



UNIVERSITY OF
SASKATCHEWAN

Proposal for Academic or Curricular Change

1. PROPOSAL IDENTIFICATION

Title of proposal:

Creation of the Mechanical Engineering (ME) Mining Option

Degree(s):

Bachelor of Science in Engineering (B.E.)

Field(s) of Specialization:

Mechanical Engineering

Level(s) of Concentration:

N/A

Option(s):

Mining Option

Degree College:

College of Engineering

Contact person(s) (name, telephone, fax, e-mail):

Dr. David Sumner, 306-966-5537, 306-966-6551, david.sumner@usask.ca

Proposed date of implementation:

January 2015

Proposal Document

Please provide information which covers the following sub topics. The length and detail should reflect the scale or importance of the program or revision. Documents prepared for your college may be used. Please expand this document as needed to embrace all your information.

3. RATIONALE

This statement should include information about program objectives, need for the program, demand, uniqueness, student outcomes including employment or academic opportunities, and the expertise of the sponsoring unit. Please specify how this proposal relates to department / college plans and to Systematic Program Review or other review recommendations.

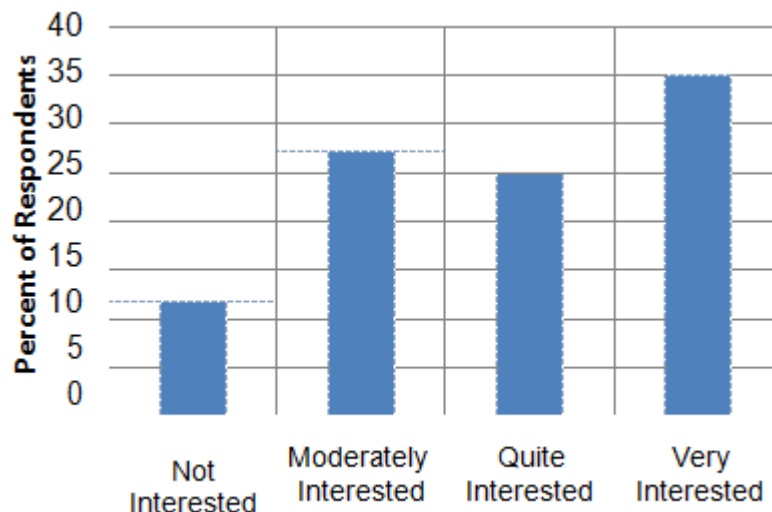
Program Objectives

A very large number of mechanical engineering graduates go on to work in the mining industry. Surveys of recent graduates (2010 and 2011) indicated that about 35% of our graduates found their initial employment in mining companies or companies primarily serving the mining industry. The option proposed here is intended to provide students with an opportunity to focus their mechanical engineering program in areas of study that are particularly relevant to the mining industry. The students would graduate with a Mining Option in Mechanical Engineering indicated on their transcripts.

Program Demand

Mining is clearly an important industry in the Province of Saskatchewan. Recently, the International Mining Innovation Institute (IMII) was formed to promote education and research relevant to the mining industry. An agreement between the College of Engineering and IMII seeks to foster the development of Mining Options in three engineering programs.

Surveys performed for the last three years have asked graduating students to gauge their interest in the following options if they had been available: mechatronics, nuclear engineering, biomechanics, materials, energy, and mining. The aggregate results for the Mining Option for the last three graduating classes (2011, 2012 and 2013) are shown below.



These surveys likely overestimate the demand for the Mining Option. For example, the respondents who said they

were “Very Interested” in the Mining Option also said they were “Very Interested” in an average of 1.4 other options. Based on this, it is estimated that 15 new students per year will stream into the mining option.

Program Uniqueness

The option is structured as a package of six compulsory and elective courses. Depending upon the elective choices that students make early in their programs, it is possible for students to complete the option by taking the same number of credit units as students in the regular mechanical engineering program. A unique feature of the option is a compulsory internship of at least 12 months duration. The next section presents a summary of the Mining Option. A detailed comparison of the option to the regular mechanical engineering program is given in Appendix A. Course descriptions from the University Course Catalog are given in Appendix B.

Student Outcomes (Employment)

In terms of potential employment outcomes for graduates of the Mechanical Engineering mining option, graduates will benefit from increased marketability as well as specialization and differentiation in regional, national, and international job markets. It is projected that graduates who remain in Saskatchewan and Alberta will benefit even more so than graduates who choose to relocate to other provinces given the current employment opportunities available in the mining industry.

Student Outcomes (Academic)

In terms of potential academic outcomes for graduates of the Mechanical Engineering mining option, graduates are not predicted to pursue graduate studies related to mining within our institution, but such a specialization will prepare graduates for future research and potential studies at alternative post-secondary institutions.

Expertise of Sponsoring Unit

While the reputation of faculty members within the Department of Mechanical Engineering is strong, the department is pleased to announce that Dr. Travis Wiens, an expert in fluid power, has been hired to support this option. In addition, the Department of Mechanical Engineering has strong relationship and extensive network with a variety of professionals in the mining industry.

4. DESCRIPTION OF PROGRAM CHARACTERISTICS

Please include a complete draft Calendar entry. In particular, please indicate if a template is already in place for such a program (for example, if it follows the general requirements and standards of B.Sc. programs) or if new standards are being introduced for this program. When existing courses are listed, please include the course title as well as the course number.

Calendar Entry (Draft)

The Mechanical Engineering Mining Option offers students the opportunity to take six courses, plus complete a mandatory twelve-month internship, within their Mechanical engineering program that gives them a focus on topics of relevance to the mining industry.

The six courses required for a student to receive the Mining Option are:

1. Compulsory Courses:
 - o GEOL 121.3 (Earth Processes)
 - o GEOE 377.3 (Introduction to Mining and Mineral Processing Engineering)

- ME 490: Design of Fluid Power Circuits
 - EPIP 401.0 (Internship Placement I)
 - EPIP 402.0 (Internship Placement II)
 - EPIP 403.0 (Internship Placement III)
2. Elective Pool A (students pick one, 3 credit units required):
 - GEOL 224.3 (Mineralogy)
 - GEOL 245.3 (Sedimentary Rocks)
 - GEOL 258.3 (Structural Geology)
 3. Elective Pool B (students pick one, 3 credit units required):
 - GEOE 315.3 (Rock Mechanics)
 - GEOE 380.3 (Mine Ventilation)
 - CHE 453.3 (Corrosion Engineering)
 4. Design Elective Courses (students pick one, 3 credit units required):
 - ME 491.3 (Thermal Systems Design)
 - ME 492.3 (Materials in Engineering Design)
 - ME 493.3 (Advanced Mechanical Design)
 - MR 497.3 (Acoustics and Vibrations in Design)

5. RESOURCES

Please describe what resources will be required by the new or revised program. Include information about the impact this proposal will have on resources used by existing programs. Please indicate whether the program be handled within the existing resources of the department or college (eg, faculty, secretarial support, equipment, information technology, laboratories, library resources, space, etc) or whether additional resources from the college or from PCIP will be required. Include any required memos from the Dean or department heads regarding resources, on the online portal.

This section is based on the assumption that 15 students per year will select the Mining Option.

Demand for courses in other units

Course	Number of ME Students Registered in the Last Three Years	Projected Demand by ME Mining Option Students (per year)	Projected Increase in Demand by ME Students (per year)	Comments
GEOL 121	225	15	0	Compulsory in Option
GEOE 377	28	15	5	Compulsory in Option
GEOL 224	1	5	5	One of three electives in Pool A
GEOL 245	1	5	5	One of three electives in Pool A
GEOL 258	2	5	5	One of three electives in Pool A
GEOE 315	0	5	5	One of three electives in Pool B
GEOE 380	8	5	1	One of three electives in Pool B
CHE 453	2	5	5	One of three electives in Pool B

Geological Sciences (GEOL)

- The compulsory GEOL 121 course and the three GEOL courses in the pool A elective list are all currently accessible to regular Mechanical Engineering students

Geological Engineering (GEOE)

- ME students are currently allowed to take GEO377.
- ME students are currently allowed to take GEOE 380.
- ME students are not currently allowed to take GEOE 315. As noted above, a change in prerequisites will be required.

Chemical Engineering (CHE)

- ME students are currently allowed to take CHE 453 as a technical elective.

Resources Required in Mechanical Engineering

In order to mount this option, it is essential that Mechanical Engineering retain expertise to offer ME 490 (Design of Fluid Power Circuits). Since 2012-13, this course has been offered with sessional lecturer resources. In order to provide long term viability for this critical course, and to retain a vibrant research program in this area, a faculty search in the fluid power area had been completed concurrently with the development of the Mining Option.

The Department of Mechanical Engineering will continue to support the general operation of the Fluid Power laboratory through its operating and capital equipment budgets. It will be the responsibility of the new faculty member to procure specialised research equipment through sources such as Canada Foundation of Innovation (CFI).

6. RELATIONSHIPS AND IMPACT OF IMPLEMENTATION

Please describe the impact this program will have on department activities and on students, and on other departments or colleges. Describe the consultation process followed for this program. Include any memos received, or have them attached to the online portal.

Impact on Department

The implementation of the Mechanical Engineering mining option is not projected to elicit a substantial impact on the Department of Mechanical Engineering.

In terms of accreditation considerations, the CEAB accreditation unit (AU) count for students completing the Mining Option will be very similar to students in the existing, fully-accredited, Mechanical Engineering program.

- The compulsory GEOL 121 course and the Group A elective, along with content in the core program, will fulfil the *Natural Science* curriculum content requirement.
- The *Engineering Design* curriculum content will be unaffected since students in the Mining Option will still need to take the same number of design courses as students in the regular program. The regular program specifies that two design electives must be taken. The Mining Option converts one of these to a compulsory course (ME 490) and specifies one design elective.
- All *Complementary Studies* content in the regular program is retained in the Mining Option.
- The *Math* curriculum content is unaffected by the option.
- There will be only very small changes in the *Engineering Science* curriculum content associated with minor differences in the electives.

Impact on Students

It is possible for a student to complete the Mining Option with the same number of credit units as students in the regular mechanical engineering program (151 cu). If a student takes something other than GEOL 121 as their first-year science elective, that course will be additional to their program. If a student takes something other than GEOL 224, 245, or 258 as their third-year science elective, that course will be additional to their program.

Impact on External Stakeholders (Other Department/Colleges)

In general, impact on external stakeholders is projected to be nominal. As referenced while assessing the impact on the department, and in terms of accreditation considerations, the CEAB accreditation unit (AU) count for students completing the Mining Option will be very similar to students in the existing, fully-accredited, Mechanical Engineering program.

- The compulsory GEOL 121 course and the Group A elective, along with content in the core program, will fulfil the *Natural Science* curriculum content requirement.
- The *Engineering Design* curriculum content will be unaffected since students in the Mining Option will still need to take the same number of design courses as students in the regular program. The regular program specifies that two design electives must be taken. The Mining Option converts one of these to a compulsory course (ME 490) and specifies one design elective.
- All *Complementary Studies* content in the regular program is retained in the Mining Option.
- The *Math* curriculum content is unaffected by the option.
- There will be only very small changes in the *Engineering Science* curriculum content associated with minor differences in the electives.

Consultation Process

The following entities and individuals were consulted during the development of this proposal. Their input is included in Appendix C.

Internal Consultations

*Department of Geological Sciences Department of Civil & Geological Engineering
Department of Chemical & Biological Engineering Engineering Student Centre
ME Undergraduate Students*

External Consultations

A variety of contacts in Saskatchewan mining companies and companies that serve the mining industry have been provided this proposal for comment. The results of these external consultations are included in Appendix C.

7. BUDGET

Please indicate if budget allocations within the department or the college will change due to this program.

In the short-term, the Department of Mechanical Engineering does not project any substantial changes in budget allocations as a result of implementing a mining option. This conclusion is based on the premise that no new course or laboratory offerings are required to be created. In addition, enrollment in the option is forecasted to include nearly fifteen (15) students per year and, as a result, there will not be a substantial increase in teaching loads.

In the long-term, the Department of Mechanical Engineering will have to assess if additional laboratory equipment will be needed to allow for the effective teaching of multiple cohorts into the option. Alternatively,

the Department of Mechanical Engineering could consider offering the laboratory sections during evenings to ensure the required laboratory equipment is accessible.

College Statement

Please provide here or attach to the online portal, a statement from the College which contains the following:

- Recommendation from the College regarding the program
- Description of the College process used to arrive at that recommendation
- Summary of issues that the College discussed and how they were resolved

Outstanding – to be determined in October 2014 Faculty Council.

Related Documentation

At the online portal, attach any related documentation which is relevant to this proposal to the online portal, such as:

- Excerpts from the College Plan and Planning Parameters
- SPR recommendations
- Relevant sections of the College plan
- Accreditation review recommendations
- Letters of support
- Memos of consultation

It is particularly important for Council committees to know if a curriculum changes are being made in response to College Plans and Planning Parameters, review recommendations or accreditation recommendations.

Consultation Forms

At the online portal, attach the following forms, as required

Required for all submissions:

- Consultation with the Registrar form

Required for all new courses:

- Course proposal forms
- OR Calendar-draft list of new and revised courses

Required if resources needed:

- Information Technology Requirements form
- Library Requirements form
- Physical Resource Requirements form
- Budget Consultation form

Appendix A
Detailed Side by Side Comparison to Regular ME Program

Regular Program			Mining Option		
First Year (34 credit units)			First Year (34 credit units)		
<i>Term 1</i>			<i>Term 1</i>		
CHEM	114.3	General Chemistry for Engineers	CHEM	114.3	General Chemistry for Engineers
COMM	102.3	Introduction to Business Management	COMM	102.3	Introduction to Business Management
GE	101.1	Introduction to the Engineering Profession	GE	101.1	Introduction to the Engineering Profession
GE	111.3	Engineering Problem Solving	GE	111.3	Engineering Problem Solving
GE	124.3	Engineering Mechanics I	GE	124.3	Engineering Mechanics I
MATH	123.3	Calculus I for Engineers	MATH	123.3	Calculus I for Engineers
<i>Term 2</i>			<i>Term 2</i>		
GE	121.3	Engineering Design	GE	121.3	Engineering Design
GE	125.3	Engineering Mechanics II	GE	125.3	Engineering Mechanics II
MATH	124.3	Calculus II for Engineers	MATH	124.3	Calculus II for Engineers
PHYS	155.3	Introduction to Electricity and Magnetism	PHYS	155.3	Introduction to Electricity and Magnetism
Science Elective (3 credit units)			GEOL	121.3	Earth Processes
<i>Term 1 or 2</i>		Junior Humanities or Social Science Elective (3 credit units)	<i>Term 1 or 2</i>		Junior Humanities or Social Science Elective (3 credit units)

Second Year (36 credit units)			Second Year (36 credit units)		
<i>Term 1</i>			<i>Term 1</i>		
CMPT	116.3	Computers I	CMPT	116.3	Computers I
EE	201.3	Electric and Magnetic Circuits	EE	201.3	Electric and Magnetic Circuits
GE	213.3	Mechanics of Materials	GE	213.3	Mechanics of Materials
ME	214.3	Introduction to Materials and Manufacturing	ME	214.3	Introduction to Materials and Manufacturing
ME	227.3	Thermodynamics I	ME	227.3	Thermodynamics I
MATH	223.3	Intermediate Calculus	MATH	223.3	Intermediate Calculus
<i>Term 2</i>			<i>Term 2</i>		
GE	226.3	Mechanics III	GE	226.3	Mechanics III
RCM	300.3	Effective Professional Communication	RCM	300.3	Effective Professional Communication
ME	215.3	Fluid Mechanics I	ME	215.3	Fluid Mechanics I
ME	229.3	Introduction to Engineering Design	ME	229.3	Introduction to Engineering Design
ME	251.3	Engineering Analysis I	ME	251.3	Engineering Analysis I
MATH	224.3	Differential Equations	MATH	224.3	Differential Equations

Regular Program			Mining Option		
Third Year (42 credit units)			Third Year (42 credit units)		
<i>Term 1</i>			<i>Term 1</i>		
ME	313.3	Mechanics of Materials I	ME	313.3	Mechanics of Materials I
ME	316.3	Dynamics and Vibrations	ME	316.3	Dynamics and Vibrations
ME	318.3	Mechanical Engineering Laboratory I	ME	318.3	Mechanical Engineering Laboratory I
ME	321.3	Engineering Analysis II	ME	321.3	Engineering Analysis II
ME	324.3	Engineering Materials	ME	324.3	Engineering Materials
ME	327.3	Heat Transfer	ME	327.3	Heat Transfer
<i>Term 2</i>			<i>Term 2</i>		
ME	314.3	Machine Design I	ME	314.3	Machine Design I
ME	323.3	Mechanics of Materials II	ME	323.3	Mechanics of Materials II
ME	328.3	Mechanical Engineering Laboratory II	ME	328.3	Mechanical Engineering Laboratory II
ME	330.3	Manufacturing Processes	ME	330.3	Manufacturing Processes
ME	335.3	Fluid Mechanics II	ME	335.3	Fluid Mechanics II
ME	352.3	Engineering Analysis III	ME	352.3	Engineering Analysis III
<i>Term 1 or 2</i>			<i>Term 1 or 2</i>		
GE	348.3	Engineering Economics	GE	348.3	Engineering Economics
Science Elective (3 credit units)			Elective Pool A¹ (3 credit units)		

Regular Program		Mining Option	
	EPIP	401	Internship Placement I
	EPIP	402	Internship Placement II
	EPIP	403	Internship Placement III

Regular Program			Mining Option		
Fourth Year (39 credit units)			Fourth Year (39 credit units)		
<i>Term 1</i>			<i>Term 1</i>		
ME	417.3	Thermodynamics II	ME	417.3	Thermodynamics II
ME	418.3	Mechanical Engineering Laboratory III	ME	418.3	Mechanical Engineering Laboratory III
ME	431.3	Control Systems	ME	431.3	Control Systems
ME	450.3	Finite Element Analysis	ME	450.3	Finite Element Analysis
			GEOE	377.3	Introduction to Mining & Mineral Processing Engineering
<i>Term 2</i>			<i>Term 2</i>		
GE	449.3	Engineering in Society	GE	449.3	Engineering in Society
			ME	490.3	Design of Fluid Power Circuits
<i>Term 1 & 2</i>			<i>Term 1 & 2</i>		
ME	495.6	Industrial Design Project	ME	495.6	Industrial Design Project
<i>Term 1 or 2</i>			<i>Term 1 or 2</i>		
Design Elective ^{3,4} (3 credit units)			Design Elective ^{3,4} (3 credit units)		
Design Elective^{3,4} (3 credit units)			Elective Pool B² (3 credit units)		
Technical Elective^{4,5} (3 credit units)					
Technical Elective^{4,5} (3 credit units)					
Senior Humanities or Social Science Elective ⁶ (3 credit units)			Senior Humanities or Social Science Elective (3 credit units)		
Complementary Studies Elective ⁷ (3 credit units)			Complementary Studies Elective (3 credit units)		

Notes:

- Elective Pool A (Choose one of the following.)
 - GEOL 224.3 Mineralogy
 - GEOL 245.3 Sedimentary Rocks
 - GEOL 258.3 Structural Geology
- Elective Pool B (Choose one of the following.)
 - GEOE 315.3 Rock Mechanics
 - GEOE 380.3 Mine Ventilation
 - CHE 453.3 Corrosion Engineering
- Design electives MUST be chosen from the following list.
 - ME 490.3 Design of Fluid Power Circuits
 - ME 491.3 Thermal Systems Design
 - ME 492.3 Materials in Engineering Design
 - ME 493.3 Advanced Mechanical Design
 - ME 497.3 Acoustics and Vibrations in Design

4. All students must take a minimum of two Design Electives.
5. Technical electives can come from the following list or any 200, 300, or 400 level classes from the Department of Computer Science or another branch of Science or Engineering (upon approval of the Department of Mechanical Engineering).

BLE	313.3	Instrumentation
CHE	453.3	Corrosion Engineering
CHE	464.3	Petroleum Production Engineering
EE	471.3	Introduction to Micro and Nanotechnology
GEOE	377.3	Introduction to Mining & Mineral Processing
GEOE	466.3	Petroleum Geomechanics
ME	460.3	Automation and Robotics in Manufacturing
ME	463.3	Advanced Structural Analysis
ME	471.3	Introduction to Aerodynamics
ME	472.3	Advanced Control Systems
ME	473.3	Introduction to Computational Fluid Dynamics
ME	475.3	Introduction to Mechatronics
ME	476.3	Multiphase Flow and Heat Transfer
ME	477.3	Advanced Engineering Materials
ME	478.3	Introduction to Fire Protection Engineering
ME	490.3	Design of Fluid Power Circuits
ME	491.3	Thermal Systems Design
ME	492.3	Materials in Engineering Design
ME	493.3	Advanced Mechanical Design
ME	497.3	Acoustics and Vibrations in Design

Appendix B
Course Descriptions from Course Catalog

GEOL 121: Earth Processes

Description

Follows the same lectures as GEOL 108. The laboratory component satisfies the requirements of students in Program Type C (B.Sc. programs). Students in the College of Education who wish to take a course in Earth Science and require a laboratory component are advised take this course.

Credit units

.3

Term description

1/2(3L-3P)

College

Arts and Science

Department

Geological Sciences

Note:

Students with credit for GEOE 118, GEOL 103, 105, 108, or 110 may not take this course for credit.

GEOE 377: Introduction to Mining and Mineral Processing Engineering

Description

Provides the student with a basic understanding of mining engineering and the mining industry. The mining component of the course will introduce the drill and blast cycle, mining methods, and the economic evaluation of mineral properties. The mineral process-engineering component will introduce mineral separation processes including gravity, electrostatic and flotation separation.

Credit units

.3

Term description

1(1.5T)

College

Engineering

Department

Civil and Geological Engineer

Prerequisite(s)

GE 213 or corequisite of GEOL 465

GEOL 224: Mineralogy

Description

Crystalline materials and their properties; crystal chemistry and chemical equilibria in natural systems; mineral properties and classification, and particularly rock-forming mineral groups; mineral genesis. .

Credit units

.3

Term description

1(3L-3P)

College

Arts and Science

Department

Geological Sciences

Prerequisite(s)

GEOL 121 and (CHEM 112 or 114).

Note:

Students with GEOG 112 or 120 may take this course with permission of the department. Students with credit for GEOL 221 may not take this course for credit.

GEOL 245: Introduction to Sedimentary Rocks

Description

Provides a general introduction to sedimentary rocks, sedimentary processes, and the depositional environments in which these rocks form. Stratigraphic concepts are introduced with specific reference to the relationship between sedimentary rock units. Laboratories focus on the identification of sedimentary rocks and structures in hand specimen.

Credit units

.3

Term description

1(3L-2P)

College

Arts and Science

Department

Geological Sciences

Prerequisite(s)

GEOL 121; and CHEM 112 or CHEM 114.

Note:

Students with GEOG 120 or 112 may take this course with permission of the department. Students with credit for GEOL 243 may not take this course for credit.

GEO 258: Structural Geology

Description

An introduction to the structural features of rocks; including discussions of their origin and use. The description of folds, faults, and joints are emphasized, along with outcrop relationships of intrusive bodies. Other topics will include tectonics, orogeny, stratigraphic facing, and non-orogenic process, such as salt doming and glacial thrusting. Laboratories will introduce mapping techniques and the analysis of geological maps.

Credit units

.3

Term description

1(3L-3P)

College

Arts and Science

Department

Geological Sciences

Prerequisite(s)

GEO 121; and CHEM 112 or CHEM 114.

Note:

Students with GEOG 120 or 112 may take this course with permission of the department.

GEOE 315: Rock Mechanics

Description

Physical properties of rock. Rock stress-deformation behaviour and failure. Laboratory and in situ testing.

Credit units

.3

Term description

2(3L-3P alt weeks)

College

Engineering

Department

Civil and Geological Engineering

Prerequisite(s):

((GE 213 and GEOE 218) or (PHYS 125 and GEOL 258)).

GEOE 380: Mine Ventilation

Description

This is an underground mine ventilation design course in which the theory of mine ventilation and air conditioning are presented and applied to various mine designs. Topics covered include: Saskatchewan regulations and engineering design criteria, measuring and modeling air flow in ventilation networks, calculation of head losses, ventilation system design, natural ventilation, selection of mine ventilation fans, occupational health hazards of mine gases and dusts, air heating and cooling, and aspects of the economics of mine ventilation.

Credit units

.3

Term description

1/2(3L-1.5P)

College

Engineering

Department

Civil and Geological Engineer

Prerequisite(s):

CE 225 or ME 215 (or equivalent), GEOE 377

CHE 453: Corrosion Engineering

Description

Intended for engineers and others who wish to develop an appreciation of the principles of corrosion and corrosion control and their application to the selection of materials of construction and the protection of engineering systems.

Credit units

.3

Term description

1/2(3L)

College

Engineering

Department

Chemical and Biological Engin

Prerequisite(s) or Corequisite(s)

CHE 223 or ME 227

ME 490: Design of Fluid Power Circuits

Description

An introduction to the design of industrial and Fluid Power circuits. The operation and design of basic components are considered. A methodology to the design of industrial circuits is introduced and applied to industrial applications. Design criteria for open loop applications are introduced.

Credit units

.3

Term description

2(3L-3P alt weeks)

College

Engineering

Department

Mechanical Engineering

Prerequisite(s):

ME 215 or CE 225 or CHE 210.

ME 491: Thermal Systems Design

Description

A design course involving the application of the fundamentals of thermodynamics. Topics may vary depending on the choice of design project, but would typically include psychrometrics, internal and external energy gains, heating and cooling loads, duct and piping design, overall thermal design specifications and system component design and selection.

Credit units

.3

Term description

1(3L-1.5P alt weeks)

College

Engineering

Department

Mechanical Engineering

Prerequisite(s):

ME 327 and ME 335 (taken).

ME 492: Materials in Engineering Design

Description

Emphasizes materials engineering in the design process. It covers an overview of available engineering materials and their selection based on mechanical properties, surface durability and cost.

Credit units

.3

Term description

2(3L-3P alt weeks)

College

Engineering

Department

Mechanical Engineering

Prerequisite(s)

ME 324.

Prerequisite(s) or Corequisite(s)

ME 330.

ME 493: Advanced Mechanical Design

Description

Deals with advanced mechanical design topics. It is considered as a continuation of Machine Design I, but with an emphasis on the use of integrated design software. The course includes use of finite element and other software, such as ANSYS, SolidWorks, and MATLAB in design. One portion of the course discusses the design process and introduces the design optimization methodology and integrated design optimization software, which will be used for solving unconstrained, constrained, and multi-objective optimal design problems. The course also includes design of systems under shock and impact loading, vibration isolation and control.

Credit units

.3

Term description

2(3L-3P alt weeks)

College

Engineering

Department

Mechanical Engineering

Prerequisite(s)

ME 314 and ME 450 (taken).

ME 497: Acoustics and Vibrations in Design

Description

This course is an introduction to acoustics and vibrations in design. Free, and forced vibrations of systems will be examined. Applied theory includes the study of the fundamental single-degree-of-freedom (DOF) and the 2DOF systems using Newton's law of motion, the energy method, Lagrange's equations, and determination of natural frequencies, acoustics, properties, and noise standards. Design part of the course includes systems under shock and impact loading, vibration isolation and control. In addition the course will include noise control and design of mechanical systems for noise reduction. The course includes design oriented lab and assignments, and design based project.

Credit units

.3

Term description

2(3L-1.5P)

College

Engineering

Department

Mechanical Engineering

Prerequisite(s):

ME 316.

Appendix C
Feedback from Industry

Summary of Consultations

Industry Feedback

A draft of the mining option proposal was distributed to various individuals involved in the mining industry via email on March 7, 2014. Feedback was invited to be received by March 21, 2014. About 67% of people in industry contacted gave a response. Several respondents consulted within their organisations to obtain wider feedback. The following is a list of those who provided feedback.

Arlen Rosa	Colonsay Mine Manager	Mosaic Potash Ltd.
Justin Boehm	Chief Mine Maintenance Engineer	PCS Allan Division
John Desjarlais	Engineer	Cameco Inc.
Louis Fourie	Resource Geologist	North Rim
Sam Farris	VP and Legacy Project GM	K+S Potash Canada
Trevor Berg	General Manager	PCS Patience Lake
Horea Chifa	Senior Mechanical Engineer	BHP Billiton
Ryan Posnikoff	Mechanical Engineer	BHP Billiton

The following points summarise the responses.

- Respondents were pleased with the idea of offering the option. Everyone that responded thought it was a valuable option.
- The courses selected to be included in the option were viewed positively. There were some specific queries about detailed course content but there was general agreement that they were relevant. Some specific comments were as follows:
 - Vibrations is very important
 - Knowledge of process design is very important
 - Fluid power course is essential
 - Material handling knowledge is very important
 - One respondent was interested in mine freezing
 - Mine safety is important
- The mandatory internship was strongly endorsed by most respondents. Only one respondent thought it was not necessary.

University Feedback

Feedback was received from the Department of Geological Sciences and from the Department of Civil and Geological Engineering. These responses are given on the following pages.

Bugg, Jim

From: Kells, Jim
Sent: Monday, March 24, 2014 2:52 PM
To: Bugg, Jim
Subject: RE: Mechanical Engineering Mining Option - Input Requested

Jim,

Thanks for your request for input on the proposed ME mining option. We have reviewed the material provided and offer the following comments (in no particular order):

- The required 12-mo. (min.) internship is interesting and perhaps a great idea. We did wonder whether it would fly to make it compulsory if we don't have some system in place to more actively (or aggressively) assist with placements. Perhaps a philosophical issue to some extent; is it acceptable to impose a program requirement for which we don't provide the 'service' or make other arrangements for it? That said, the matter of a year-long practicum is excellent in a mining context.
- GEOE 377 Introduction to Mining and Mineral Processing.
 - Required course as anticipated.
 - Although it appears as though GEOL 121 is not a stated pre-req, that is the intention (and will be corrected). I'm not sure how we ended up with the pre-reqs noted (GE 213 or GEOL 465 co).
 - We should likely discuss program enrollment limits for this course from each program.
 - As per discussions that we had last year and again by email more recently (i.e., you, me, DY), this is essentially as 'survey' course intended for GEOE, CHE and ME students taking the mining options. At present, it involves two aspects of the mining environment, namely mining technologies and mineral processing systems. It could be retooled to include mechanical systems in the mine environment, which would make it a three-way point of entry vis. a vis. content to the mining options.
- Elective Pool A
 - Our concern here is that the addition of more Engineering students to these courses, perhaps particularly GEOL 224, will further exacerbate our ability to have adequate access to them. They are all required courses in the GEOE program; we have had some difficulties getting our students in to one or more of them of late. The College would have to address this matter in some manner.
 - We presume that the intention with this suite of courses is for ME students to get exposure to the mining/rock environment. We wondered if another course might also be considered, namely GEOE 315 Rock Mechanics. GEOE 315 is a required course in the GEOE program. If this were to be the case, we should likely discuss an enrollment limit for ME students (lab issues). In addition to GE 213, taken by ME students, the course also requires GEOE 218.
- GEOE 218
 - This course is taken by all students in CE, GEOE and ENVE. As such, it is a very large section course (~130 students in Term 1 this year). At the very least, we would need to determine a course limit for ME students. Moreover, we feel that this course would also be of limited value to ME students as it is a lead-in to applied courses in soil mechanics, hydrogeology and rock mechanics.
 - I note that GEOL 121 is a co-req for GEOE 218. Although we prefer students to have GEOL 121 in advance, the decision to make it a co-req was to provide for full flexibility of program choice coming into Year 2 (as per a College decision taken many years ago).
- GEOE 378 Mine Ventilation
 - This course currently has an enrollment limit of 25, which I believe is divided 15 GEOE and 10 ME. With the launching of the three options and increases in enrollment via the SEM project, we will need to revisit the cap and distribution of seats.
 - This course is largely directed at GEOE and ME students.
- Option quotas

- On the matter of option quotas, we feel that something must be done to better manage the situation at both a program and a course level. At the program level, given the current quota for GEOE at 36 (although possibly increasing to 48 under SEM), we are thinking of establishing limits of 24 for each of the 'traditional' GEOE program and the GEOE mining option. In turn, the setting of a program-related quota would have implications for course limits. Given the involvement of ME and CHE in the mining options, we need a collaborative discussion in this regard.

If you have questions of me in regard to this matter, let's discuss at our earliest convenience. As you will appreciate, things are starting to finally move along with our mining options, and thus it is best if we get our collective plans finalized asap.

Cheers,
Jim



Department of Geological Sciences

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Aaron Phoenix,
Acting Associate Dean, Academic,
College of Engineering

March 14, 2014

Dear Aaron,

Thank you for the opportunity to discuss the proposed mining options in Geological, Chemical and Mechanical Engineering. I have discussed these proposals with the faculty who will be most directly affected. The relatively small additional enrollment in 245 and 258 should be manageable. The mineralogy class, 224, is likely to see the greatest pressure because of uptake by Chemical Engineering mining option students. Primarily the concern with that class is in the labs, which require microscope work. An additional lab section may be required in this class to accommodate the numbers you indicate. This year the College of Engineering helped us to add a lab section in 224 and we may have to ask again.

We should be able to manage the additional enrollment in 121 and are very happy to see that the Chemical Engineering mining option is requesting 108 (121 without the lab component). Engineering students currently take 121 in term 2 and almost fill that class. I note that the two options that want 121 have scheduled 121 in term2 as well. Anything that can be done to encourage students to do 121 in spring summer would alleviate the pressure on that section.

We are of course pleased to see that you find our courses to be useful and we wish you success with the new options.

A handwritten signature in cursive script that reads "Jim Merriam".

Jim Merriam

Department Head

Geological Sciences



Faculty Council Meeting – Minutes

October 2, 2014

2:30 – 4:00 p.m.

124 Thorvaldson Bldg

CHAIR: C. Maulé

PRESENT: S. Alam, O-D. Baik, D. Bergstrom, J. Bugg, I. Busch-Vishniac, W. Chang, A.A. Elshorbagy, R. Evitts, G.A. Ferguson, T. Fonstad, R. Fotouhi, C. Hawkes, W. Helgason, T. Hlady, R. Johanson, C. Kerslake, G. Kipouros, S.B. Ko, D. Lynch, D. Makaroff, S. Maw, K. Mazurek, D. Milne, J. Moffatt, M. Nemati, C. Niu, C. Owen, J. Peng, R. Retzlaff, A. Saadat-Mehr, T. Scott, J. Soltan, D. Teng, S. Vanderby, L. Wegner, J. Wills, Q. Yang, C. Zhang, L. Zhang

GUESTS: K. Olszewski

REGRETS: L. Baldo, B. Daku, Y.-H. Lin, S. Noble, A. Phoenix, B. Sparling, D. Sumner, K. Willoughby, K. Wilson (EDW)

SECRETARY: M. McLaughlin

AGENDA ITEM	SUPPORTING DOCUMENTATION
<p>1 Approval of Motions from June 24, 2014 meeting – C. Maulé MOTION: To retroactively approve all motions that were circulated in the June 24, 2014 Faculty Council meeting package due to not reaching quorum at the meeting. Moved: C. Maulé Seconded: D. Lynch Abstained: none Opposed: none</p>	CARRIED
<p>2 Approval of Agenda – C. Maulé MOTION: To approve the agenda of October 2, 2014 Moved: C. Maulé Seconded: J. Bugg</p>	CARRIED
<p>3 Approval of Prior Minutes – C. Maulé MOTION: To approve the minutes of June 24, 2014 as circulated. Moved: C. Maulé Seconded: C. Niu Abstained: none Opposed: none</p>	CARRIED
<p>4 Items Arising from Prior Minutes – R. Fotouhi R. Fotouhi reminded council of the concern raised about faculty attendance. Council chair indicated that he will continue to promote attendance.</p>	
<p>5 New Business</p> <p>a. Approval of Fall Graduands – G. Kipouros on behalf of A. Phoenix The following motions were put before Faculty Council to approve the list of graduands in the specific engineering disciplines.</p> <p>The motions put forth to approve Biological Engineering, Engineering</p>	



Physics, Environmental Engineering, and Geological Engineering graduands were rescinded as there were not any names put forth.

- | | |
|---|-----------------------|
| <p>i. Chemical Engineering Bachelor of Science Degrees
MOTION: To approve the list of graduands for Chemical Engineering to receive a Bachelor of Science in Engineering degree with Distinctions/Great Distinctions as noted beside their names at the October 25, 2014 Convocation.</p> <p>Moved: G. Kipouros
Seconded: R. Evitts</p> | <p>CARRIED</p> |
| <p>ii. Civil Engineering Bachelor of Science Degrees
MOTION: To approve the list of graduands for Civil Engineering to receive a Bachelor of Science in Engineering degree with Distinctions as noted beside their names at the October 25, 2014 Convocation.</p> <p>Moved: G. Kipouros
Seconded: L. Wegner</p> | <p>CARRIED</p> |
| <p>iii. Computer Engineering Bachelor of Science Degrees
MOTION: To approve the list of graduands for <i>Computer Engineering</i> to receive a <i>Bachelor of Science in Engineering</i> degree with Distinctions as noted beside their names at the October 25, 2014 Convocation.</p> <p>Moved: G. Kipouros
Seconded: S.-B. Ko</p> | <p>CARRIED</p> |
| <p>iv. Electrical Engineering Bachelor of Science Degrees
MOTION: To approve the list of graduands for <i>Electrical Engineering</i> to receive a <i>Bachelor of Science in Engineering</i> degree with Distinctions/Great Distinctions as noted beside their names at the October 25, 2014 Convocation.</p> <p>Moved: G. Kipouros
Seconded: C. Niu</p> | <p>CARRIED</p> |
| <p>v. Mechanical Engineering Bachelor of Science Degrees
MOTION: To approve the list of graduands for Mechanical Engineering receive a Bachelor of Science in Engineering degree with Distinctions/Great Distinctions as noted beside their names at the October 25, 2014 Convocation.</p> <p>Moved: G. Kipouros
Seconded: J. Bugg</p> | <p>CARRIED</p> |
| <p>vi. Last minute changes to the Convocation List
MOTION: To assign Associate Dean Academic authority to make any necessary changes on the convocation list regarding the addition or removal of names or addition or removal of Distinction or Great Distinction due to the submission of late marks or grade changes which would affect the awarding of the degree.</p> <p>Moved: G. Kipouros
Seconded: T. Fonstad</p> | <p>CARRIED</p> |



b) October 26, 2013 Convocation Awards

Due to time restrictions as to when the Student Awards Committee can meet, this information will not be presented at the meeting. It will be brought to the November 27, 2014 Faculty Council meeting for information.

c) Recommendation of Mining Options in Chemical, Geological, and Mechanical Engineering undergraduate programs – D. Milne (UAPC Rep) for A. Phoenix

Discussion & Recommendation

The following options have been presented in response to industrial and student demand. Each option was consulted with external parties to ensure relevance of the curriculum, and external funding has been secured for the first three years to support the costs associated with the options.

MOTION: To recommend to University Council the creation of the Chemical Engineering Mineral Processing option as presented.

Moved: D. Milne

Seconded: R. Evitts

No discussion took place.

CARRIED

MOTION: To recommend to University Council the creation of the Geological Engineering Mining Option as amended.

Moved: D. Milne

Seconded: G. Ferguson

Minor amendments were presented at the meeting; no discussion took place.

CARRIED

MOTION: To recommend to University Council the creation of the Mechanical Engineering Mining Option as amended.

Moved: D. Milne

Seconded: J. Bugg

Minor amendments were presented at the meeting; no discussion took place.

CARRIED

d) Advisory Council to the Dean – G. Kipouros

~For information~

The Dean has established a new standing committee, *Advisory Council to the Dean*, to support college operations. The *Nominations & Bylaws Committee* is requested to update the constitution to reflect this new standing committee and incorporate its terms into the Appendix.

6 College of Engineering Faculty Council Subcommittee Updates

All council subcommittees are invited to provide short updates at Faculty Council.

Nominations & Bylaws Committee – W. Helgason (Chair)

NOTICE OF MOTION: The Nominations & Bylaws Committee will be presenting the creation of two new council committees and their terms of



reference; as well as amendments to the constitution at the next Faculty Council meeting.

7 College of Engineering Student Society Updates

All student representatives are invited to provide short updates at Faculty Council.

SESS – C. Kerslake

- College splash event was held October 1
- Travelling to Calgary to meet alumni Oct 3
- Conference season planning is underway and to remind council of two upcoming events:
 - Skills Competition – Nov 1
 - NCWIE – Nov 15-16

IEEE

-nothing to report

8 Question/Comment Period – C. Maulé

The Dean indicated that all committees noted in the constitution will need to have terms of reference presented. Administrative committees' terms of reference will be presented to Faculty Council over the coming year.

D. Lynch thanked the faculty for their support for safety days in September. A survey was distributed to students to identify what was learned and the information will be summarized and distributed at a later date.

9 Next Meeting

November 27, 2014
2:30-4:00pm
124 Thorvaldson

10 Meeting Adjourned – C. Maulé

15:00

**Consultation with the Registrar Form
(New Programs and New Majors / Minors / Concentrations)**

Title: Mining Option on the Mechanical Engineering Major of the Bachelor of Science In Engineering Programs

This form is to be completed by the Registrar (or his/her designate) during an in-person consultation with the faculty member responsible for the proposal. Please consider the questions on this form prior to the meeting.

Section 1: New Degree / Diploma / Certificate Information or Renaming of Existing

1 Is this a new degree, diploma, or certificate?
Is an existing degree, diploma, or certificate being renamed?
If you've answered NO to each of the previous two questions, please continue on to the next section.

Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>

2 What is the name of the new degree, diploma, or certificate?

3 If you have renamed an existing degree, diploma, or certificate, what is the current name?

4 Does this new or renamed degree / diploma / certificate require completion of degree level courses or non-degree level courses, thus implying the attainment of either a degree level or non-degree level standard of achievement?

5 What is your suggested credential abbreviation for this new or renamed degree, diploma, or certificate (please consult with Academic Services)? What is the Banner code for this new or renamed degree, diploma, or certificate?

6 Which College is responsible for the awarding of this degree, diploma, or certificate?

7 Is there more than one program to fulfill the requirements for this degree, diploma, or certificate? If yes, please list these programs.

8 Are there any new majors, minors, or concentrations associated with this new degree / diploma / certificate? Please list the name(s) and whether it is a major, minor, or concentration, along with the sponsoring department.

9 If this is a new graduate degree, is it thesis-based, course-based, or project-based?

Section 2: New Program for Existing Degree / Diploma / Certificate Information

1 Is this a new program?
Is an existing program being revised?
If you've answered NO to each of the previous two questions, please continue on to the next section.

Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>

2 If YES, what degree, diploma, or certificate does this new/revised program meet requirements for?

3 What is the name of this new program?

4 What other program(s) currently exist that will also meet the requirements for this same degree(s)?

5 What College/Department is the academic authority for this program?

6 Is this a replacement for a current program?

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
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7 If YES, will students in the current program complete that program or be grandfathered?

8 If this is a new graduate program, is it thesis-based, course-based, or project-based?

Section 3: New / Revised Major, Minor, or Concentration for Existing Degree Information (Undergraduate)

1 Is this a new or revised major, minor, or concentration attached to an existing degree program?
If you've answered NO, please continue on to the next section.

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	Revised	<input type="checkbox"/>
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2 If YES, please specify whether it is a major, minor, or concentration. If it is more than one, please fill out a separate form for each.

3 What is the name of this new / revised major, minor, or concentration?
Concentration

4 Which department is the authority for this major, minor, or concentration? If this is a cross-College relationship, please state the Jurisdictional College and the Adopting College.
Mining Option [suggested code - MINM] (4 characters for code and 30 characters for description)

5 Mechanical Engineering [ME] Which current program(s), degree(s), and/or program type(s) is this new / revised major, minor, or concentration attached to?
BE [Bachelor of Sc Engineering] and EPIP [EN Professional Intern Prog]

Section 4: New / Revised Disciplinary Area for Existing Degree Information (Graduate)

1 Is this a new or revised disciplinary area attached to an existing graduate degree program? Yes No Revised

If you've answered NO, please continue on to the next section.

2 If YES, what is the name of this new / revised disciplinary area?

3 Which Department / School is the authority for this new / revised disciplinary area?

4 Which current program(s) and / or degree(s) is this new / revised disciplinary area attached to?

Section 5: New College / School / Center / Department or Renaming of Existing

1 Is this a new college, school, center, or department?

Is an existing college, school, center, or department being renamed?

If you've answered NO to each of the previous two questions, please continue on to the next section.

Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>

2 What is the name of the new (or renamed) college, school, center, or department?

3 If you have renamed an existing college, school, center, or department, what is the current name?

4 What is the effective term of this new (renamed) college, school, center, or department?

5 Will any programs be created, changed, or moved to a new authority, removed, relabelled?

6 Will any courses be created, changed, or moved to a new authority, removed, relabelled?

7 Are there any ceremonial consequences for Convocation (i.e. New degree hood, adjustment to parchments, etc.)?

Section 6: Course Information

1 Is there a new subject area(s) of course offering proposed for this new degree? If so, what is the subject area(s) and the suggested four (4) character abbreviation(s) to be used in course listings?

No

2 If there is a new subject area(s) of offerings what College / Department is the academic authority for this new subject area?

3 Have the subject area identifier and course number(s) for new and revised courses been cleared by the Registrar?

4 Does the program timetable use standard class time slots, terms, and sessions?
If NO, please describe.

Yes No

NOTE: Please remember to submit a new "Course Creation Form" for every new course required for this new program / major. Attached completed "Course Creation Forms" to this document would be helpful.

Section 7: Admissions, Recruitment, and Quota Information

1 Will students apply on-line? If not, how will they apply?

As per current set-up

2 What term(s) can students be admitted to?

As per current set-up

3 Does this impact enrollment?

No change

4 How should Marketing and Student Recruitment handle initial inquiries about this proposal before official approval?

Refer to the Department

Section 8: Tuition Information

1 How will tuition be assessed?

Per Course	<input type="checkbox"/>
Per Credit Unit	<input type="checkbox"/>
Program Based	<input type="checkbox"/>
Standard Term	<input type="checkbox"/>
Other *	<input type="checkbox"/>
Current Set-Up	X

* See attached documents

2 If fees are per credit, do they conform to existing categories for per credit tuition? If YES, what category?

3 If program-based, will students outside the program be allowed to take the classes?

4 If YES, what should the per credit fee be?

Section 9: Government Loan Information

NOTE: Federal / provincial government loan programs require students to be full-time in order to be eligible for funding. The University of Saskatchewan defines full-time as enrollment in a minimum of 9 credit units (operational) in the fall and/or winter term(s) depending on the length of the loan.

1 If this is a change to an existing program, will the program change have any impact on student loan eligibility?

No

2 If this is a new program, do you intend that students be eligible for student loans?

Section 10: Convocation Information (only for new degrees)

1 Are there any 'ceremonial consequences' of this proposal (ie. New degree hood, special convocation, etc.)?

2 When is the first class expected to graduate?

3

What is the maximum number of students you anticipate/project will graduate per year (please consider the next 5-10 years)?

Section 11: Schedule of Implementation Information

1 What is the start term?

201505 [May 2015]

2 Are students required to do anything prior to the above date?

If YES, what and by what date?

Yes No

Section 12: Registration Information

1 Will students register themselves?

If YES, what priority group should they be in?

As per current set-up

Yes No

Section 13: Academic History Information

1 Will instructors submit grades through self-serve?

Yes No

2 Who will approve grades (Department Head, Assistant Dean, etc.?)
As per current set-up

Section 14: T2202 Information (tax form)

1 Should classes count towards T2202s? Yes No

Section 15: Awards Information

1 Will terms of reference for existing awards need to be amended? Yes No
2 If this is a new undergraduate program, will students in this program be eligible for College-specific awards?

Section 16: Program Termination

1 Is this a program termination? Yes No
If yes, what is the name of the program?

2 What is the effective date of this termination?

3 Will there be any courses closed as a result of this termination?
If yes, what courses? Yes No

4 Are there currently any students enrolled in the program?
If yes, will they be able to complete the program? Yes No

5 If not, what alternate arrangements are being made for these students?

6 When do you expect the last student to complete this program?

Section 17: SESD - Information Dissemination (Internal for SESD use only)

1 Has SESD, Marketing and Student Recruitment, been informed about this new / revised program? Yes No
2 Has SESD, Admissions, been informed about this new / revised program? Yes No
3 Has CGSR been informed about this new / revised program? Yes No
4 Has SESD, Transfer Credit, been informed about any new / revised courses? Yes No

5 Has ICT-Data Services been informed about this new or revised degree / program / major / minor / concentration? Yes No

6 Has the Library been informed about this new / revised program? Yes No

7 Has ISA been informed of the CIP code for new degree / program / major? Yes No

SIGNED

Date: Nov. 18, 2014

Registrar (~~Jason Dault~~, Assistant-Registrar for Russell Singer): Russell Singer

College / Department Representative: Mark Ho

