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**MEMORANDUM**

<b>ATTENTION</b>	Senate	<b>DATE</b>	December 12, 2016
<b>FROM</b>	Wade Parkhouse, Acting Chair	<b>PAGES</b>	1/1
<b>RE:</b>	Senate Committee on Undergraduate Studies Faculty of Applied Sciences (SCUS 16-46)		

For information:

Acting under delegated authority at its meeting of December 1, 2016 SCUS approved the following curriculum revisions effective Fall 2017.

1. School of Computing Science (SCUS 16-46b)

- (i) Upper division requirement changes to the Computing Science and Linguistics Joint Major
- (ii) Upper and lower division requirement changes to the Dual Degree Program Major

2. School of Mechatronics Systems Engineering (SCUS 16-46d)

- (i) New Course Proposal: MSE 428-3, Design of Mechanisms



## FACULTY OF APPLIED SCIENCES

OFFICE OF THE DEAN

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**MEMORANDUM**

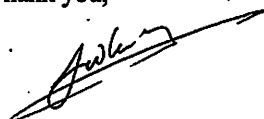
<b>ATTENTION</b>	Senate Committee on Undergraduate Studies	<b>DATE</b>	November 21, 2016
<b>FROM</b>	Ed Park, Associate Dean	<b>PAGES</b>	
<b>RE:</b>	Curriculum Changes		

The following changes have been approved by the FAS Undergraduate Curriculum Committee and are appended here for approval by SCUS and recommendation to Senate.

- 1.) Faculty of Applied Sciences
  - a. Notice of Intent – Sustainable Energy Engineering program
- 2.) School of Computing Science
  - a. Course Pre-requisite Change
    - CMPT 129
  - b. Calendar Changes
    - Revision to CMPT/LING Joint Major
      1. Replacement of CMPT 320 with CMPT 376W
    - Revision to Dual Degree Program
      1. Removal of CHIN 182
      2. Removal of CMPT 320
      3. Addition of course to breadth requirement
- 3.) School of Engineering Science
  - a.
    -
  - b. Course Pre-requisite Change
    - ENSC 405W
    - ENSC 427
  - c. Course Deletion
    - ENSC 376
- 4.) School of Mechatronic Systems Engineering
  - a. Course Pre-requisite Change
    - MSE 320

- MSE 321
- b. New Course Proposal
- MSE 428

Thank you,

A handwritten signature in black ink, appearing to read "Edward Park", written over a horizontal line.

Edward Park  
Associate Dean

(EP/mt)



COURSE SUBJECT  NUMBER  TITLE

**INSTRUCTIONS (OVERALL):**

1. Using Microsoft Word draft changes using the following guideline. Paste in box below.
2. Rationale must be included. If more space is needed than provided below, please use the provided text box on page 2 of this document.
3. Indicate term = Fall, Spring, Summer

**TYPE OF CHANGES RECOMMENDED**

Please type 'X' for the appropriate revision(s):

Course number	Credit	Title	Description	x	Prerequisite	Deletion
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**WORDING/DESCRIPTION EDITS**

1. Indicate deleted or changed text using striketrough.
2. Indicate added or new text using underline.
3. Equivalent courses: preclusion statement should read:
  - a. Students with credit for x cannot take y for further credit.

CMPT 102 or CMPT 120: Introduction to Computing Science and Programming I.

**SAMPLE**

POL 223 ~~Canadian-American~~ Political Economy (3)

~~An introductory study of America's~~ Canada's political economy, stressing the interrelated nature of Canada's economic and political life. ~~The course~~ Focuses on current economic problems and policies, taking into account the geographical, historical and political environments. Topics include the resource and industrial structures, research and development, the public sector, fiscal and monetary policy, the role of the state, trade and foreign ownership, energy, regional disparity, corporate concentration and the political economy of federalism.

~~This course is identical to CNS 280 and students cannot take both courses for credit.~~

Students with credit for CNS 280 cannot take POL 223 for further credit.

~~Recommended-Pre-requisite:~~ POL 100 or 101W.

Breadth – Social Sciences.

**RATIONALE**

If more space is needed, please use the provided text box on page 2 of this document

CMPT 102 is considered a sufficient preparation for CMPT 129, and is of interest to Mathematics and Statistics students. Adding this prerequisite will allow Mathematics and Statistics students to choose between CMPT 102 and CMPT 120.

**EFFECTIVE TERM AND YEAR, FOR CHANGES**

Fall, Spring, Summer and year (please enter in textbox)

## Revision to Computing Science and Linguistics Joint Major

John Edgar

October 2016

### Description

Remove CMPT 320 as a program requirement and replace with CMPT 376W.

### Rationale

CMPT 320 (Social Implications of a Computerized Society) was removed as a requirement for the Computing Science Major and Honours programs (approved by Senate: S-16-41). This change is intended to bring the joint major into line with the major program.

## Program Requirements

### Upper Division Requirements

#### Computing Science Requirements

Students complete a t least 24 units, including all of

CMPT 300 - Operating Systems I (3)

CMPT 307 - Data Structures and Algorithms (3)

~~CMPT 320 - Social Implications - Computerized Society (3)~~

CMPT 376W - Technical Writing and Group Dynamics (3)

CMPT 413 - Computational Linguistics (3)

and four courses chosen from four distinct concentration areas as listed in Table I. CMPT 308 and 379 are recommended.

## **Revision to Computing Dual Degree Program Major**

**John Edgar**

**November 2016**

### **Description**

1. Remove CHIN 182 as a program requirement, a lab session will be added into the CHIN 280/281 sequence to partially alleviate the impact of the removal
2. Remove CMPT 320 as a program requirement
3. Add an additional course to the program's breadth requirement.

### **Rationale**

1. CHIN 182 is one of five Chinese language instruction courses required for students with no previous knowledge of the Chinese language. In addition to these five courses, DDP students receive additional language instruction in the form of language immersion at Zhejiang University in China (20 contact hours per week for 28 weeks in two semesters). Although CHIN 182 was considered useful to give students preliminary practice of Mandarin Conversation to be better prepared for the "immersion" in China, it is far less effective than that later immersion in China. Moreover, the proposed lab session, together with recently built online listening exercises will further alleviate the removal and make it possible that the DDP Chinese curriculum continues its success. Finally, the CHIN course credits students receive count towards their degree credit requirement. Hence, the DDP students could receive up to 15 units from the above CHIN courses including CHIN182. Although CS students are encouraged to get more breadth from non-CS courses, it has been suggested that 15 credits Chinese language is excessive. The proposed change will reduce it by 3 units.
2. CMPT 320 (Social Implications of a Computerized Society) is currently one of four required 300 level courses for the B.Sc. credential. These courses tend to act as a bottleneck for students and there has been difficulty staffing CMPT 320. Social and Professional issues in Computing (SP) are considered important for our curriculum so are to be added to the syllabus of two other courses, CMPT 125 and CMPT 376W. CMPT 320 will remain as an elective course.
3. The addition of a course to the breadth requirement will result in the removal of CMPT 320 having no impact on the number of credits required to complete the program.

## **Program Requirements**

### **Lower Division Requirements**

**Simon Fraser University Students**

Students starting at Simon Fraser University complete 15 units of foundational courses plus customized Mandarin courses prior to attending Zhejiang University. Course substitutions may be approved in consultation with an advisor.

### Foundational Courses

CMPT 120 - Introduction to Computing Science and Programming I (3)  
 MATH 151 - Calculus I (3)  
 MATH 152 - Calculus II (3)  
 MATH 240 - Algebra I: Linear Algebra (3)  
 PHIL 120W - Moral Problems (3)

### Mandarin Courses

Students with no previous knowledge of Chinese languages complete the following courses.

CHIN 180 - Intensive Mandarin Chinese for Beginners I (3)  
 CHIN 181 - Intensive Mandarin Chinese for Beginners II (3)  
~~CHIN 182 - Mandarin Chinese Conversation (3)~~  
 CHIN 280 - Intensive Mandarin Chinese for Beginners III (3)  
 CHIN 281 - Intensive Mandarin Chinese for Beginners IV (3)

Students with some previous knowledge of Chinese languages are assessed for placement by the DDP Chinese Language Instructor. Students may be required to take one or more of the following courses.

CHIN 190 - Heritage Mandarin Chinese I (3)  
 CHIN 191 - Heritage Mandarin Chinese II (3)  
 CHIN 290 - Heritage Mandarin Chinese III (3)  
 CHIN 291 - Heritage Mandarin Chinese IV (3)

Upon completion of Mandarin courses at Simon Fraser University, students are further assessed by the DDP Chinese Language instructor. Some students may be exempted from further Mandarin studies by taking and passing the HSK level 5 Exam with a score of 180 or higher. All other students must take the Zhejiang non-credit Mandarin summer immersion program prior to commencing academic study at Zhejiang University.

### Zhejiang University Course Plans

Students complete lower division requirements following one of the two-year Dual Degree course plans set by Zhejiang University. These plans may include additional Mandarin instruction dependent on language assessment. All plans meet the minimum unit residency requirements of Zhejiang University including the core computing science course work. However, some electives used to satisfy Zhejiang University requirements may not be allowed

for SFU credit. The SFU DDP program **advisor** will have lists of Zhejiang elective courses that are pre-approved for SFU credit.

Block DDP credit will appear on the SFU transcript for course work completed at Zhejiang University. Students receive 40 units of block DDP credit for the core courses including 3 units of B-Sci credit, 6 units of Q credit and 3 units of B-Soc credit. All course plans include at least 6 required units of additional block credit including 3 units of B-Hum and 3 units of B-Soc credit.

Students required to take the additional Chinese language and culture courses receive up to 9 units of further block credit including 3 units of B-Hum and 3 units of B-Soc credit. Block credit may be assigned for additional pre-approved electives, while electives not on the approved list may be individually assessed.

Courses completed at Zhejiang University are not transfer units. They are marked as DDP units on the Simon Fraser University transcript.

### **Zhejiang University Students**

After successful completion of the two-year Dual Degree program curriculum at Zhejiang University, Zhejiang University students receive 60 units of block DDP credit on the SFU transcript plus up to 6 additional units of assigned upper division CMPT credit. The block DDP credit includes 6 units of B-Hum credit, 6 units of B-Soc credit, 6 units of B-Sci credit, 6 units of B-undesigned and 6 units of Q credit. Zhejiang students must complete 6 units of W credit at Simon Fraser University.

### **Upper Division Requirements**

All SFU and ZJU students complete the following upper division courses or equivalent. Students should consult an advisor before commencing upper division requirements. Course substitutions may be approved in consultation with an advisor.

#### **Breadth Requirement**

**Seven** ~~Six~~ courses from five of the six Table 1 areas of concentration must be completed including

- CMPT 300 - Operating Systems I (3)
- CMPT 307 - Data Structures and Algorithms (3)
- CMPT 371 - Data Communications and Networking (3)
- CMPT 354 - Database Systems I (3)

#### **Depth Requirement**



Twelve units of additional CMPT courses numbered CMPT 400 or above must be completed (excluding CMPT 415, 416, and 498, which may be included by special permission).

### **Additional Requirements**

~~CMPT 320 - Social Implications - Computerized Society (3)~~

CMPT 376W - Technical Writing and Group Dynamics (3)

MACM 316 - Numerical Analysis I (3)

CMPT 497 - Dual Degree Program Capstone Project (6) \*

\* CMPT 497 can be replaced by two approved CMPT 400 level courses (6 units)



<b>COURSE SUBJECT</b>	ENSC	<b>NUMBER</b>	405W	<b>TITLE</b>	Project Documentation, User Interface and Group Dynamics.
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**TYPE OF CHANGES.** Please type 'X' for the appropriate revision(s):

	Course number		Credit		Title		Description	X	Prerequisite
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**WORDING/DESCRIPTION EDITS.** Indicate deleted or changed text using strike through, indicate added or new text using underline. If you need to enter more text than the box allows, drag the endpoint of the text box to make it bigger, as it will not automatically expand.

This is the first course in a group-based, two-course capstone sequence: [ENSC 405W](#), [ENSC 440](#). Topics include group writing processes, project documentation and engineering design, group dynamics, engineering standards, project management, dispute resolution, intellectual property, entrepreneurship, and user interface design. These groups will be maintained for the completion of the capstone project in [ENSC 440](#). Engineering Science students cannot take [MSE 401W](#) or [MSE 405W](#) for credit. **A minimum of two co-ops must be completed before enrolling in this course.** Students must take [ENSC 440](#) in the term directly following successful completion of [ENSC 405W](#). Grades awarded in [ENSC 405W](#) are conditional on the successful completion of [ENSC 440](#) in the subsequent term.

Prerequisite: [ENSC 105W](#), [ENSC 204](#), [ENSC 351](#), [ENSC 295 or 296](#), a minimum of ~~100~~ 118 units. Students who have taken ([ENSC 304](#) and [ENSC 305W](#)) may not take [ENSC 405W](#) for credit. Writing.

**EFFECTIVE TERM AND YEAR FOR CHANGES**

Fall, Spring, Summer and year (please enter in textbox)

FALL 2017

**RATIONALE** (must be included)

ENSC 405W should be taken by students that are on the verge of graduation. This is a CEAB requirement. Ideally the annual course enrollment and number of students graduating in the subsequent year should closely correlate.

The requirement for two co-op terms and a completed credit count of 118 should ensure that students are within three semesters from graduation.

COURSE SUBJECT  NUMBER  TITLE

**TYPE OF CHANGES.** Please type 'X' for the appropriate revision(s):

	Course number	Credit	Title	Description	X	Prerequisite
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**WORDING/DESCRIPTION EDITS.** Indicate deleted or changed text using strike through, indicate added or new text using underline. If you need to enter more text than the box allows, drag the endpoint of the text box to make it bigger, as it will not automatically expand.

Quantitative performance analysis and design of data and integrated services networks. Re-transmission error recovery schemes, networks of queues, congestion control, routing strategies. Multiple access techniques in data networks, design for specified throughput and delay performance. Wireless networks, routing approaches in mobile networks. Analysis and design of broadband integrated services digital networks, asynchronous time division multiplexing. Laboratory work is included in this course. Prerequisite: ENSC 327 ~~or, for School of Computing Science Majors, CMPT 371~~. A minimum of 80 units required. Engineering students may not take CMPT 371 as a substitute for ENSC 427 for further credit.

**EFFECTIVE TERM AND YEAR FOR CHANGES**

Fall, Spring, Summer and year (please enter in textbox)

Fall 2017

**RATIONALE** (must be included)

We have not had Computing Science students taking this course in recent years. Schedules cannot code this pre-requisite as it was intended which is resulting in our own students not being able to register. Since Computing Science students rarely take this course, we would like to remove CMPT 371 as a pre-requisite for those students and handle such requests on a case by case basis if there are any.

COURSE SUBJECT  NUMBER  TITLE

**RATIONALE** (must be included)

ENSC 376 was combined with a special topics laser course to create the current course ENSC 470. There would be too much duplication between ENSC 376 and ENSC 470, so we stopped teaching ENSC 376.

**EFFECTIVE TERM AND YEAR FOR CHANGES**

Fall, Spring, Summer and year (enter in textbox)

**PLEASE DO THE FOLLOWING:**

1. Attach a program impact list along with your course deletion form. Contact the Senate and Academic Services Office (sfucal@sfu.ca) for a program impact list.
2. Once you have the program impact list, please review how deleting this course affects each program's requirements.
3. If more substantial changes are required to programs as a result of this deletion, please also submit a program modification form.
4. If no further changes other than deletion is required in program requirements, please list those programs in the box below:

5. Lastly, please conduct a course impact analysis, which reviews the effect of a course number change and/or course deletion on course prerequisites. For instructions on how to do a course impact analysis, please visit [our page](#) and click on "deleting a course" and review Step 2. Course Impact Analysis.



COURSE SUBJECT  NUMBER  TITLE

**TYPE OF CHANGES.** Please type 'X' for the appropriate revision(s):

	Course number	Credit	Title	Description	X	Prerequisite
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**WORDING/DESCRIPTION EDITS.** Indicate deleted or changed text using strike through, indicate added or new text using underline. If you need to enter more text than the box allows, drag the endpoint of the text box to make it bigger, as it will not automatically expand.

Review of stress and strain in solids, superposition, energy theorems, theories of failure, elastic and inelastic analysis of symmetrical bending, torsion of circular members, and virtual work. Adequacy assessment and synthesis of machine elements with a focus on the design process. Static failure of ductile and brittle materials, fatigue analysis of structures. Topics include the design of welds, bolted connections, springs and shafts. Solution strategies include both analytical and finite element methods. Prerequisite: MSE 100 or ENSC 104, MSE 220 or ENSC 231, MSE 221 or ENSC 281. MSE 100 may be taken concurrently. Students with credit for ENSC 382 may not take MSE 320 for further credit.

**EFFECTIVE TERM AND YEAR FOR CHANGES**

Fall, Spring, Summer and year (please enter in textbox)

Fall 2017

**RATIONALE** (must be included)

Students admitted from colleges get waivers for first year courses. As MSE program is highly structured and MSE courses are mainly offered once a year, such students directly register for second year courses and are not able to take MSE 100. Therefore, the instructors of the course proposed to make MSE 100 as a co-requisite.



<b>COURSE SUBJECT</b>	MSE	<b>NUMBER</b>	321	<b>TITLE</b>	Engineering Thermodynamics and Heat Transfer
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**TYPE OF CHANGES.** Please type 'X' for the appropriate revision(s):

	Course number		Credit		Title		Description	X	Prerequisite
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**WORDING/DESCRIPTION EDITS.** Indicate deleted or changed text using ~~strike through~~, indicate added or new text using underline. If you need to enter more text than the box allows, drag the endpoint of the text box to make it bigger, as it will not automatically expand.

Energy transfer as work and heat, the First Law of thermodynamics. Properties and states of simple substances. Control-mass and control-volume analyses. Entropy, the Second Law of thermodynamics. Carnot cycle. Energy conversion systems; internal combustion engines, power plants and refrigeration cycles. Heat transfer by conduction, convection, and radiation. Formulation and solution of steady and transient problems. Cooling of microelectronics, thermal solutions. Prerequisite: MATH 152, 251, PHYS 444 140. Students with credit for ENSC 388 or PHYS 344 may not take MSE 321 for further credit.

**EFFECTIVE TERM AND YEAR FOR CHANGES**

Fall, Spring, Summer and year (please enter in textbox)

Fall 2017
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**RATIONALE** (must be included)

We noted that there was a typo in the calendar description of this course.

**COURSE SUBJECT/NUMBER****COURSE TITLE**

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

MSE 428 - Design of Mechanisms

**AND**

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

Design of Mechanisms

**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.**

Introduction to mechanisms: linkages, cams, gears, Geneva wheels, etc. Displacement analyses of mechanisms, limit positions, time ratio, and transmission angles. Graphical synthesis of mechanisms, function, path and motion generation. Analytical synthesis of mechanisms: Freudenstein equation and standard dyad method. Coupler curves and mechanism cognates. Cam follower curve synthesis, design of cam profiles using graphical and analytical methods. Gear analysis and design: ordinary and planetary gear trains.

**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.

No additional material is required.

Library report status

**RATIONALE FOR INTRODUCTION OF THIS COURSE**

This course is intended to provide the fundamentals of mechanism design. Students will learn different methods for the synthesis of linkages, cams, and other mechanisms. In the course project, students will be required to design, build and analyze a mechanical machine, whose motion is being transmitted by a number of mechanisms.

**SCHEDULING AND ENROLLMENT INFORMATION**

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

This course has been offered as a selected topic for two years. It will continue to be taught annually.

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

What is the probable enrollment when offered? Estimate:

30



**CREDITS**
 Indicate number of credits (units): **3**

 Indicate number of hours for:      Lecture **3**      Seminar **3**      Tutorial      Lab **1**      Other

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

Flavio Firmani

**WQB DESIGNATION** (attach approval from Curriculum Office)
**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**.

MSE 100 and MSE 222

**COREQUISITE****STUDENT LEARNING OUTCOMES**

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

- Students will learn different types of mechanism synthesis: path, motion and function generation; the functions of mechanisms; and their applications.
- Students will learn different methods to synthesize mechanisms (graphical and analytical).
- In the project, students will learn how to synthesize and analyze mechanisms, transmit motion through different components, explore functions of the different mechanisms, optimize linkages for desired outputs, and construct mechanisms.
- Students will be exposed to work collaboratively with other students during the design course project.

**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:

Access to the computer laboratory. Matlab and Working Model Licenses.  
Access to the machine shop.

**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.

Nil.

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 \_\_\_\_\_