](#)
[BPK 412 - Molecular Cardiac Physiology \(3\)](#)
[BPK 415 - Neural Control of Movement \(3\)](#)
[BPK 417W - Obesity, Adipocyte Function and Weight Management \(3\)](#)
[BPK 420 - Selected Topics in Kinesiology I \(3\) ^](#)
[BPK 421 - Selected Topics in Kinesiology II \(3\) ^](#)
[BPK 422 - Selected Topics in Kinesiology III \(3\) ^](#)
[BPK 423 - Selected Topics in Kinesiology IV \(3\) ^](#)
[BPK 426 - Neuromuscular Anatomy \(3\)](#)
[BPK 431 - Integrative Cancer Biology \(3\)](#)
[BPK 432 - Physiological Basis of Temperature Regulation \(3\)](#)
[BPK 443 - Advanced Exercise Prescription \(3\)](#)
[BPK 444 - Cardiac Disease: Pathophysiology and Assessment \(3\)](#)
[BPK 445 - Advanced Cardiac Rehabilitation \(3\)](#)
[BPK 446 - Neurological Disorders \(3\)](#)
[BPK 448 - Rehabilitation of Movement Control \(3\)](#)
[BPK 458 - Prevention and Management of Cardiovascular Disease \(3\)](#)
~~[BPK 461 - Physiological Aspects of Aging \(3\)](#)~~
[BPK 481 - Musculoskeletal Disorders \(3\)](#)
[BPK 482 - Ergonomics and Rehabilitation \(3\)](#)

A maximum of six units from the following may be used towards the above requirements

[BPK 496 - Directed Study Literature \(3\) ^](#)
[BPK 498 - Directed Study Experiential \(3\) ^](#)



Calendar Entry Change

Name of Program **Kinesiology Honours**

Rationale for change:
BPK 461 is being deleted from the calendar
This course has not been offered recently and there are no plans to offer it in the future

Effective term and year: Fall 2018

The following program(s) will be affected by these changes:

Kinesiology Honours

Calendar Change: “to” and “from” sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

Kinesiology Honours

Program Requirements

Active Health and Rehabilitation Concentration

This program option requires a total of at least 60 upper division units, which is composed of the upper division core courses shown above and the following additional requirements.

Students who choose this concentration will complete additional BPK units as specified below, including all of

[BPK 303 - Kinanthropometry \(3\)](#)

[BPK 343 - Active Health: Assessment and Programming \(3\)](#)

and four of

[BPK 307 - Human Physiology III \(3\)](#)

[BPK 308 - Experiments and Models in Systems Physiology \(3\)](#)

[BPK 311 - Applied Human Nutrition \(3\)](#)

[BPK 312 - Nutrition for Fitness and Sport \(3\)](#)

[BPK 375 - Human Growth and Development \(3\)](#)

[BPK 381 - Psychology of Work \(3\)](#)

[BPK 382 - Workplace Health \(3\)](#)

[BPK 401 - Muscle Biomechanics \(3\)](#)
[BPK 402 - Mechanical Behavior of Biological Tissues \(3\)](#)
[BPK 408W - Cellular Physiology Laboratory \(3\)](#)
[BPK 412 - Molecular Cardiac Physiology \(3\)](#)
[BPK 415 - Neural Control of Movement \(3\)](#)
[BPK 417W - Obesity, Adipocyte Function and Weight Management \(3\)](#)
[BPK 420 - Selected Topics in Kinesiology I \(3\) ^](#)
[BPK 421 - Selected Topics in Kinesiology II \(3\) ^](#)
[BPK 422 - Selected Topics in Kinesiology III \(3\) ^](#)
[BPK 423 - Selected Topics in Kinesiology IV \(3\) ^](#)
[BPK 426 - Neuromuscular Anatomy \(3\)](#)
[BPK 431 - Integrative Cancer Biology \(3\)](#)
[BPK 432 - Physiological Basis of Temperature Regulation \(3\)](#)
[BPK 443 - Advanced Exercise Prescription \(3\)](#)
[BPK 444 - Cardiac Disease: Pathophysiology and Assessment \(3\)](#)
[BPK 445 - Advanced Cardiac Rehabilitation \(3\)](#)
[BPK 446 - Neurological Disorders \(3\)](#)
[BPK 448 - Rehabilitation of Movement Control \(3\)](#)
[BPK 458 - Prevention and Management of Cardiovascular Disease \(3\)](#)
~~[BPK 461 - Physiological Aspects of Aging \(3\)](#)~~
[BPK 481 - Musculoskeletal Disorders \(3\)](#)
[BPK 482 - Ergonomics and Rehabilitation \(3\)](#)

A maximum of six units from the following may be used towards the above requirements

[BPK 496 - Directed Study Literature \(3\) ^](#)
[BPK 498 - Directed Study Experiential \(3\) ^](#)



Calendar Entry Change: Lower Division Requirements for Mathematics and Computing Science Joint Honours Program

Name of Program or Name of Faculty: Department of Mathematics

Rationale for change:

CMPT 150 is now a discontinued course. CMPT 295 was not listed as its replacement.

Effective term and year: Fall 2018

The following program(s) will be affected by these changes:
Mathematics and Computing Science Joint Honours Program

Calendar Change: “to” and “from” sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

and all of

~~CMPT 150 - Introduction to Computer Design (3)~~
 CMPT 225 - Data Structures and Programming (3)
 CMPT 276 - Introduction to Software Engineering (3)
CMPT 295 - Introduction to Computer Systems (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)
 STAT 270 - Introduction to Probability and Statistics (3)

Calendar Entry Change

SCUS 18-03c(i)

Name of Program or Name of Faculty Physics

<p>Rationale for change:</p> <p>We would like students to have the opportunity to take MATH 462 – Fluid Mechanics as part of this program.</p> <p>Other changes reflect changes to course names for our upper division physics labs as previously approved.</p>
<p>Effective term and year:</p> <p>Fall 2018</p>
<p>The following program(s) will be affected by these changes:</p> <p>APPH Majors</p>

Calendar Change: “to” and “from” sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

<p>Students complete a total of 36 units, including all of</p> <p>MATH 310 - Introduction to Ordinary Differential Equations (3) PHYS 321 - Intermediate Electricity and Magnetism (3) PHYS 326 - Electronics and Instrumentation (4) PHYS 332W - Optics Laboratory Advanced Physics Laboratory I (4) PHYS 344 - Thermal Physics (3) PHYS 385 - Quantum Mechanics I (3) PHYS 421 - Electromagnetic Waves (3)</p> <p>and 13 units selected from</p> <p>CHEM 340 - Materials Chemistry (3) ENSC 426 - High Frequency Electronics (4) ENSC 495 - Introduction to Microelectronic Fabrication (4) ** MATH 462 - Fluid Dynamics (3) NUSC 341 - Introduction to Radiochemistry (3) NUSC 346 - Radiochemistry Laboratory (2) PHYS 365 - Semiconductor Device Physics (3) PHYS 395 - Computational Physics (3) + or MACM 316 - Numerical Analysis I (3)</p>



PHYS 431 - ~~Advanced Physics Laboratory~~ **Advanced Physics Laboratory II** (4)
PHYS 455 - Modern Optics (3)
PHYS 465 - Solid State Physics (3)

Calendar Entry Change

Name of Program or Name of Faculty Physics

<p>Rationale for change:</p> <p>We would like students to have the opportunity to take MATH 462 – Fluid Mechanics as part of this program.</p> <p>Other changes reflect changes to course names for our upper division physics labs as previously approved.</p>
<p>Effective term and year:</p> <p>Fall 2018</p>
<p>The following program(s) will be affected by these changes:</p> <p>APPH Honours</p>

Calendar Change: “to” and “from” sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

<p>Students complete a minimum total of 53 units, including all of</p> <p>MATH 310 - Introduction to Ordinary Differential Equations (3) PHYS 321 - Intermediate Electricity and Magnetism (3) PHYS 326 - Electronics and Instrumentation (4) PHYS 332W - Optics Laboratory Advanced Physics Laboratory I (4) PHYS 344 - Thermal Physics (3) PHYS 384 - Methods of Theoretical Physics I (3) PHYS 385 - Quantum Mechanics I (3) PHYS 421 - Electromagnetic Waves (3) PHYS 431 - Advanced Physics Laboratory I Advanced Physics Laboratory II (4) PHYS 432 - Undergraduate Honours Thesis (6) ++</p> <p>and a minimum of 17 additional units chosen from</p> <p>CHEM 340 - Materials Chemistry (3) ENSC 426 - High Frequency Electronics (4) ENSC 495 - Introduction to Microelectronic Fabrication (4) ** MATH 462 - Fluid Dynamics (3) NUSC 341 - Introduction to Radiochemistry (3)</p>



NUSC 346 - Radiochemistry Laboratory (2)
PHYS 365 - Semiconductor Device Physics (3)
PHYS 395 - Computational Physics (3) * or MACM 316 - Numerical Analysis I (3)
PHYS 455 - Modern Optics (3)
PHYS 465 - Solid State Physics (3)



Calendar Entry Change

SCUS 18-03c(ii)

Name of Program or Name of Faculty Physics

<p>Rationale for change:</p> <p>We would like students to have the opportunity to take MBB 491 as part of this program.</p> <p>Other changes reflect changes to PHYS 332 previously approved, where BIPH students will do a selected set of experiments.</p>
<p>Effective term and year:</p> <p>Fall 2018</p>
<p>The following program(s) will be affected by these changes:</p> <p>BPPH Majors</p>

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

<p>Students must complete a minimum total of 40 units, including</p> <p>all of</p> <p>MATH 310 - Introduction to Ordinary Differential Equations (3)</p> <p>MBB 322 - Molecular Physiology (3)</p> <p>MBB 331 - Molecular Biology (3)</p> <p>PHYS 321 - Intermediate Electricity and Magnetism (3)</p> <p>PHYS 347 - Introduction to Biological Physics (3)</p> <p>PHYS 385 - Quantum Mechanics I (3)</p> <p>PHYS 433W - Biophysics Laboratory 332W - Advanced Physics Laboratory I (4)</p> <p>and one of</p> <p>CHEM 360 - Thermodynamics and Chemical Kinetics (3)</p> <p>MBB 323 - Introduction to Physical Biochemistry (3)</p> <p>PHYS 344 - Thermal Physics (3)</p> <p>and upper division MBB and PHYS courses to reach a minimum total of 40 units.</p> <p>MATH 462 may be included amongst these five in this requirement. The following courses are suggested:</p> <p>MATH 462 - Fluid Dynamics (3)</p> <p>MBB 308 - Molecular Biology Laboratory (3)</p> <p>MBB 309W - Biochemistry Laboratory (4)</p>



MBB 321 - Intermediary Metabolism (3)
MBB 342 - Introductory Genomics and Bioinformatics (3)
MBB 421 - Nucleic Acids (3)
MBB 422 - Biomembranes (3)
MBB 423 - Protein Structure and Function (3)
MBB 491 - Individual Study Semester (5)
PHYS 395 - Computational Physics (3)
PHYS 413 - Advanced Mechanics (3)
PHYS 445 - Statistical Physics (3)
PHYS 455 - Modern Optics (3)
PHYS 492 - Special Topics in Physics (3)



Calendar Entry Change

Name of Program or Name of Faculty Physics

<p>Rationale for change:</p> <p>We would like students to have the opportunity to take MBB 491/492 as part of this program. This is a second option for a thesis project in the MBB program which allows students to split their research work over two semesters. Both MBB 481/482/483 and MBB 491/492 require MBB 308 and 309W as pre-requisites. These are both optional courses in the BIPH program, but we have added them explicitly.</p> <p>Other changes reflect changes to PHYS 332 previously approved, where BIPH students will do a selected set of experiments.</p>
<p>Effective term and year:</p> <p>Fall 2018</p>
<p>The following program(s) will be affected by these changes:</p> <p>BPPH Honours</p>

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

<p>Upper Division Requirements</p> <p>Students must complete a minimum total of 49 units, including</p> <p>all of</p> <p>MATH 310 - Introduction to Ordinary Differential Equations (3)</p> <p>MBB 322 - Molecular Physiology (3)</p> <p>MBB 331 - Molecular Biology (3)</p> <p>PHYS 321 - Intermediate Electricity and Magnetism (3)</p> <p>PHYS 347 - Introduction to Biological Physics (3)</p> <p>PHYS 385 - Quantum Mechanics I (3)</p> <p>PHYS 433W - Biophysics Laboratory 332W - Advanced Physics Laboratory I (4)</p> <p>and one of</p> <p>CHEM 360 - Thermodynamics and Chemical Kinetics (3)</p> <p>MBB 323 - Introduction to Physical Biochemistry (3)</p> <p>PHYS 344 - Thermal Physics (3)</p>
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~~and two other upper division MBB or PHYS courses. MATH 462 may be included in these two. The following courses are suggested.~~

~~MATH 462 - Fluid Dynamics (3)
 MBB 308 - Molecular Biology Laboratory (3)
 MBB 309W - Biochemistry Laboratory (4)
 MBB 321 - Intermediary Metabolism (3)
 MBB 342 - Introductory Genomics and Bioinformatics (3)
 MBB 421 - Nucleic Acids (3)
 MBB 422 - Biomembranes (3)
 MBB 423 - Protein Structure and Function (3)
 PHYS 395 - Computational Physics (3)
 PHYS 413 - Advanced Mechanics (3)
 PHYS 445 - Statistical Physics (3)
 PHYS 455 - Modern Optics (3)
 PHYS 492 - Special Topics in Physics (3)~~

and either OPTION A or OPTION B:

OPTION A

Students who choose this option will complete all of

either

all of

MBB 308 - Molecular Biology Laboratory (3)

MBB 309W - Biochemistry Laboratory (4)

MBB 481 - Individual Study Semester - Honours Thesis (5)

MBB 482 - Individual Study Semester - Honours Research Performance (5)

MBB 483 - Individual Study Semester - Honours Thesis Defense (5)

or

all of

MBB 308 - Molecular Biology Laboratory (3)

MBB 309W - Biochemistry Laboratory (4)

MBB 491 - Individual Study Semester (5)

MBB 492 - Individual Study Semester (10)

OPTION B

Students who choose this option will complete all of

PHYS 384 - Methods of Theoretical Physics I (3)

PHYS 415 - Quantum Mechanics II (3)

PHYS 421 - Electromagnetic Waves (3)

PHYS 432 - Undergraduate Honours Thesis (6)

PHYS 445 - Statistical Physics (3)

~~and two other~~ upper division MBB or PHYS courses **to reach a minimum total of 49 units.**

MATH 462 may be included in ~~these two~~ **this requirement.** The following courses are suggested:



MATH 462 - Fluid Dynamics (3)
MBB 308 - Molecular Biology Laboratory (3)
MBB 309W - Biochemistry Laboratory (4)
MBB 321 - Intermediary Metabolism (3)
MBB 342 - Introductory Genomics and Bioinformatics (3)
MBB 421 - Nucleic Acids (3)
MBB 422 - Biomembranes (3)
MBB 423 - Protein Structure and Function (3)
PHYS 395 - Computational Physics (3)
PHYS 413 - Advanced Mechanics (3)
PHYS 445 - Statistical Physics (3)
PHYS 455 - Modern Optics (3)
PHYS 492 - Special Topics in Physics (3)



Calendar Entry Change

SCUS 18-03c(iii)

Name of Program or Name of Faculty Physics

<p>Rationale for change:</p> <p>Mathematical Physics is a joint honours program offered by Physics and Mathematics. Mathematics has recently added a thesis option, MATH 498 + MATH 499. We would like students to have the opportunity to take MATH 498 + MATH 499 instead of PHYS 432 as part of this program.</p> <p>Other changes reflect changes to course names previously approved.</p>
<p>Effective term and year:</p> <p>Fall 2018</p>
<p>The following program(s) will be affected by these changes:</p> <p>MAPH Honours</p>

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

<p>and all of</p> <p>PHYS 321 - Intermediate Electricity and Magnetism (3) PHYS 332W - Optics Laboratory Advanced Physics Laboratory I (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)</p> <p>and two of</p> <p>PHYS 390 - Introduction to Cosmology and 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)</p>
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either

PHYS 432 – Undergraduate Honours Thesis (6)

or both of

MATH 498 – Communication and Research Skills in the Mathematical Sciences (1)

MATH 499W – Honours Research Project (5)



Calendar Entry Change

SCUS 18-03c(iv)

Name of Program or Name of Faculty Physics

<p>Rationale for change:</p> <p>We would like students to have the opportunity to take MATH 462 – Fluid Mechanics as part of this program.</p> <p>Other changes reflect changes to course titles for PHYS 332 and 431.</p>
<p>Effective term and year:</p> <p>Fall 2018</p>
<p>The following program(s) will be affected by these changes:</p> <p>PHYS Honours</p>

Calendar Change: “to” and “from” sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

<p>Students complete a minimum total of 53 units, including all of</p> <p>MATH 310 - Introduction to Ordinary Differential Equations (3)</p> <p>PHYS 321 - Intermediate Electricity and Magnetism (3)</p> <p>PHYS 332W - Optics Laboratory Advanced Physics Laboratory I (4)</p> <p>PHYS 344 - Thermal Physics (3)</p> <p>PHYS 384 - Methods of Theoretical Physics I (3)</p> <p>PHYS 385 - Quantum Mechanics I (3)</p> <p>PHYS 413 - Advanced Mechanics (3)</p> <p>PHYS 415 - Quantum Mechanics II (3)</p> <p>PHYS 421 - Electromagnetic Waves (3)</p> <p>PHYS 431 - Advanced Physics Laboratory I Advanced Physics Laboratory II (4)</p> <p>PHYS 432 - Undergraduate Honours Thesis (6)</p> <p>PHYS 445 - Statistical Physics (3)</p> <p>and twelve additional upper division credits in physics. MATH 462 can be used to meet this requirement. PHYS 346 cannot be used to meet this requirement.</p>

**Calendar Entry Change****Name of Program or Name of Faculty : STAT minor, Faculty of Science**

Rationale for change:

1. Mathematical competence is beneficial to STAT minor students. However, calculus is not specifically required in this program. We have thus decided to allow students to take linear algebra (another fundamental subject in mathematics) in lieu of Calculus II.
2. Editorial change to upper division requirements.

Effective term and year: 1187

The following program(s) will be affected by these changes: STAT minor

Calendar Change: "to" and "from" sections are not required. All deletions should be crossed out as follows: ~~sample~~. All additions should be marked by a **bold**.

Lower Division Requirements

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

and one of

- STAT 101 - Introduction to Statistics (3)
- STAT 201 - Statistics for the Life Sciences (3)
- STAT 203 - Introduction to Statistics for the Social Sciences (3)
- STAT 270 - Introduction to Probability and Statistics (3)
- BUEC 232 - Data and Decisions I (4)



Upper Division Requirements

A minimum of 11 of the 15 upper division ~~STAT~~ units must be completed using STAT courses. The remaining 4 units may be substituted with upper division non-STAT units that focus on statistical inference, study design, or quantitative reasoning, such as BUS 336. The eligibility of other non-STAT courses will be at the discretion of departmental advisors. Recommended STAT courses are listed below.