

**UNIVERSITY COUNCIL  
ACADEMIC PROGRAMS COMMITTEE  
REQUEST FOR DECISION**

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**PRESENTED BY:** Roy Dobson, chair

**DATE OF MEETING:** January 22, 2015

**SUBJECT:** **Graduate Certificate in One Health**

**DECISION REQUESTED:** *It is recommended:*

*That Council approve the Graduate Certificate in One Health, effective May 1, 2015, and that Council's Bylaws be amended to reflect the name of the new program.*

**PURPOSE:**

The Graduate Certificate in One Health offers students an opportunity to develop capacity in interdisciplinary problem-solving in the emerging area of One Health, broadly defined as multiple disciplines working together to obtain optimal health for people, animals, and the environment.

**DISCUSSION SUMMARY:**

The certificate will be offered as a supplementary credential to students registered in discipline-specific master's and doctoral thesis programs at the university, with the goal of providing graduate students with interdisciplinary knowledge and a skill set relevant to One Health while permitting students to attain the requisite disciplinary depth in their core graduate program. The certificate program consists of two 3-credit courses, which can only be credited against the One Health Certificate program. The administrative home of the certificate program will be the Western College of Veterinary Medicine.

**COMMITTEE REVIEW:**

The academic programs committee discussed the proposal with proponents, Dr. Bruce Reeder, Department of Community Health and Epidemiology and Dr. Hugh Townsend, Large Animal Clinical Science and program chair, VIDO at its meeting on January 7, 2015, and recommended approval of the certificate program. The committee supports the program as innovative and practical, building on research and scholarship in the university's One Health signature area and the proximity of the health sciences on one campus.

**ATTACHMENTS:**

1. Proposal: Graduate Certificate in One Health [Certificate of Proficiency]

## Memorandum

**To:** Sandra Calver, Associate Secretary, Academic Programs Committee (APC) of University Council

**CC:** Dr. Hugh Townsend, Department of Large Animal Clinical Sciences  
Dr. Bruce Reeder, Department of Community Health and Epidemiology

**From:** Dr. Trever Crowe, Associate Dean, College of Graduate Studies and Research (CGSR)

**Date:** January 6, 2015

**Re:** New Program Proposal – Graduate Certificate of Proficiency in One Health

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Consistent with the Curricular Changes Authority Chart approved by University Council in January 2013, for the consideration of the Academic Programs Committee of University Council, please find appended to this memo:


- Motions for approval of the Graduate Certificate of Proficiency in One Health from the Graduate Programs Committee and the Executive Committee of CGSR
- The proposal for the creation of a new Graduate Certificate of Proficiency in One Health
- Consultation with the Registrar form
- Response from Planning and Priorities Committee of University of Council to Notice of Intent
- Notice of Intent for program proposal

The College of Graduate Studies and Research supported the creation of the new Graduate Certificate of Proficiency in One Health with a final motion to recommend the proposal to APC, carried by the College Executive Committee on January 6, 2015.

The Graduate Certificate of Proficiency in One Health is designed to strengthen research and training across the health science disciplines, interdisciplinary graduate schools and research facilities on campus. The program will provide important linkages to holistic health which supports aboriginal engagement and initiatives.

The Graduate Certificate of Proficiency in One Health will be available to graduate research students pursuing a PhD or thesis-based Master's degree. The Graduate Certificate of Proficiency in One Health would be completed concurrently with a degree program. It will require 6 credit units of coursework that cannot be credited toward another program.

Please do not hesitate to contact me to address any questions or concerns that may arise.

  
Trever Crowe, Associate Dean, CGSR



## Memorandum

**To:** Sandra Calver, Associate Secretary, Academic Programs Committee (APC) of University Council

**CC:** Dr. Hugh Townsend, Department of Large Animal Clinical Sciences  
Dr. Bruce Reeder, Department of Community Health and Epidemiology

**From:** Dr. Trever Crowe, Associate Dean, College of Graduate Studies and Research (CGSR)

**Date:** January 6, 2015

**Re:** Decisions by the CGSR Executive Committee and the Graduate Programs Committee regarding a new Graduate Certificate of Proficiency in One Health

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The Graduate Programs Committee considered the proposal for the creation of a new Graduate Certificate of Proficiency in One Health at meetings held on November 10, 2014, and December 8, 2014. Following the November meeting, the proponents were asked to respond to 8 issues identified in the proposal including: program attributes, the relationship and expected outcomes for the certificate outside the iTraP/CREATE grant, under-representation of faculty from some health fields, faculty continuity in program management, budget, course proposal information, grading, and outcomes of completion. The proponents were diligent in responding to issues identified and provided clarifications and revisions to resolve any concerns.

**Motion:** *"To approve the new Graduate Certificate of Proficiency in One Health."* Whiting/Racine CARRIED

The Executive Committee of CGSR considered the proposal for creation of a new Graduate Certificate of Proficiency in One Health at its meeting on January 6, 2015. Committee members discussed the purpose of the certificate noting that the number of certificates being offered at the institution appears to be on the rise. It was clarified that the certificate could not be a required component of a degree program.

**MOTION:** *"To approve the proposed Graduate Certificate of Proficiency in One Health."* Pohler/Eramian Carried

## Memorandum

To: Dr. Dionne Pohler, Chair, Graduate Programs Committee, CGSR

Cc: Dr. Trever Crowe, Associate Dean CGSR

From: Dr. Hugh Townsend, Department of Large Animal Clinical Sciences  
Dr. Bruce Reeder, Department of Community Health and Epidemiology

Date: December 1, 2014

Re: Proposal for a Graduate Certificate of Proficiency in One Health

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We wish to thank the Graduate Programs Committee for their thoughtful review of the proposal for a Graduate Certificate of Proficiency in One Health. We have considered the committee's advice and offer the following response:

1. The Graduate Attributes listed in Appendix F of the proposal are indeed ambitious. Nevertheless, they have been achieved during the past two years by a motivated cadre of graduate students through a combination of coursework and research in their home program, and engagement in the Certificate Program. Several of the attributes, such as having a substantive area of knowledge and research expertise, derive primarily from the student's home program. Others, such as systems thinking, knowledge integration, and an appreciation of multiple perspectives, derive primarily from the Certificate Program. Leadership and professional skills, on the other hand, are developed in both programs.
2. The CREATE ITraP program has provided faculty at the University of Saskatchewan with two years of experience in innovative approaches to graduate training in One Health. Thorough evaluations conducted at the end of each year have guided the evolution of the program. There is a desire by both faculty and students engaged in the program to see it institutionalized as a Certificate Program. For the students, this will provide a recognized credential; for faculty and the institution, it will enhance the visibility and sustainability of graduate training in the university's One Health Signature Area. In addition to the training described in the present proposal for the One Health Certificate, the NSERC-funded CREATE ITraP program is able to offer students enrolled in that program a research stipend and funding for participation in a summer school and externship. These features are not available to Certificate students outside the CREATE ITraP program.
3. In each of the past two years, the breadth of faculty members engaged in the program has increased and the composition changed according to the cases and issues studied. Joining the

program this year will be faculty from the Colleges of Medicine, Veterinary Medicine, Nursing, Pharmacy and Nutrition, Arts and Science, and all three interdisciplinary graduate schools (see ONEH 800 and 801 course proposals and Section 5.2 Faculty Resources in the Certificate Proposal).

4. Faculty and departmental commitments to the Certificate Program are recognized in the assignment of duties of participating faculty members. The proponents of the Program agree that this is essential to its strength and sustainability.
5. As outlined in Section 7 of the proposal and in the Letters of Support (Appendix J), until 2019/20, the administrative costs of the program will be covered by the CREATE ITraP program, after which time the Western College of Veterinary Medicine will do so, in part with generated tuition revenue.
6. GSR 400.1 New Graduate Course Proposal forms, as well as SESD Course Creation Information forms have been completed for both courses, and statements on academic honesty and the grading rubric have been included (Appendices H and I).
7. Following a thorough discussion, faculty members teaching in the program have decided to move grading of the two courses from Pass/Fail to Percentage Grades. On balance, the latter approach is felt to be most suitable in the long term.
8. The Learning Outcomes related to attitudes are ambitious. However, as evidenced by the student evaluations in the past two years, the innovative approach taken in these two courses has challenged and changed student attitudes to teams, science, and team science.

Thank you for your consideration of this proposal. We would be pleased to respond to any further questions the committee might have.

Best regards,

A handwritten signature in blue ink, appearing to be 'Z. H.', enclosed in a thin blue rectangular border.A handwritten signature in black ink, appearing to be 'Bue', with a horizontal line underneath.



UNIVERSITY OF  
SASKATCHEWAN

## Proposal for Academic or Curricular Change

### PROPOSAL IDENTIFICATION

**1. TITLE OF PROPOSAL:** Graduate Certificate in One Health

**Degree(s):** Graduate Certificate of Proficiency

**Field(s) of Specialization:** One Health

**Level(s) of Concentration:**

**Option(s):**

**Degree College:** Graduate Studies and Research

**Home College:** Western College of Veterinary Medicine

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

Dr. Hugh Townsend  
Professor  
Large Animal Clinical Science  
WCVM  
Tel: 306-966-1514  
Email :  
[hugh.townsend@usask.ca](mailto:hugh.townsend@usask.ca)

Dr. Bruce Reeder  
Professor  
Community Health and Epidemiology  
College of Medicine  
Tel: 306-966-7934  
Email :  
[bruce.reeder@usask.ca](mailto:bruce.reeder@usask.ca)

**Date:** 1 December, 2014

**Proposed date of implementation:** May, 2015

### 2. TYPE OF CHANGE

Requiring approval by Council

- X A new Degree-Level program or template for program.
  - ❑ A new Field of Specialization at the Major or Honours Level of Concentration or template for a major or honours program.
  - ❑ Conversion of an existing program from regular to special tuition program.
  - ❑ A change in the requirements for admission to a program.
  - ❑ A change in quota for a college.
  - ❑ Program revisions that will use new resources.
  - ❑ A replacement program, including program deletion.
  - ❑ A program deletion (consult Program Termination Procedures, approved by Council in May 2001).

Requiring approval by Academic Programs Committee

- X Addition of a higher Level of Concentration to an existing Field of Specialization.
  - ❑ Addition of a new Field of Specialization at the Minor Level of Concentration.
  - ❑ A change in program options.
  - ❑ A change in the name of a Degree-level Program or Field of Specialization.
  - ❑ A change in the total number of credit units required for an approved degree program.

### 3. RATIONALE

#### 3.1 Introduction

One Health is an interdisciplinary, multi-sectorial approach used to address the complex issues of the 21<sup>st</sup> century, as much in research and teaching as in the development of policies, programs and services.

One Health has been defined as “the collaborative efforts of multiple disciplines working together locally, nationally and globally to attain optimal health for people, animals and the environment” (American Veterinary Medical Association 2008). Although first articulated by Dr. Calvin Schwabe, Professor, University of California, Davis, in 1984 under the rubric One Medicine, One Health, these holistic principles have guided Indigenous peoples for millennia. The One Health approach has been endorsed by a number of professional organizations (Kahn, Kaplan, & Monath, 2013), the World Health Organization and the Public Health Agency of Canada.

Leading academic institutions are moving to strengthen their research and training programs in One Health. With a number of outstanding faculty, research centres and students, the University of Saskatchewan has an opportunity to position itself among Canada’s most distinguished academic institutions for research and training in this emerging area. One component of such a strategy is the development of a graduate certificate in One Health.

#### *Benefits to the Institution*

Offering a Graduate Certificate in One Health benefits the University of Saskatchewan in several ways: 1) it strengthens the institution’s One Health Signature Area for research and scholarship; 2) it links established research and training programs of the health science faculties and research



institutions on campus (e.g., the Vaccine and Infectious Disease Organization and International Vaccine Center (VIDO/InterVac), Toxicology Centre, Global Institute for Water Security, Global Institute for Food Security, the Canadian Centre for Health and Safety in Agriculture (CCHSA) and Canadian Wildlife Health Cooperative); 3) it integrates the expertise of the three interdisciplinary graduate Schools (School of Public Health, School of the Environment and Sustainability, Johnson Shoyama Graduate School of Public Policy); 4) it develops capacity in interdisciplinary problem –solving essential for addressing today’s complex problems; and 5) it provides important linkages to the holistic thinking that is central to Indigenous studies in the Department of Native Studies, the Indigenous Peoples Health Research Centre and Aboriginal Education Research Centre.

### *Benefits to Faculty*

One Health facilitates collaboration and communication between faculty, across disciplines, and epistemologies. The Certificate in One Health will benefit faculty in a number of ways: 1) it will provide essential faculty professional development opportunities in interdisciplinary problem-based learning and interdisciplinary knowledge brokering (Anhold et al., 2012); 2) interdisciplinary team-teaching will support deeper understanding of the multiple approaches and ways of knowing used to solve complex problems (Gardner, 2013) and improve teaching ability (Barrett et al., 2011; Carpenter et al., 2007; Game & Metcalfe, 2009; Letterman & Dugan, 2004; Preves & Stephenson, 2009); 3) teaching in the program will promote interdisciplinary campus-wide research collaborations and provide opportunities to deepen faculty experience in addressing One Health problems from a wide range of perspectives. All are foundational for development of an effective One Health program at University of Saskatchewan.

### *Benefits to Students*

The Certificate in One Health helps future professionals to : 1) understand the connectedness of, and enhance the well-being of, animal and human health and the health of the environment; 2) obtain the interdisciplinary knowledge and skill sets needed to assess and respond to issues from these complex interactions; and 3) think across the continuum from scientific discovery to policy development. These abilities are increasingly important as more and more professionals from across disciplines are required to assess and respond to issues arising from the complex interactions of animals, humans, and the environment. The Certificate in One Health program will prepare graduate students to address complex problems in a creative, integrated, and systematic manner at an advanced level. They will learn how to navigate complex systems and develop strong skill sets in interdisciplinary knowledge analysis and integration. . The Certificate program will also honor multiple ways of knowing, including the holistic nature of Indigenous thought (Battiste & Henderson, 2000).

## **3.2 Background**

Many faculty members have been working in relative isolation on One Health issues without capitalizing on potential interdisciplinary collaborations in research and training. The University of Saskatchewan One Health Initiative has arisen to address this gap, and in doing so has engaged more than 40 faculty members and partners from government and industry. Following a two-day workshop in December, 2011 a One Health Leadership Committee was formed from a broad range of disciplines such as agriculture and bioresources, law, medicine, nursing and veterinary medicine. The Committee has developed a strategic plan identifying four areas of

strategic research focus and priorities for graduate and undergraduate training. The strategic plan was revisited and updated at a recent One Health Retreat, March 24-25, 2014. The present proposal for a new graduate training program in One Health is a component of that plan.

Three other initiatives have significantly impacted the design of the proposed program. First, in 2012, under the leadership of Dr. Baljit Singh, the University of Saskatchewan was awarded a \$1.65 million Natural Sciences and Engineering Research Council (NSERC) CREATE Training Program grant in Infectious Disease, Food Safety and Public Policy ([http://www.usask.ca/wcvm/graduate\\_programs/ITraP\\_program/index.php](http://www.usask.ca/wcvm/graduate_programs/ITraP_program/index.php)) matched by an additional \$2.4 million of university monies. The program will provide 79 undergraduate, graduate, and post-doctoral fellowship stipends over a period of eight years (2012- 2020). Key components of this training program are an interdisciplinary One Health core course, seminar series, an annual week-long summer school with outstanding faculty, and internships in government and industry. These components have been offered during the 2012-13 and 2014-14 academic years as 898 courses. They have been carefully evaluated by participating students and faculty, and that input used to provide the foundation of this proposed certificate program. When the proposed Graduate Certificate in One Health is in place, it is expected that students within the CREATE program as well as students from outside of the program who are working in areas of One Health will register in the certificate program. Second, generous support from the staff and Curriculum Innovation Fund of the Gwenna Moss Centre for Teaching Excellence has helped: 1) to conduct an evaluation of the CREATE program's One Health problem-based learning course; 2) to survey best practices in interdisciplinary graduate education relevant to the program; and 3) to design the curriculum for the proposed Certificate in One Health. Third, through collaboration with the School of Environment and Sustainability, the proposed program has drawn upon expertise and experience of that unit in teaching interdisciplinary problem-based learning for sustainability. This has been of considerable value in the development of the present proposal.

### **3.3 Environmental Scan**

A review of published literature identifies several promising practices for the effective teaching of One Health. It is advisable: 1) to focus on collaborative, interdisciplinary communication and problem solving skills (Cobbald, 2009; Hall & Weaver, 2001); 2) to ensure that content is diverse and flexible; and 3) to employ a systems thinking model that emphasizes holistic understanding of problems and approaches (Cobbald, 2009).

Structurally, the concept of One Health has been incorporated into curriculum in academic institutions in four ways (see Appendix A):

1. Integration of One Health into existing courses
2. One Health course(s)
3. One Health Certificate, Diploma, or Graduate Degree
4. Combined Degrees (e.g., MD or DVM with MPH)

## **4. DESCRIPTION OF PROGRAM CHARACTERISTICS**

### **4.1 Graduate Certificate**

A new graduate program leading to a certificate of proficiency in One Health is proposed. Students enrolled in existing masters and doctoral programs at the University of Saskatchewan will be eligible to also enroll in the certificate as a supplementary qualification. The certificate would be recognized on the student's transcripts and a parchment awarded at convocation. For the purpose of the University of Saskatchewan, the integration of One Health into curriculum is effective if, and only if, it is integrated into curriculum across disciplines. To offer one course in One Health is an option, but a single course would not enable students to move to effective and competent application of the skills needed to solve One Health problems (Howard, 2004; Howard & Rapport, 2004). The certificate option maximizes development of an interdisciplinary knowledge and skill set while maintaining disciplinary depth in the student's core graduate program.

In North America, two academic institutions (Université de Montréal, University of Florida) offer certificate programs related to One Health. The Université de Montréal offers a Certificate in Veterinary Public Health: the animal-human-environmental interface. Students who complete an additional Certificate in Veterinary Public Health Interventions and a practicum/project are eligible to receive a Master's degree in Veterinary Public Health. This program is currently offered in French, but is to be offered in English in the coming years. The University of Florida offers a Certificate program in One Health, a Masters of Health Science (MHS) program with a concentration in One Health and a PhD program in Public Health with a concentration in One Health. In the United Kingdom one academic institution (University of Edinburgh) offers a One Health curriculum that permits progression from a Certificate to Diploma to a Master of Science degree. In the Edinburgh program it is possible to complete only a Certificate or Diploma. A detailed description of these programs is provided in Appendix B.

### **4.2 Guiding Principles of the Pedagogy**

A collaborative, interdisciplinary, experiential approach to problem-based learning will guide all aspects of course development and implementation. The University of Saskatchewan's Certificate in One Health will be distinguished by the development of student skills in creative and critical problem-solving across disciplines, as well as interdisciplinary knowledge integration across cultures and sectors in local, national and global contexts. A key feature of the program is its online participation from international students, as well as students in various other locations across Canada.

Examination of issues in the program will take a holistic approach, based on a wide body of evidence that recognizes the importance of diverse ways of knowing for interdisciplinary problem-solving (Miller et al., 2011; Murphy, 2011). It is expected that students already come to the Certificate in One Health with significant content knowledge in the area of specialization of their graduate studies.

Using the Research Skill Development Framework (RDF) (Willison & O'Regan 2006) (Appendix C) teaching and learning activities will be carefully scaffolded so students will be guided from a level of closed inquiry with a high degree of structure and guidance to a level of

open inquiry with self-determined guidelines. The 4Mat Cycle (McCarthy & McCarthy 1987) (Appendix D) will be applied throughout the program to:

1. Motivate students (the Hook);
2. Build comprehension and knowledge (the Stuff);
3. Apply and analyze (the Practice); and,
4. Synthesize and evaluate (the Solo Flight).

Team teaching (rather than tag-team teaching) where “two or more teachers regularly and purposefully share responsibility for planning, presentation, and evaluation of lessons prepared for the same group of students” (Carpenter et al, 2007), will be routinely employed to stimulate and model effective interdisciplinary problem-solving. A recent review of team teaching by the School of the Environment and Sustainability informs this approach (Appendix E).

#### **4.3 One Health Competencies**

In recent years, attention has focused on the competencies required of health professionals to work effectively in interdisciplinary teams. The Canadian Interprofessional Health Collaborative has developed the National Interprofessional Competency Framework (2010), and a comparable effort in the U.S. identified the Core Competencies for Interprofessional Collaborative Practice (2011). This work has subsequently been applied to the field of One Health by the U.S. Agency for International Development (USAID 2012), and by an international consortium including WHO and the Food and Agricultural Organization (FAO) (Rome, 2012). Considering this background and the focus at the University of Saskatchewan, we propose that graduates of the program will exhibit the competencies in collaborative problem-solving and interdisciplinary knowledge integration outlined in Appendix F.

#### **4.4 Learning Outcomes**

Upon completion of the Certificate in One Health, graduates will demonstrate the specific knowledge, skills and attitudes outlined in Appendix G.

#### **4.5 Proposed Program Structure and Content**

The NSERC CREATE Integrated Training Program in Infectious Disease, Food Safety and Public Policy provides the framework for the proposed Certificate Program in One Health. That Training Program enrolled 10 students in the academic year 2012-13, 20 in 2013-14, and conducted an independent evaluation of the two courses each year. The structure and content of the Certificate Program proposed below is based upon that experience and evaluation.

#### **Program Requirements:**

##### **Registration:**

Students must be registered in the College of Graduate Studies and Research in a thesis-based Masters or PhD program.

##### **Admission Average:**

A cumulative weighted average of **at least 70%** (U of S grade system equivalent) in the last two years of study..

**Admission Requirements:**

Applicants will submit the following documents in the admission package:

- Transcripts
- Letter of intent
- Curriculum vitae
- Approval of the graduate student supervisory committee

The selected candidates will undergo an interview by the admission panel of the Program Committee.

**Language Proficiency Requirements:**

Proof of English proficiency may be required for international applicants and for applicants whose first language is not English. See the College of Graduate Studies and Research Academic Information and Policies for more information

**Degree Requirements:**

This program consists of the following courses, totaling 6 credits units, to be completed during full-time enrolment during a one-year period, including:

- ONEH 800
- ONEH 801

**Double-Counting:**

There will be no double-counting permitted. Indeed, the six (6) credit units cannot be credited in a program other than the One Health Graduate Certificate.

**The six (6) credit units (C.U.) will comprise the following components:**

1. *ONEH 800 Principles and Practice of One Health – 3 C.U. (Appendix H)*

Students will learn skills in collaborative problem-solving and interdisciplinary knowledge integration in the field of One Health. Working in collaborative teams, students learn and apply analytical tools to identify and clarify goals, define the problem, assess alternatives and collaboratively devise policy-oriented approaches to resolve real-world problems at the human-animal-environment interface.

Permission of the department is required

2. *ONEH 801 Seminar in Advanced Applications of One Health Problem-solving – 3 C.U. (Appendix I)*

Working in collaborative teams, students choose and apply appropriate interdisciplinary problem-solving and decision-making tools to self-selected, current One Health problems. Students enrich the depth and breadth of their knowledge about One Health issues, learn about dilemmas and breakthroughs in the field, and hone their skills working

in intercultural, interdisciplinary teams. During the program, students will document their intellectual and emotional growth, and in a final assignment, reflect upon their learning, and its application in their thesis research and broader academic experience.

Permission of the department is required

### **Draft Catalogue Entry:**

### **Admission Requirements:**

- Students must be registered in the College of Graduate Studies and Research in a thesis-based Master's or PhD program. A cumulative weighted average of **at least 70%** (U of S grade system equivalent) in the last two years of study.
- **Language Proficiency Requirements:** Proof of English proficiency may be required for international applicants and for applicants whose first language is not English. See the College of Graduate Studies and Research Academic Information and Policies for more information
- Applicants will submit the following documents in the admission package:
  - Transcripts
  - Letter of intent
  - Curriculum vitae
  - Approval of the graduate student supervisory committee

The selected candidates will undergo an interview by the admission panel of the Program Committee.

### **Certificate Requirements:**

This program consists of the following courses, totaling 6 credits units, to be completed during full-time enrolment during a one-year period, including:

- GSR 960.0
- GSR 961.0 if research involves human subjects
- GSR 962.0 if research involves animal subjects
- ONEH 800.3
- ONEH 801.3

**Please note:** No double-counting permitted. The six (6) credit units cannot be credited in a program other than the One Health Graduate Certificate.

### **4.6 Administrative Structure**

The administrative structure of Certificate Program in One Health will follow the model of another interdisciplinary program at the U of S, the graduate program in Environmental Engineering. The academic home of the Certificate Program in One Health will be the Western

College of Veterinary Medicine (WCVM). The Certificate Program Committee will be comprised of 6-8 faculty members from various colleges who are actively engaged in the teaching and supervision of students in the program. The Chair of the Committee and members will be appointed by the Dean of WCVM for a renewable two-year term. The Chair and Certificate Program Committee will function in a manner typical of the Chair and Committee of a Graduate Program as delineated by the College of Graduate Studies and Research (CGSR). The graduate program requirements will be defined by Certificate Program Committee, consistent with requirements of the College of Graduate Studies and Research, and will be met by all graduate students in the program. The Chair will report on matters related to the Program to the Dean, WCVM.

#### **4.7 Student Advisory Committees**

A student's Advisory Committee will be constituted as required by the Graduate Program Committee of the student's 'home' department. It will be strongly encouraged that the composition of the Advisory Committee of students participating in the One Health Certificate Program be interdisciplinary, and that the approach to the thesis matter reflect One Health principles. The student will meet all the standard requirements for the degree in the 'home' department.

### **5. RESOURCES**

#### **5.1 Administrative support**

The academic home the program will be the Western College of Veterinary Medicine (WCVM). Administrative support, estimated to be 0.25 FTE, will be provided by the current full-time Program Coordinator of the NSERC CREATE Integrated Program in Infectious Diseases, Food Safety and Public Policy (ITrap), and, following the completion of that program in 2020, by the Office of the Dean, WCVM (Appendix J, Letters of Support).

#### **5.2 Faculty resources**

The faculty members currently engaged in the NSERC-funded CREATE Integrated Training Program in Infectious Disease, Food Safety and Public Policy will continue their engagement:

Leadership:

- Dr. Vikram Misra will serve as the inaugural Chair of the Certificate Program Committee.
- Dr. Cheryl Waldner will serve as Course Coordinator, Principles and Practice of One Health;
- Dr. Baljit Singh will serve as Course Coordinator, Seminar in Advanced Applications of One Health Problem-solving;

### Teaching:

Faculty members who will contribute to instruction in the Certificate Program, within their assignment of duties, include:

M.J. Barrett, School of the Environment and Sustainability  
D. Clark, School of the Environment and Sustainability  
T. Epp, Large Animal Clinical Sciences, WCV  
V. Gerds, Large Animal Clinical Sciences, WCV and VIDO  
J. Gordon, Dept. of Medicine, Medicine  
E. Jenkins, Veterinary Microbiology, WCV  
S. Kirychuk, Dept. of Medicine, Medicine  
V. Misra, Veterinary Microbiology, WCV  
N. Muhajarine, Community Health and Epidemiology, Medicine  
C. Neudorf, Community Health and Epidemiology, Medicine  
N. Osgood, Computer Science, Arts and Science  
P. Phillips, Johnson Shoyama Graduate School of Public Policy  
B. Reeder, Community Health and Epidemiology, Medicine  
M. Schwandt, Community Health and Epidemiology, Medicine  
B. Singh, Veterinary Biomedical Sciences, WCV  
H. Townsend, Large Animal Clinical Sciences, WCV and VIDO  
C. Waldner, Large Animal Clinical Sciences, WCV  
K. Wasan, Pharmacy and Nutrition  
P. Woods, Nursing  
G. Zello, Pharmacy and Nutrition

### **5.3 Space, ICT, Library needs**

The Certificate Program will be administered out of the current office of the NSERC CREATE Integrated Training Program in Infectious Disease, Food Safety and Public Policy in WCV, hence new space is not required. As a number of participating students may be located outside of Saskatoon, a room with video conference capability and appropriate technical support will be necessary for both courses. The present facilities in WCV are adequate. No new library needs are anticipated. See Appendix K, Consultation Forms

## **6. RELATIONSHIPS AND IMPACT OF IMPLEMENTATION**

The Certificate in One Health will be a program available to highly qualified graduate students enrolled in an existing graduate program at the University of Saskatchewan. The program will complement their in-depth disciplinary training by enabling the students to develop the interdisciplinary knowledge and skills required to address complex health and environmental



(One Health) problems in an integrated manner. As it imposes academic and tuition requirements on students in addition to those of their home program, participation will be limited to motivated, outstanding students.

A majority of students participating in the NSERC CREATE ITraP are likely to enroll in the Certificate Program in One Health (estimate from survey of current students: 75%). As well, the Certificate Program will attract students from outside of the ITraP program, in particular from graduate programs in: Veterinary Microbiology, Veterinary Biomedical Sciences, Large Animal Clinical Sciences, Community Health and Epidemiology, Health Science, Schools of Public Health, Public Policy, Environment and Sustainability, Computer Science. The estimated future enrollment in the program is given in Table 1 below:

**Table 1. Projected student enrollment in the Certificate Program in One Health**

| <b>Students</b>  | <b>2014/15</b> | <b>2015/16</b> | <b>2016/17</b> | <b>2017/18</b> | <b>2018/19</b> | <b>2019/20</b> |
|--|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>ITraP students - enrolled in Certificate (total ITraP MSc/PhD students)</b> | 19 (26)        | 19 (25)        | 16 (21)        | 12 (16)        | 11 (14)        | 11 (14)        |
| <b>Non-ITraP students</b>  | 5              | 6              | 9              | 13             | 15             | 15             |
| <b>Total</b>   | 24             | 25             | 25             | 25             | 26             | 26             |

All academic units from which the Certificate Program will draw students are supportive and, indeed, currently direct their most capable students to it. As it is a supplementary academic qualification that students may acquire while completing the core requirements in their 'home' program, the Certificate Program will not compete with existing graduate programs for students. It is expected, rather, that the existence of such a unique program at the University of Saskatchewan will attract new graduate students to the institution.

## **7. BUDGET AND TUITION**

### **Budget**

The proposed courses have already been developed, pilot-tested and evaluated during the past two years as part of the NSERC-funded CREATE ITraP program with support from the Curriculum Innovation Fund of the Gwenna Moss Centre for Teaching Excellence. It is not

anticipated that new faculty resources, space allocation, library or IT resources will be required to offer this program (Appendix K). For the years 2015-2020, the CREATE ITraP program has agreed to fund the administrative costs of the One Health Certificate Program. Beyond 2020, with generated tuition revenue from the program, the Western College of Veterinary Medicine has agreed to fund its administrative costs (Appendix J, Letters of Support).

**Table 2. Budget for the Certificate Program in One Health**

|   | <b>2014 – 2020</b> |                                  |                    |
|---|--------------------|----------------------------------|--------------------|
| <b>Annual Operating Costs</b>   | <b>Total Costs</b> | <b>CREATE ITraP/WCVM Support</b> | <b>New Request</b> |
| Administrative support (0.25 FTE ASPA Phase 1 target point + 17% fringe benefits) | 16,735             | 16,735                           | -                  |
| General office operating expenses   | 5,000              | 5,000                            | -                  |
| Books   | 500                | 500                              | -                  |
| Computer software   | 1,500              | 1,500                            | -                  |
| <b>Total Costs</b>  | <b>\$23,735</b>    | <b>\$23,735</b>                  | -                  |

### **Tuition**

Students registered in the certificate will complete six (6) credit units and will pay for those six (6) credit units in addition to what is paid for their initial graduate degree. If a student is not able to complete the six (6) credit units, tuition per course will be charged.

### **Tuition Revenue (projected)**

In the NSERC CREATE ITraP program on which the Certificate is modelled, 10 students were registered in 2012/13, and 20 students registered in 2013/14. By the academic year 2019/20, the graduate program is projected to enroll 26 students per year. At the estimated tuition rate of \$201.00 per credit unit for a graduate program (Institutional Planning and Assessment quote), the tuition per student will be \$1206.00 for the program. By 2019/20, total tuition revenue of \$31,356.00 will derive from the program (Table 3).

**Table 3. Projected tuition revenue from the Certificate Program in One Health**

| Academic Year | Enrolment | Tuition Revenue |
|---------------|-----------|-----------------|
| 2014/15       | 24        | \$28,944        |
| 2015/16       | 25        | \$30,150        |
| 2016/17       | 25        | \$30,150        |
| 2017/18       | 25        | \$30,150        |
| 2018/19       | 26        | \$31,356        |
| 2019/20       | 26        | \$31,356        |

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## **APPENDIX A**

### **ENVIRONMENTAL SCAN OF ONE HEALTH PROGRAMS**

There are four ways that the concept of One Health has been incorporated into curriculum in academic institutions:

- 1. Integration of the One Health concept into content of existing programs**
  - a. Tufts University – Cummings School of Veterinary Medicine
  - b. University of Calgary - Faculty Veterinary Medicine
- 2. One Health course(s)**
  - a. Duke University, North Carolina State University, and the University of North Carolina – Chapel Hill - North Carolina One Health Collaborative – One Health Course
  - b. University of California - One Health Centre for Expertise – One Health course
  - c. University of Illinois – Center for One Health Illinois – One Health course
- 3. One Health certificate, diploma, or degree**
  - a. University of Edinburg - The Royal (Dick) School of Veterinary Studies – Cert., Dip., or MSc
  - b. University of Florida - Department of Environmental & Global Health and College of Public Health and Health Professions – Cert., MHS, PHD
  - c. University of Montreal - Faculty of Veterinary Medicine – “Microprogrammes” in Veterinary Public Health – Animal, Human, Environmental Health Interface
- 4. Combined degree (e.g., DM, DVM, MSc, PhD, etc.) programs with a Masters in Public Health (MPH) or a degree with specialization**
  - a. Ohio State University – College of Veterinary Medicine and College of Public Health – MPH with Veterinary Public Health specialization
  - b. Tufts University – DM & DVM with MPH
  - c. University of Calgary - Faculty Veterinary Medicine - Department of Ecosystem and Public Health
  - d. University of Illinois – College of Veterinary Medicine and the School of Public Health, University of Illinois at Chicago – DVM with MPH
  - e. Virginia–Maryland Regional College of Veterinary Medicine - Center for Public and Corporate Veterinary Medicine

## APPENDIX B

### ONE HEALTH PROGRAM DESCRIPTIONS

Across all institutions students are required to complete a set of core courses. Core courses are often face-to-face and often in an intensive format, except for one program that is web-based. For those programs that require the completion of additional courses these courses are often web-based.

There is not standard subject matter across programs or expectations for course completion. This being said, in general, across all programs in place, subject matter includes One Health concepts, applied applications, and the way in which these can be used to address public health issues. Two of the three programs use lectures and tutorials with the expectation of participation and examinations with one of the two also using field and laboratory exercises. One program uses a combination of presentations by the instructor, presentations by a guest expert, analysis activities, exploration activities, activities mapping, simulation activities, and reflective practice with a specific course that uses an experiential and solution-oriented approach to instruct students in interdisciplinary skills.

#### **University of Edinburgh - Certificate in One Health**

<http://www.ed.ac.uk/schools-departments/vet/studying/postgraduate/taught-programmes/one-health>

The program is structured to permit progression via Certificate, Diploma and MSc; however, it is also possible to finish at the Certificate or Diploma. The Certificate is designed to be completed over a period of 1 to 2 years. The Certificate is composed of three core courses (20 Credits - 200 Hours - each) each course taken over a period of 10 weeks. Training is web-based and uses a blend of online learning methods (e.g., video podcasts, web based discussion forums and expert tuition). The three courses in the Certificate are:

- *Introduction to One Health (20 Credits);*
- *Applied Epidemiology, Surveillance and Observational Studies (20 Credits); and,*
- *One Health Policy and Practice (20 Credits).*

The first course, *Introduction to One Health*, is designed to introduce students to the core concepts of One Health and related concepts (e.g., ecosystem health), the drivers of disease in a globalised world and the complex relationship between animals, humans and the ecosystem (or environment) as well as an overview of important issues in the field. In particular it will explore the inter-disciplinary nature of One Health and the role of the key actors within this framework. The second course, *Applied Epidemiology, Surveillance and Observational Studies*, is designed to increase students understanding of epidemiological principles, surveillance of disease and risk

management. The third course, *One Health Policy and Practice*, is designed to introduce students to the principles of global health governance and policy development (i.e., how policy is made and how policy can be changed).

### **University of Florida – Certificate in One Health**

<http://egh.phhp.ufl.edu/>

The certificate is designed to be completed in a twelve month period and is earned through 18 to 20 days of intensive training at the University of Florida coupled with one term of web-based, asynchronous, distance learning training. Training includes lectures, tutorials, field experiences, laboratory exercises, public health demonstrations, and written examinations, with the goal of introducing students to the many facets of studying emerging infectious diseases. Disciplines reviewed include: epidemiology, environmental health, veterinary health, zoonotic diseases, epidemiology, entomology, microbiology, food production, food safety, water quality assessments, and outbreak investigations. The Certificate is awarded after a student successfully completes the 9 credits of prescribed course work with a grade point average (GPA) of at least a 3.0 on a 4.0 scale. After demonstrating excellence in performance, successful certificate trainees may compete for further scholarship support (Fogarty, USAID, etc.) and apply 9 credits of the training towards a Masters in Public Health at the University of Florida:

On-site courses:

An Introduction to One Health Problem Solving (PHC 6006 2 credits)

Public Health Laboratory Techniques (PHC 6561 1 credit)

An Introduction to Entomology Zoonotic Diseases and Food Safety (PHC 6515 3 credits)

On Line course:

PHC 6313: Environmental Health Concepts in Public Health (3 credits): This 16 week, asynchronous web-based.

### **Master of Health Sciences (MHS) – One Health Concentration**

This program emphasizes working across public health, veterinary health, and environmental health disciplines to tackle difficult health problems.

The MHS One Health curriculum addresses a diverse range of health issues but has a strong focus upon infectious diseases. Courses and other educational experiences are structured to enable students to develop competence in very specific health skills. Recommended undergraduate prerequisite training for One Health degrees include basic biology, chemistry, physiology, and college algebra.

The program offers particular depth in how infectious diseases are transmitted at the human-animal interface; how the environment impacts such disease transmission; and how we can predict and mitigate new and current disease threats. An emphasis is placed upon agricultural industries, biosecurity, entomology, zoonotic diseases, animal health, food production, pathogen detection and identification, and environmental controls. Through elective courses, students may draw on the extensive expertise of University of Florida faculty from diverse disciplines to gain special training in a specific field of interest. Where possible, students will emerge well versed in One Health problem solving via partnerships with industry.

## PHD in Public Health – One Health Concentration

This program requires a minimum of 90 post-baccalaureate credit hours. These credits will include core public health coursework (15 credits); quantitative methods and statistics (12 credits); professional issues (7 credits); concentration area (35 credits); supervised research (3 credits); supervised teaching (3 credits); and dissertation research (15 credits). Recommended undergraduate prerequisite training for One Health degrees include basic biology, chemistry, physiology, and college algebra.

The One Health concentration is a research-oriented health degree that emphasizes working across public health, veterinary health, and environmental health disciplines to tackle difficult health problems. This program is designed to bridge the gap between various areas of animal, plant, and human health to improve the wellbeing of all species.

## Université de Montréal - “Microprogrammes” in Veterinary Public Health – Animal, Human, Environmental Health Interface

[http://www.medvet.umontreal.ca/etudes/2\\_3cycles/microprogramme/sante\\_publ.html](http://www.medvet.umontreal.ca/etudes/2_3cycles/microprogramme/sante_publ.html)

The Certificate is designed to be completed over a period of 1 year. The Certificate is composed of six core courses (1-2 Credits each) and four electives. Three of the courses are completed on-site during a 4 to 5 day face-to-face, intensive training per course in Saint-Hyacinthe and three of the courses completed off-site during terms of web-based, training. On-site training includes lectures and tutorials that use a combination of presentations by the instructor, presentations by a guest expert, analysis activities, exploration activities, activities mapping, simulation activities, and reflective practice while off-site training includes “any time” and “real-time” exchanges and interactive, conference sessions. The six core courses in the Certificate are:

- *Ecosystems and global issues in Veterinary Public Health (2 Credits - On-site);*
- *Food Security: Issues and Challenges (2 Credits - On-site);*
- *Communication, Leadership and Transdisciplinarity (1 Credit - On-site);*
- *Applied Veterinary Epidemiology (2 Credits - Off-site);*
- *Quantitative Methods: Case Studies in Veterinary Public Health (2 Credits - Off-site);*  
*and,*
- *Zoonoses and Veterinary Public Health Problems (2 Credits - Off-site).*

The first course, *Ecosystems and Global Issues in Veterinary Public Health*, is designed to introduce students to the ecosystem approaches to health in particular the “One World, One Health” approach. The second course, *Food Security: Issues and Challenges*, is designed to introduce students to the concept of food security, the issues, their relationship to public health and the challenges. The third course, *Communication, Leadership and Transdisciplinarity*, is designed to introduce students to the challenges of communication in the context of transdisciplinary work, the types of leadership practices and to understand their importance to the team. The fourth course, *Applied Veterinary Epidemiology*, is designed to introduce students to epidemiologic principles. The fifth course, *Quantitative Methods: Case Studies in Veterinary Public Health*, is designed to introduce students to the application of quantitative methods of



data analysis. The sixth course, *Zoonoses and Veterinary Public Health Problems*, is designed to introduce students to the public health issue of zoonotic diseases and the environmental and socio-economic context in which these diseases operate.

## **APPENDIX C**

### **RESEARCH SKILL DEVELOPMENT FRAMEWORK (Willison & O'Regan 2007)**

# Research Skill Development Framework

A conceptual model to make explicit the incremental and cyclic development of student research skills

## LEVEL OF STUDENT AUTONOMY

|            | Level 1  | Level 2   | Level 3  | Level 4  | Level 5  |
|------------|--|---|--|--|--|
| Curious    | Students research at the level of a <b>closed inquiry*</b> and require a <b>high degree of structure/guidance</b>                                      | Students research at the level of a <b>closed inquiry*</b> and require <b>some structure/guidance</b>   | Students research <b>independently</b> at the level of a <b>closed inquiry*</b>  | Students research at the level of an <b>open inquiry*</b> within <b>structured guidelines</b>  | Students research at the level of an <b>open inquiry*</b> within <b>self-determined guidelines</b> in accordance with the discipline                             |
| Determined | Respond to questions/tasks arising explicitly from a closed inquiry.   | Respond to questions/tasks required by and implicit in a closed inquiry.  | Respond to questions/tasks generated from a closed inquiry.  | Generate questions/aims/hypotheses framed within structured guidelines.  | Generate questions/aims/hypotheses based on experience, expertise and literature.  |
| Critical   | Collect and record required information/data using a prescribed methodology from a prescribed source in which the information/data is clearly evident. | Collect and record required information/data using a prescribed methodology from prescribed source/s in which the information/data is not clearly evident.                  | Collect and record required information/data from self-selected sources using one of several prescribed methodologies.   | Collect and record self-determined information/data from self-selected sources, choosing an appropriate methodology based on structured guidelines.          | Collect and record self-determined information/data from self-selected sources, choosing or devising an appropriate methodology with self-structured guidelines. |
| Organised  | Evaluate information/data and the inquiry process using simple prescribed criteria.  | Evaluate information/data and the inquiry process using prescribed criteria.  | Evaluate information/data and the inquiry process using criteria related to the aims of the inquiry.   | Evaluate information/data and the inquiry process comprehensively using self-determined criteria developed within structured guidelines.                     | Evaluate information/data and the inquiry process rigorously using self-generated criteria based on experience, expertise and literature.                        |
| Creative   | Organise information/data and manage the research process according to a simple prescribed structure.  | Organise information/data and manage the research process according to prescribed structures.   | Organise information/data and manage the research process by adapting provided structures.   | Organise information/data and manage the research process using self-determined structures that fit provided guidelines.                                     | Organise information/data and manage the research process using self-determined protocols in accordance with the discipline.                                     |
| Persuasive | Synthesise and analyse information/data to reproduce existing knowledge in prescribed formats. Ask questions of clarification/curiosity.               | Synthesise and analyse information/data to reorganise existing knowledge in standard formats. Ask relevant, researchable questions.   | Synthesise and analyse information/data to construct emergent knowledge. Ask rigorous, researchable questions based on new understandings.   | Synthesise, analyse and apply information/data to fill recognised knowledge gaps.  | Synthesise, analyse and apply information/data to fill self-identified gaps or extend knowledge.   |
|            | Use mainly lay language and prescribed genre to demonstrate required knowledge and understanding for lecturer/teacher as the audience.                 | Use some discipline-specific language and prescribed genre to demonstrate self-selected knowledge and understanding from a stated perspective and for a specified audience. | Use mostly discipline-specific language and appropriate genre to demonstrate knowledge and understanding within a field from a scholarly perspective and for a specified audience. | Use the language of the discipline and appropriate genre to address knowledge and understanding gaps from several perspectives for a self-selected audience. | Use the language of the discipline, choosing appropriate genre to extend knowledge and understanding, from diverse perspectives for a range of audiences.        |

A. Students **embark** on inquiry and so **determine** a **need** for knowledge/understanding

B. Students **find/generate** needed information/data using appropriate methodology

C. Students **critically evaluate** information/data and the process to find/generate this information/data

D. Students **organise** information collected/generated and manage the research process

E. Students **synthesise and analyse** and **apply** new knowledge

F. Students **communicate** knowledge and the processes used to generate it, with an awareness of ethical, social and cultural issues

\* closed = lecturer specified, open = student initiated. Lecturers and teachers determine scope of inquiry and standard required; student achievement determines the Level their research actually attains. For example, the provision of an open inquiry within structured guidelines (Level 4) in the First Year University context will see some students providing evidence of Level 1 attainment for a specific facet, with others demonstrating Level 2, Level 3 or Level 4, depending on their degree of rigour.

## **APPENDIX D**

### **THE 4 MAT CYCLE (McCarthy & McCarthy 1987)**

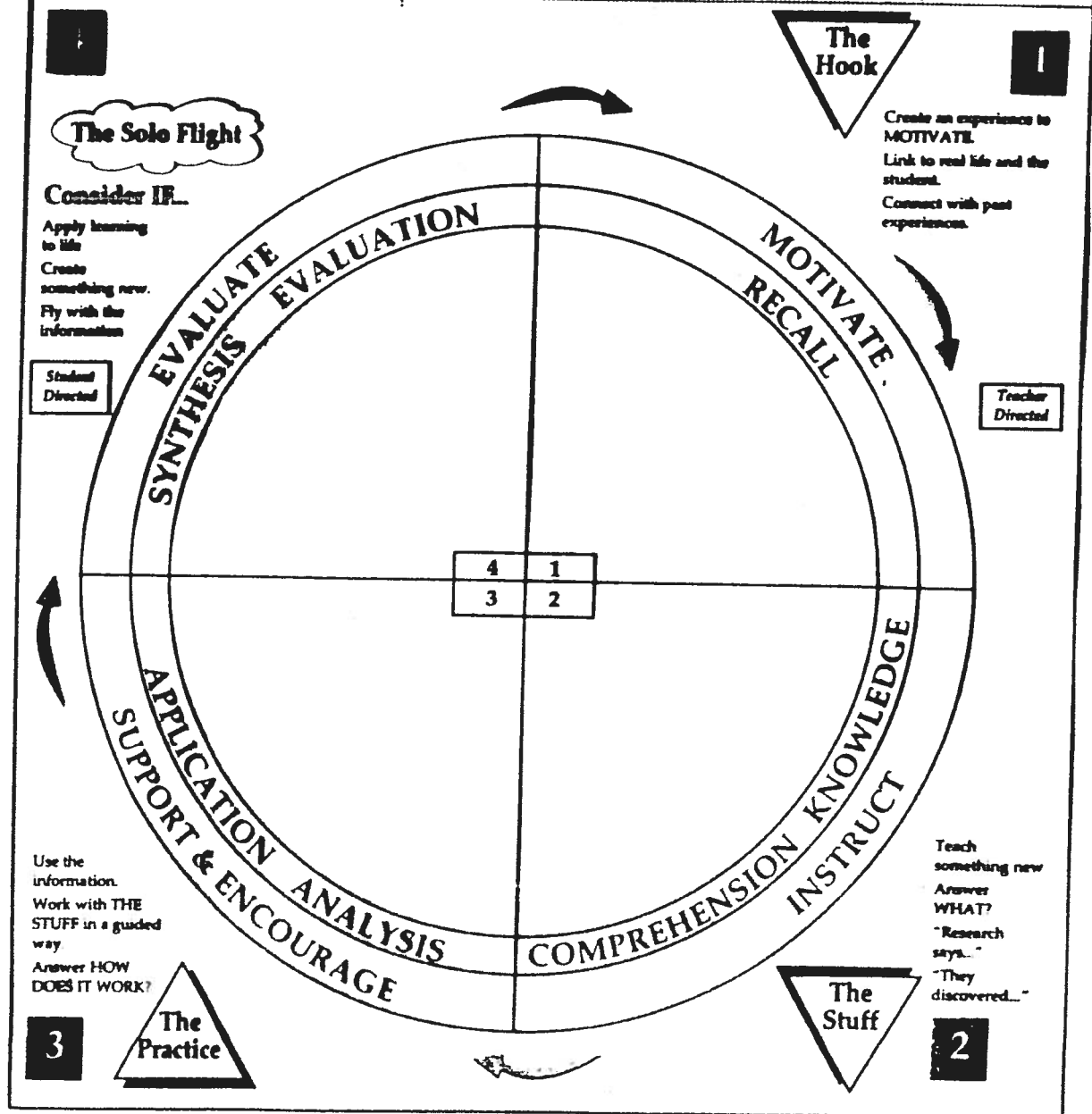
# Lesson Topic \_\_\_\_\_

## Objectives:

WHY are we spending class time on this?

## Intelligences — something to think about

- ☐ talk, read or write about it
- ☐ draw, sketch or visualize it
- ☐ dance it, build a model of it
- ☐ sing it, chant it, find music that illustrates it, put on music
- ☐ relate to a personal feeling
- ☐ conceptualize, quantify, think critically about it
- ☐ work on it with another person or group of people



## **APPENDIX E**

### **LITERATURE REVIEW – TEAM TEACHING IN HIGHER EDUCATION**

# Literature Review: Team Teaching in Higher Education

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*Aimee Schmidt, M.J. Barrett & Maureen Reed*

## Appendix 1

# Team Teaching in Higher Education Literature Review Summary

|                            |   |
|----------------------------|---|
| Advantages for Students    | <ul style="list-style-type: none"> <li>• Exposure to multiple perspectives</li> <li>• Greater learning opportunities</li> <li>• Increased student participation</li> <li>• Increased levels of student satisfaction and enthusiasm</li> <li>• Improved quality and quantity of feedback</li> </ul>  |
| Disadvantages for Students | <ul style="list-style-type: none"> <li>• Difficulties adjusting to the unconventional classroom structures</li> <li>• Anxieties over assessment practices</li> <li>• Need to adjust to various teaching styles within one classroom</li> <li>• Difficulty figuring out the main points of the lesson</li> <li>• Feeling overwhelmed and confused about meeting the expectations of more than one teacher</li> <li>• Being presented with too much information over too short a time period</li> </ul>   |
| Advantages for Teachers    | <ul style="list-style-type: none"> <li>• Improved teaching abilities</li> <li>• Classroom management is easier</li> <li>• Enhanced conflict management and collaborative skills</li> <li>• Renewed motivation to teach and increased pleasure in teaching</li> <li>• Greater insights into course content</li> <li>• Opportunities for new research</li> </ul>  |
| Disadvantages for Teachers | <ul style="list-style-type: none"> <li>• Team teaching is time consuming</li> <li>• Faculty with already busy workloads are discouraged by the belief that team teaching is too demanding</li> <li>• Budget limitations</li> <li>• There are few incentives for teachers to participate in team teaching since institutional policies push faculty towards research excellence rather than pedagogical excellence</li> <li>• Team teachers receive lower initial teaching evaluations</li> <li>• The dependent nature of team teaching raises the potential for interpersonal conflict</li> <li>• Loss of individual autonomy is persistent frustration for team teachers</li> <li>• Loss of flexibility that occurs within the team taught classrooms that makes it harder to catch up on lost time</li> </ul> |
| What is                    | <ul style="list-style-type: none"> <li>• Good relationship between collaborating teachers</li> </ul>  |



|  |   |
|--|---|
| necessary for effective team teaching? | <ul style="list-style-type: none"> <li>• Teachers should have compatible personalities that allow them to work together.</li> <li>• Teachers need to have a shared vision and shared objectives</li> <li>• A clear definition of roles for each team member is necessary so that each teacher knows exactly how they can contribute to a course</li> <li>• Team members must be able to reach a consensus regarding instructional strategies, materials, grading, etc.</li> <li>• Time should be taken to co-develop the syllabus and co-plan the course content</li> <li>• The structure of the course should be constantly renegotiated throughout the semester</li> <li>• Teachers need to provide students with some form of resolution at the end of the class.</li> <li>• Consistent grading strategies are vital for maintaining student satisfaction</li> <li>• Students should be informed upon enrollment that the course will be team taught</li> <li>• Team teachers need to put on a unified front in the classroom</li> <li>• One instructor may take the lead in topics over which they have greater expertise, however, the other should interrupt to share relevant perspectives and experiences</li> <li>• It is important that students view teachers as having equal authority</li> </ul> |
| Team teaching and Interdisciplinarity  | <ul style="list-style-type: none"> <li>• Team teaching is commonly seen as a tool for blurring disciplinary boundaries</li> <li>• True interdisciplinary teaching demands not only presenting information but also comparing and contrasting philosophical and methodological assumptions.</li> <li>• For content to become truly integrated by interdisciplinary teams colleagues need to learn from each other</li> <li>• Structuring interdisciplinary courses around problems is a successful team teaching approach</li> <li>• Teaching the course multiple times allows for a more successful presentation of connections across disciplines</li> </ul>   |
| Team Teaching and Sustainability       | <ul style="list-style-type: none"> <li>• Team teaching reinforces the importance of alternative viewpoints and perspectives to a much greater degree than non-team-taught courses</li> <li>• Team teaching increases students' sensitivity to the complexity of environmental issues</li> <li>• Students learn that academic disciplines are not always mutually exclusive and that more is accomplished working interdisciplinarily</li> <li>• Team teaching provides a level of disciplinary integration that is necessary for environmental education</li> <li>• Team teaching is increasingly being employed as a method for teaching about sustainability</li> </ul>   |

## APPENDIX F

### GRADUATE ATTRIBUTES

*Upon completion of the One Health Certificate graduate students will be able to:*

- Think holistically with a systems approach
  - Apply critical and creative thinking to one health problems
  - Transcend disciplinary boundaries to achieve harmonious integration of human, animal and natural systems
  - Identify and assess how human, animal and natural systems work and interact
- Integrate a range of perspectives and ways of knowing
  - Demonstrate and encourage respect for a range of perspectives and ways of knowing including those of Indigenous Peoples
  - Articulate the benefits and limitations of a range of perspectives and ways of knowing
  - Be profoundly aware of their own position, its strengths, limitations, and assumptions
- Have a substantive area of expertise in keeping with their program of study.
  - Have substantive expertise within their chosen field of study
  - Create, analyze, synthesize and communicate within their field(s) of study
  - Communicate their expertise effectively to those outside that field
- Have research expertise
  - Recognize the processes of research
  - Design and execute effective interdisciplinary research
  - Synthesize, integrate, analyze and evaluate data for the purpose of creating new knowledge
- Demonstrate collaborative, leadership and professional skills in knowledge sharing
  - Work effectively in interdisciplinary and multisectoral teams
  - Effectively manage self in the context of sustainability projects (e.g. setting realistic deadlines, being reliable, working effectively under uncertainty, solving problems, maintaining a positive attitude, modelling professional conduct
  - Facilitate, mediate, translate, and communicate knowledge to appropriate audiences in many different forms
- Demonstrate ethical behaviour and understanding in practice and research
  - Articulate the principles of ethics applied to their field of research and practice
  - Understand the ethical dimensions of working with communities, including indigenous communities
  - Conduct research in an ethical manner

- Integrate knowledge and principles from the domains of basic science, clinical practice and policy development and implementation
  - Comprehend the lexicon of these One Health domains
  - Describe the process of policy development and means to influence it
  - Understand the roles of academia, government and industry in these domains, and the means to integrate across these domains

## APPENDIX G

### LEARNING OUTCOMES

#### Course 1 Learning Outcomes:

Upon completion of the course students will:

Knowledge:

- Understand the difference between problem-oriented and solution-oriented approaches to one-health problems (intermediate level)
- Describe several problem-solving and decision-making frameworks, the strengths, limitations, and appropriate applications of each (intermediate level)
- Demonstrate knowledge of a range of specific analytical tools (e.g. multi-variant analysis) valuable in assessing one health problems (intermediate level)
- Describe a range of knowledge systems/multiple 'ways of knowing' (introductory level)
- Demonstrate knowledge within one's primary area of study, and its place within a one health paradigm
- Articulate the impact of personal standpoint on one's assessment of a problem (intermediate level)

Skills:

- Apply critical and creative thinking in problem-solving (intermediate level)
  - Select and apply frameworks and other relevant tools appropriate to analyzing one health cases
  - Efficiently access and evaluate information within one's own discipline (intermediate level); know how to effectively assess information beyond one's own discipline
  - Apply a problem-oriented approach to one-health problem-solving (intermediate level)
- Work effectively in interdisciplinary, intercultural and/or cross-sectoral teams
  - Communicate effectively in inter-personal/-sectoral/-cultural/-disciplinary settings
  - Demonstrate skill in contributing one's expertise (in appropriate ways) to one-health problems (advanced)
  - Participate effectively in collaborative problem-solving and decision-making in inter-personal/-sectoral/-cultural/-disciplinary settings (intermediate level)
  - Apply effective leadership skills (including the ability to give and receive effective feedback) (introductory level)
  - Work effectively on-line with collaborators in distant locations (advanced level)
- Apply principles of risk assessment and management (introductory level)
- Effectively conduct policy analysis and policy development (intermediate level)

- Apply principles of ethics in problem-solving (introductory level)
- Demonstrate skills of a reflective practitioner (advanced level)

Attitudes - students will demonstrate the attitudes of:

- Critical inquiry
- Openness
- Respect
- Flexibility
- Humility
- Integrity and ethics
- Social and environmental responsibility

## **Course 2 Learning Outcomes**

On completion of the course students will:

Knowledge:

- Demonstrate understanding of current one health dilemmas and breakthroughs
- Articulate the impact of personal standpoint on one's assessment of a problem
- Demonstrate knowledge within one's primary area of study, and place it within a one health paradigm
- Demonstrate effective application of integrated science
- Know a select number of international, national and local decision-making organizations and structures relevant to One Health

Skills:

- Effectively apply appropriate problem-solving and decision-making frameworks and tools (introduced in Course 1, or learned elsewhere) to:
  - Investigate, analyze and present various aspects of one-health problem
  - Identify gaps in current knowledge
  - Demonstrate understanding of the roles, strengths and limitations of selected framework and tools
  - Recommend and present policy alternatives
- Demonstrate ability to communicate one's own disciplinary knowledge to a multi-disciplinary audience
- Demonstrate skills of a reflective practitioner

- Apply principles of ethics in problem-solving

Attitudes - students demonstrate the attitudes of:

- Critical inquiry
- Openness
- Respect
- Flexibility
- Humility
- Integrity and ethics
- Social and environmental responsibility

## APPENDIX H

### Course Outline

#### ***Principles and Practice of One Health – 3 C.U.***

**Catalogue Description:** Students will learn skills in collaborative problem-solving and interdisciplinary knowledge integration in the field of One Health. Working in collaborative teams, students learn and apply analytical tools to identify and clarify goals, define the problem, assess alternatives and collaboratively devise policy-oriented approaches to resolve real-world problems at the human-animal-environment interface.

**Pre-requisites:**

Students are expected to come to the program with, and further develop in their home graduate program, an area of substantive expertise, research expertise and the ability to access and evaluate information within their respective discipline.

**Program Context:**

This is the first of two official requirements for a Graduate Certificate in One Health. The other requirement is a seminar in *Advanced Applications of One Health Problem-Solving* (3 CU). In addition, students are expected to engage in complementary experiences outside of the formal course structure and demonstrate the characteristics and qualities of a reflective practitioner.

**Marking Approach:**

Evaluation in this course is by a percentage grade, with a pass being a grade of 70%. The University of Saskatchewan College of Graduate Studies assessment criteria apply. Students will be required to submit a group contract with each group assignment.

**Teaching and learning approaches:**

A collaborative, interdisciplinary, experiential approach to problem-based learning will guide all aspects of course development and implementation. The course is distinguished by the development of student skills in creative and critical problem-solving across disciplines and the inclusion of multiple ways of knowing. Teaching and learning approaches will include (but are not limited to): problem-based learning groups, case studies; readings and discussion; lectures; cooperative learning modules such as literature jigsaws; and instructor and student-led seminars. Because of the frequently changing nature of One Health problems and the fact that instructors will be bringing their own expertise to each of the cases, materials for individual cases and case selection will evolve over time.

**Course schedule and structure:**

Classes will meet for 3 hours, once a week, unless otherwise agreed to by all class participants and instructors. Ongoing reflection and feedback from cooperative learning groups, as well as questionnaires, facilitated discussion, and a formal student survey and focus group discussions will contribute to the evaluation and emergent aspects of the course design.

**Learning Goals:** On completion of the course students will demonstrate an intermediate level of knowledge, skills and attitudes to enable them to participate effectively in:

1. Collaborative problem-solving
2. Interdisciplinary knowledge integration (biomedical-clinical-social-cultural-policy)

**Learning Outcomes:** Upon completion of the course students will:

Knowledge:

- Understand the difference between problem-oriented and solution-oriented approaches to One Health problems (intermediate level)
- Describe several problem-solving and decision-making frameworks, the strengths, limitations, and appropriate applications of each (intermediate level)
- Demonstrate knowledge of a range of specific analytical tools (e.g. multi-variant analysis) valuable in assessing One Health problems (intermediate level)
- Describe a range of knowledge systems/multiple 'ways of knowing' (introductory level)
- Demonstrate knowledge within one's primary area of study, and its place within a One Health paradigm
- Articulate the impact of personal standpoint on one's assessment of a problem (intermediate level)

Skills:

- Apply critical and creative thinking in problem-solving (intermediate level)
  - Select and apply frameworks and other relevant tools appropriate to analyzing One Health cases
  - Efficiently access and evaluate information within one's own discipline (intermediate level); know how to effectively assess information beyond one's own discipline
  - Apply a problem-oriented approach to One Health problem-solving (intermediate level)
- Work effectively in interdisciplinary, intercultural and/or cross-sectoral teams
  - Communicate effectively in inter-personal/-sectoral/-cultural/-disciplinary settings
  - Demonstrate skill in contributing one's expertise (in appropriate ways) to One Health problems (advanced)
  - Participate effectively in collaborative problem-solving and decision-making in inter-personal/-sectoral/-cultural/-disciplinary settings (intermediate level)
  - Apply effective leadership skills (including the ability to give and receive effective feedback) (introductory level)
  - Work effectively on-line with collaborators in distant locations (advanced level)
- Apply principles of risk assessment and management (introductory level)
- Effectively conduct policy analysis and policy development (intermediate level)
- Apply principles of ethics in problem-solving (introductory level)
- Demonstrate skills of a reflective practitioner (advanced level)

Attitudes - students will demonstrate the attitudes of:

- Critical inquiry
- Openness
- Respect
- Flexibility



- Humility
- Integrity and ethics
- Social and environmental responsibility

**Required Texts:**

Bennett, L.M., Gadlin, H., Levnine-Finley, S. (2010). *Collaboration & Team Science: a Field Guide*. Bethesda, MD: National Institutes of Health.

Clark, S.G. 2011. *The Policy Process: A Guide for Natural Resource Professionals*. Yale University Press, New Haven, CT.

Case materials and additional analysis frameworks will be provided by individual case instructors.

**Recommended:**

Clark, T.W., Stephenson, M.J., Ziegelmayer, K., and Rutherford, M. (editors). 2001. *Species and Ecosystem Conservation: an interdisciplinary approach*. Yale School of Forestry & Environmental Studies Bulletin Series, no. 105 (selected chapters). URL: [http://environment.yale.edu/publication-series/biodiversity\\_and\\_ecosystems/792](http://environment.yale.edu/publication-series/biodiversity_and_ecosystems/792) Selected chapters.

Clark et. al. Solving problems in Endangered species Conservation: An Introduction to Problem Orientation from *An Interdisciplinary Approach to Endangered Species Recovery: Concepts, Applications, Cases*. Selected chapters.

Patton, B., Fisher, R., Ury, W.L. (2011). *Getting to Yes: Negotiating Agreement without Giving In*. Penguin Books.

| Assignments   | Proportion of final grade |
|---|---------------------------|
| <p><b>Teaching Case</b> (topic to be determined by instructor):</p> <p>In pairs, using the policy sciences framework, students will name elements of their epistemological, disciplinary and cultural standpoint, then conduct and present either a social or decision process analysis of the faculty-selected selected issue. This assignment will apply the concepts of the Policy Sciences Framework.</p> <p><b>Due date: Classes 2, 3.</b></p> | ungraded                  |
| <p><b>Policy Sciences Framework Quiz:</b> Students will complete, in class, a quiz defining key terms in the Policy Sciences Framework (Clark, p. 10). <b>Date: Class 3</b></p>   | self-assessed             |

|   |   |
|---|---|
| <p><b>Case 2 (Nipah Virus Disease): Problem Analysis (groups):</b> Students will be given a set of case materials on a specific One Health problem. Working with that material in groups of 3-5, students will define the problem; summarize and project historical, current, and future trends; identify underlying influences and gaps in knowledge; complete a social process and a decision process analysis, and identify, evaluate and recommend policy alternatives, using the Policy Sciences Framework. Student-generated tables and figures are highly encouraged as ways to economically summarize and present information. Oral presentation (20 minutes) and paper (approx. 6000 words).</p> <p><b>Due date: Class 7</b></p> | 40%   |
| <p><b>Case 3: Integrated Science (Food Borne Disease):</b> Working in small groups, using an Integrated Science framework, students will prepare an individual synthesis of the current understanding of the science underlying the Food Borne Disease case study.</p> <p><b>Due date: Class 11</b></p>   | 30%   |
| <p><b>Case 4: Student-developed Case Study. Group problem analysis:</b> Working in two teams, students will design a case study, with specific learning outcomes and deliverables, for their peers. These teams will then present their deliverables to the class in an oral presentation (30 minutes) and written analysis (approx. 6000 words).</p> <p><b>Due Date: Case study materials to peers – Class 9; Group Presentations - Class 12</b></p>   | 30%   |
| <p><b>Program Survey and Focus Group Discussion:</b> This reflective process will close the course. It includes an online survey reflecting on the course, as well as an in-class focus group discussion identifying strengths and areas of change for the course, and the One Health Certificate program.</p> <p><b>Due Date: Class 13</b></p>   |   |
| <p><b>Self-reflection/assessment of learning and participation: survey and focus group. Plus free-form self-reflection.</b> Formal reflections will be assigned twice throughout the term (after the first case, and at the end of term). They may take both visual and written forms. The final reflection must identify key areas of growth and learning; understandings of one health; and key elements of standpoint, and interdisciplinary problem-solving. In addition to many self-selected portfolio items, these reflections will contribute to students' portfolios which will be presented at the end of the program.</p>  | Ungraded<br>(used for certificate portfolio at the end of course 2) |

Provisional Class Schedule (based on 3 hours of class time per week):

Two-thirds to three-quarters of class time will be spent directly working on cases as shown in the provisional course schedule below. The remaining class time will be spent on instructor-led learning modules, carefully scaffolded to support skill and knowledge development in collaborative problem-solving and knowledge integration across disciplines and cultures, including Indigenous content and perspectives. The exact timing of these modules will be identified by a combination of student-identified needs and instructor judgement to ensure smooth integration into students' case-based learning experiences.

Modules:

| First Third of Class  | Middle Third of Course  | Final Third of Course  |
|---|---|--|
| <p>Problem-orientation vs solution-orientation (Policy Sciences Framework)</p> <p>Standpoint (e.g. identifying one's disciplinary paradigm)</p> <p>Team Science: Team-building principles and techniques; interdisciplinary and intercultural communication</p> <p>Creating a portfolio in One Health</p> | <p>Communication, conflict resolution and negotiation</p> <p>Frameworks: e.g. Integrative Science, Biomedical Analysis</p> <p>Leadership in an interdisciplinary team</p> <p>Writing a policy memo</p> <p>Knowledge systems, including indigenous knowledge systems</p> | <p>Organizational roles and responsibilities in One Health</p> <p>Cultural competence in One Health</p> <p>Presentation and media skills</p> |

| Schedule:      | Learning Activity  | Student Preparation  |
|----------------|--|--|
| <u>Class 1</u> | <p>Introductions to one another via Lasswell's values orientation</p> <p>Problem-oriented vs. solution-orientated approaches to interdisciplinary problem-solving</p> <p>Introduction of Policy Sciences Framework (mini-lecture) and application to PBL Teaching Case 1</p> <p>Clarify the role of standpoint and introduce social process analysis</p> | Clark 2011; Flores, 2000   |
| <u>Class 2</u> | Student presentations of social process analysis of Teaching Case 1  | Working in pairs or threes, half the class prepares social process analysis Clark (2011) |

|                 |   |  |
|-----------------|---|--|
|                 | Introduction to Decision Process Analysis of Teaching Case  |  |
| <u>Class 3</u>  | Student presentations of decision process analysis of Teaching Case 1<br>Framework Quiz<br>Demonstration of problem orientation | Working in pairs or threes, half the class prepares decision process analysis<br><br>Prepare for group quiz Clark (2011) |
| <u>Class 4</u>  | Introduce Nipah Case (Case 2)   | Clark (2011)<br>Nipah Case Materials   |
| <u>Class 5</u>  | Nipah Case Continued  | Nipah Case Materials   |
| <u>Class 6</u>  | Nipah Case Continued  | Nipah Case Materials   |
| <u>Class 7</u>  | Nipah Case Student Presentations  | Oral Presentations of Student Nipah Case Analysis  |
| <u>Class 8</u>  | Case 3 Food Borne Diseases<br>Integrated Science framework introduced   | Food Borne Disease Case Materials  |
| <u>Class 9</u>  | Food Borne Diseases   | Food Borne Disease Case Materials  |
| <u>Class 10</u> | Food Borne Diseases   | Food Borne Disease Case Materials  |
| <u>Class 11</u> | Food Borne Disease Presentations  | Teams use new framework(s) to analyze their case   |
| <u>Class 12</u> | Student-Developed Case Presentations  | Oral presentations of student-led Cases  |
| <u>Class 13</u> | Program and Individual Evaluation   | Completed Survey   |

## School and University policy statements

(adapted from University of Saskatchewan College of Graduate Studies)

### 1. Grading System Description

#### 90-100 Exceptional (Master's and PhD)

A superior performance with consistent strong evidence of

- a comprehensive, incisive grasp of subject matter;
- an ability to make insightful, critical evaluation of information;
- an exceptional capacity for original, creative and/or logical thinking;

## APPENDIX I

### Course Outline

#### ***Seminar in Advanced Applications of One Health Problem-Solving - 3 C.U.***

**Calendar Description:** Working in collaborative teams, students choose and apply appropriate interdisciplinary problem-solving and decision-making tools to self-selected, current One Health problems. Students enrich their depth and breadth of knowledge about One Health issues, learn about dilemmas and breakthroughs in the field, and hone their skills working in intercultural, interdisciplinary teams.

**Prerequisite:** Successful completion of Principles and Practice of One Health or permission of the program coordinator. Students are expected to come to the program with, and further develop in their home graduate program, an area of substantive expertise, research expertise and the ability to access and evaluate information within their respective discipline.

**Program Context:**

This is the second requirement for a Graduate Certificate in One Health. The other requirement is the *Principles and practice of One Health* (3 CU). In addition, students are expected to engage in complementary experiences outside of the formal course structure that demonstrate the characteristics and qualities of a reflective practitioner.

**Marking Approach:**

This second course in the certificate program *Advanced Applications of One Health Problem-Solving* builds on and extends the learning from *Principles and Practice of One Health*. Evaluation in this course is by a percentage grade, with a pass being a grade of 70%. The University of Saskatchewan College of Graduate Studies assessment criteria apply. Students will be required to submit a group contract with each group assignment.

**Teaching and learning approach:** A collaborative, interdisciplinary, experiential approach to learning will guide all aspects of course development and implementation. Instructional formats will include integrated seminars prepared and presented collaboratively by two to three students from different disciplines, small group learning through the jigsaw method, peer feedback, guest lectures, and the 'flipped classroom' formats. The course is distinguished by the high degree of respect and responsibility placed on students for their own learning, intensifying student skills in creative and critical problem-solving across disciplines, and inclusion of multiple ways of knowing. With the exception of the portfolio presentations which is a half-day meeting, classes will meet for 3 hours, once a week, unless otherwise agreed to by all class participants and instructors.

**Learning Goals** - on completion of the course students will demonstrate an advanced level of knowledge, skills and attitudes to enable them to participate effectively in:

3. Collaborative problem-solving
4. Interdisciplinary knowledge integration (biomedical-clinical-social-cultural-policy)

**Learning Outcomes** - on completion of the course students will:

Knowledge:

- Demonstrate understanding of current one health dilemmas and breakthroughs
- Articulate the impact of personal standpoint on one's assessment of a problem
- Demonstrate knowledge within one's primary area of study, and place it within a one health paradigm
- Demonstrate effective application of integrated science
- Know a select number of international, national and local decision-making organizations and structures relevant to One Health

Skills:

- Effectively apply appropriate problem-solving and decision-making frameworks and tools (introduced in Course 1, or learned elsewhere) to:
  - Investigate, analyze and present various aspects of one-health problem
  - Identify gaps in current knowledge
  - Demonstrate understanding of the roles, strengths and limitations of selected framework and tools
  - Recommend and present policy alternatives
- Demonstrate ability to communicate one's own disciplinary knowledge to a multi-disciplinary audience
- Demonstrate skills of a reflective practitioner
- Apply principles of ethics in problem-solving

Attitudes - students demonstrate the attitudes of:

- Critical inquiry
- Openness
- Respect
- Flexibility
- Humility
- Integrity and ethics
- Social and environmental responsibility

**Required Texts:**

There will be no required textbook for the course. Materials will be identified by students and faculty that are relevant to the individual cases being investigated.

**Course schedule and structure:** Classes will meet for 3 hours, once a week, unless otherwise agreed to by all class participants and instructors. Ongoing reflection and feedback from cooperative learning groups, as well as questionnaires, facilitated discussion, and a formal student survey will contribute to the course design.

At the beginning of the term, students and faculty will identify a range of One Health issues to be investigated during the term and criteria for selection of topics. Students will then choose topics to address and establish their approaches and timelines for analysis and presentations

| Assignments   | Proportion of final grade            |
|---|--------------------------------------|
| <b>Standpoint presentation:</b> Students will present in 10 minutes, key aspects of their standpoint in relation to One Health. Disciplinary, cultural, and worldview components must be included. Class 1  | ungraded                             |
| <b>Seminar presentation:</b> Interdisciplinary student groups (2-3 students) will present their selected topic (dilemma or breakthrough), facilitate discussion and provide follow-up on identified issues. Presentations must: clearly identify the problem; identify both their analytical framework used and standpoint in relation to the problem, and the strengths and limitations each of these provides; identify any gaps in knowledge which require further exploration; propose policy alternatives and a rationale for each. A 5000 word summary essay must be submitted to accompany the seminar. Throughout the term in rotation.   | 35%<br>Presentation 15%<br>Essay 20% |
| <b>Seminar Responses:</b> Students will individually prepare a written analysis of 2 peer seminar presentations. Not more than 750 words in length, this analysis will address the following questions: To what degree did the presentation take a One Health perspective? Was the problem clearly identified? Did the student identify their own standpoint in relation to the problem? Was the framework(s) chosen to complete the analysis made explicit? Were they effective? What gaps remain in the analysis? Do you agree with the proposed policy alternatives? Why or why not? These responses will be submitted both to the faculty and to the presenting peers. Throughout the term in rotation. | 20%<br>(2 X 10%)                     |
| <b>Ethics Analysis</b> of identified One Health issue using an appropriate framework for ethical analysis: individual assignment (1200-1800 words). Class 7.  | 20%                                  |
| <b>One Health Reflective Paper:</b> The certificate program aims to have students develop and demonstrate the skills of a reflective practitioner. The Reflective Paper will enable students to document, reflect upon, and deepen learning during and after experiences in the program. At the end of their program, students will prepare a paper and assemble a portfolio to demonstrate how they have recorded and reflected upon their learning, and applied the learning in their thesis research, and any practical work in the university, community, public and private sectors  | 25%                                  |

### Provisional Class Schedule:

Two-thirds to three-quarters of class time will be spent directly working on seminar topics as shown in the provisional course schedule below. The remaining class time will be spent on instructor-led learning modules, carefully scaffolded to support skill and knowledge development in collaborative problem-solving and knowledge integration across disciplines and cultures, including Indigenous content and perspectives. A proposed schedule is given below, however the exact timing of these modules will be identified by a combination of student-identified needs and instructor judgement to ensure smooth integration into students' case-based learning experiences.

| CLASS #                  | Class Focus   | Student Seminars   |
|--------------------------|---|--|
| <u>Class 1</u>           | Workshop: Implications of standpoint on one health problem-solving (integration of learning from Course 1); Student presentations of standpoint; Compiling a Portfolio of One Health learning | 10 minute presentation on standpoint   |
| <u>Class 2</u>           | Decision-making organizations relevant to One Health (Jigsaw format); selection of seminar topics   |  |
| <u>Class 3</u>           | Indigenous Perspectives on Health and Healing - guest   | Student Seminar 1  |
| <u>Class 4</u>           | Knowledge translation and commercialization – lecture   |  |
| <u>Class 5</u>           | Ethics in One Health – Flipped Classroom format   | Student Seminar 2  |
| <u>Class 6</u>           | Risk assessment and public perception – Flipped Classroom format  | Student Seminar 3  |
| <u>Class 7</u>           | Student Seminars  | Student Seminars 4 & 5   |
| <u>Class 8</u>           | Student Seminars  | Student Seminars 6 & 7   |
| <u>Class 9</u>           | Leadership in One Health – case studies seminar format; Reflective paper/Portfolio Preparation  |  |
| <u>Class 10</u>          | Student Seminars  | Student Seminars 8 & 9   |
| <u>Class 11</u>          | Student Seminars  | Student Seminar 10   |
| <u>Class 12 &amp; 13</u> | Half-Day Special Seminar & Program Evaluation   | Student One Health Reflective paper/Portfolio presentations; Post-Program Survey & Focus Group |



## **APPENDIX J**

### **Letters of Support**

10 September 2014

Dr. Lisa Kalychuk  
Chair, Planning and Priorities Committee  
University Council  
University of Saskatchewan

**RE: Graduate and Undergraduate Certificate Programs in One Health**

Dear Dr. Kalychuk:

The proposed graduate and undergraduate Certificate Programs in One Health will provide outstanding training opportunities for students at the University of Saskatchewan. They will meaningfully advance the priority that the university, the Council of Health Science Deans and the Western College of Veterinary Medicine have given to interprofessional education and practice. These proposals were developed with broad, multi-college faculty input and support.

The Western College of Veterinary Medicine will be pleased to serve as the academic home for the proposed graduate and undergraduate Certificate Programs, and will provide the necessary administrative support to manage the programs effectively.

Please feel free to contact me with any comments or additional questions.

Sincerely,



Douglas A. Freeman DVM, PhD  
Dean

September 11, 2014

Dr. Lisa Kalynchuk  
Chair, Planning and Priorities Committee  
University Council  
University of Saskatchewan

**RE: Graduate Certificate Program in One Health**

Dear Dr. Kalynchuk,

I have been pleased to lead the NSERC-funded Collaborative Research and Training Experience (CRE-ATE) program called Integrated Training Program (ITraP) in Infectious Disease, Food Safety and Public Policy since it was launched at the University of Saskatchewan in 2012. We have been highly successful in attracting and training outstanding graduate students in this interdisciplinary team science program in One Health. Each year, we have carefully evaluated our experience and incorporated student and faculty feedback into our approach to teaching and learning in the program.

The ITraP program faculty are now in a position to propose the establishment of a graduate Certificate Program in One Health built on this foundation. As part of its commitment, the ITraP program will be pleased to provide the necessary administrative support for the new program for the duration of the ITraP program funding period (2012-2018), following which I understand the Western College of Veterinary Medicine has offered to provide this support.

We look forward to the success of this new endeavor!

Thank you.

Yours sincerely,



Baljit Singh, BVSc&AH, MVSc, PhD, FAAA  
3M National Teaching Fellow  
Professor and Associate Dean (Research)  
Email: baljit.singh@usask.ca

9/11/2014

Page

1

# Memorandum

**To:** Dr. Hugh Townsend, Department of Large Animal Clinical Sciences, and  
Dr. Bruce Reeder, Department of Community Health and Epidemiology

**CC:** Dr. Trevor Crowe, Associate Dean, CGSR

**From:** Dr. Dionne Pohler, Chair, Graduate Programs Committee, CGSR

**Date:** November 19, 2014

**Re:** Proposal for Graduate Certificate of Proficiency in One Health

---

The Graduate Programs Committee of CGSR met on November 10, 2014, to consider the proposal for a Graduate Certificate of Proficiency in One Health. The committee discussed the proposal at length. Here is a summary of the questions and concerns noted:

- The graduate attributes listed in Appendix F of the proposal seemed inflated. Were those attributes meant to be inclusive of the certificate and the thesis-based degree program?
- Information in the proposal seemed specific to ITraP rather than the certificate proposal.
- Committee members were concerned that there was only one faculty member from the College of Medicine. The College of Medicine seemed to be under-represented and other academic units were not represented at all, such as Nursing, Pharmacy, etc.
- Committee members suggested there should be some consideration for faculty commitments to ensure that there was some faculty continuity over time.
- The budget was not clear. The proposal did not clearly indicate if the CREATE/ITraP grant was going to cover costs, and if so how those costs would be managed after the grant ended.
- GSR 400: New Course Proposal forms needed to be completed for each of the two courses. Additional details on course proposals were needed including the addition of statements on academic integrity and more information on the grading rubric.
- Committee members expressed some concern regarding the criteria for pass/fail courses. They wondered how a student would be graded if s/he earned 69%. Committee members would recommend numerical grades.
- Regarding Appendix G, it was questioned how the two courses would change attitudes compared to other courses.
- Associate Dean Crowe would be prepared to meet with you to try to help facilitate program approval.

Please respond to these concerns as quickly as possible to help facilitate the approval process. If you have any questions or concerns, please contact Kelly Clement at [Kelly.clement@usask.ca](mailto:Kelly.clement@usask.ca) or 306-966-2229

DP:kc

## ***MEMORANDUM***

TO: Bruce Reeder, Dept. of Community Health and Epidemiology, College of Medicine  
Hugh Townsend, Large Animal Clinical Sciences, WCVN and VIDO-InterVac

FROM: Lisa Kalynchuk, chair, planning and priorities committee of Council

DATE: September 25, 2014

RE: **Planning and priorities committee response to a Notice of Intent for Graduate Undergraduate Certificates of Proficiency in One Health**

---

Thank you once again for attending the planning and priorities committee meeting on September 17, 2014 to present the notice of intent for the proposed undergraduate and graduate certificates in One Health. The notice was received with interest, with many comments on the uniqueness of the programs in terms of their concept and delivery and potential to enhance interdisciplinary research and training opportunities for students.

The following observations and suggestions are provided for your consideration as you prepare to develop the full program proposal. The majority of these relate to the admissions process and other similar operational aspects.

- That the admissions process include consideration of students' disciplinary background to ensure there is a diversity so that students can benefit from the cross-fertilization of disciplines intended to be a strong feature of the program;
- That the entry level of students in terms of number of credit units completed at the undergraduate program be determined as part of the admissions process;
- That consideration be given to those prerequisites students from a non-science background may require to succeed in the program;
- That the benefits students could expect to receive from the program, such as, enhanced career and leadership opportunities, be emphasized in the program proposal;
- That program demand and whether the capstone courses offered will be made available to students not registered in the certificate programs be determined;
- That the proposal consider how tuition will be charged at the graduate level and whether the cost of the graduate-level certificate courses is included in the standard graduate student tuition charged per term, or whether the certificate program will be considered as ancillary to the student's program, with tuition assessed separately as an additional cost;

.../2

- That the acceptability of “double-counting” of the certificate courses toward degree requirements at the graduate level be considered. At the undergraduate level, students commonly “double-count” courses to obtain areas of specialization or a field of study as a “minor” in addition to their “major” field of study. At the graduate level, however, including the certificate courses as part of the core requirements of a student’s approved program of studies presents difficulty in that it double-counts courses on an individual program basis.

I wish you the very best as you proceed to develop the full program proposal. Please do not hesitate to contact me if you have any questions.

Kind regards,



---

Lisa Kalynchuk

- c     Ernie Barber, interim provost and vice-president academic  
      Trevor Crowe, associate dean, College of Graduate Studies and Research  
      Roy Dobson, chair, academic programs committee of Council  
      Russell Isinger, registrar and director of student services

**Planning and Priorities Committee of Council  
Notice of Intent:**

**One Health Certificates of Proficiency - Undergraduate & Graduate**

**1. What is the motivation for proposing this program at this time?  
What elements of the University and/or society support and/or require  
this program?**

This notice proposes the development of two new programs at the University of Saskatchewan: an undergraduate Certificate of Proficiency in One Health and a graduate Certificate of Proficiency in One Health.

One Health is a term used to identify “the collaborative efforts of multiple disciplines working together locally, nationally and globally to attain optimal health for people, animals and the environment together” (American Veterinary Medical Association 2008). One Health is not a discipline, but rather an integrated, interdisciplinary approach used to study and address complex problems (<http://libguides.usask.ca/onehealth>). It represents an application of the broad principles of Team Science (Bennett, Gadlin, Levine-Finley 2010) to problems at the interface of human-animal-environmental health.

Employers in the public and private sectors increasingly seek university graduates who have both disciplinary depth and the ability to work in integrated, interdisciplinary teams. With this in mind, the university's health science colleges, Council of Health Science Deans, and graduate schools of Environment and Sustainability, Public Health and Public Policy actively promote interdisciplinary education. The proposed One Health training programs represent practical opportunities for such education: elective programs to complement the core disciplinary training of enrolled students.

The proposals have been developed during the past year through broad consultation with faculty and senior leaders of university colleges and schools. The proposal for the undergraduate Certificate in One Health has been developed with input from 13 faculty members from the Colleges of Veterinary Medicine (4), Medicine (4), Pharmacy and Nutrition (2), Nursing (1), Law (1) and the Gwenna Moss Centre for Teaching Effectiveness (1). The graduate Certificate in One Health has had input from 15 faculty members from the Colleges of Veterinary Medicine (3), Medicine (2), Pharmacy and Nutrition (2), the Schools of Public Health (2), Environment and Sustainability (2), Public Policy (1), VIDO (2), and the Gwenna Moss Centre for Teaching Effectiveness (1).

The undergraduate Certificate is proposed as a 12 credit unit (CU) program open to undergraduate students enrolled in a degree program at the university, with a focus on the health science programs. A core One Health course (3 CU) would be

accompanied by an experiential practicum (2 CU), capstone workshop (1 CU), and two electives (3 CU each) drawn from a list of approved courses.

The graduate Certificate is proposed as a 6 CU program open to graduate students enrolled in a disciplinary program at the university. It will comprise a core problem-based learning course on the Principles and Practice of One Health (3 CU), and a seminar course on Advanced Applications in One Health (3 CU) which includes a capstone workshop. Students will be encouraged to integrate One Health principles into their thesis research and benefit from an interdisciplinary advisory committee.

**2. What is the anticipated student demand for the program? Does the program meet a perceived need, particularly within a national context? How have these needs been assessed?**

In North America to our knowledge, no institution offers an undergraduate training program in One Health, and only the University of Montreal and the University of Florida offer specific graduate training in the field. The former offers a Master's degree in Veterinary Public Health with emphasis on One Health, while the latter offers graduate Certificate, Master's and PhD degree programs in One Health. The University of Saskatchewan will therefore be one of a few North American institutions offering students such innovative, interdisciplinary training.

Student interest in One Health is illustrated by the success of several recent University of Saskatchewan initiatives. For the past three years, first and second year health science students have participated in an annual weekend One Health Leadership Experience workshop featuring case studies, leadership discussions and presentations by international leaders. Participation has risen from 75, to 100, to 200 students in 2014. Stimulated by the field, students have created a university One Health Student Club with over 30 members and core funding from the USSU, and through it, sponsored activities throughout the academic year. At the graduate level, the NSERC-funded CREATE Integrated Training Program in Infectious Disease, Food Safety and Public Policy was established in 2012. This training program has served as the foundational model for the proposed graduate One Health Certificate program. Applications for this program have increased from 11 to 25 in the past two years; 10 and 20 students, respectively, have been accepted into the program from graduate programs in the Colleges of Veterinary Medicine (Departments of Veterinary Microbiology, Veterinary Biomedical Sciences, Large Animal Clinical Sciences), Medicine (Community Health and Epidemiology), the School of Public Health (Epidemiology, and Vaccinology and Immunotherapeutics programs), School of Public Policy, and Arts and Science (Computer Science).



Offering elective certificate programs in One Health for health science and graduate students will distinguish the University of Saskatchewan and potentially attract students to our institution who might otherwise not have come.

**3. How does this proposal fit with the priorities of the current college or school plan and the University's integrated plan? If the program was not envisioned during the integrated planning process, what circumstances have provided the impetus to offer the program at this time?**

The proposed certificate programs in One Health are founded upon interdisciplinary, experiential, problem-based learning (PBL) modules incorporating a range of pedagogical innovations. The programs are an excellent fit with the strategic direction of the university. The University of Saskatchewan Third Integrated Plan (2012-2016) highlights the need for the institution to build excellence in areas of focus. Under the theme of Knowledge Creation, six Signature Areas of research were selected, one of which is One Health. Under the theme of Innovation in Academic Programs and Services, bold new approaches to academic programming are encouraged that emphasize collaborative, experiential learning. The Third Integrated Plan of the Western College of Veterinary Medicine and the College of Medicine's Strategic Research Plan *Toward 2020* both identify One Health as a key element. The university's One Health Initiative (2013-2015), which has been funded jointly by PCIP and the Council of Health Science Deans, places a priority on the development of certificate training programs. Supplemental funding and support from the Curriculum Innovation Fund of the Gwenna Moss Centre for Teaching and Learning Effectiveness has accelerated this development during the past year.

**4. What is the relationship of the proposed program to other programs offered by the college or school and to programs offered elsewhere (interactions, similarities, differences, relative priorities)? Is there justification to proceed regardless of any perceived duplication? Will a program be deleted as a result of offering the new program?**

The One Health Certificates are designed to be pursued concurrently with the degree programs in which students are enrolled. It is anticipated that the majority of undergraduate students will be enrolled in a professional program in one of the health science colleges, whereas the majority of graduate students will be enrolled in a graduate program in one of the health science colleges, or the Schools of Public Health, Public Policy, Environment and Sustainability. A minority of students will be from the Colleges of Arts and Science, and Agriculture and Bioresources.

The undergraduate and graduate certificate programs will be elective, supplemental tuition-bearing programs in which excellent students can choose to enroll.

Admission to the programs will be based upon application to, and interview by, the Program committee. In some cases, one or more of the courses of the certificate program may be considered electives by the student's home program.

The administrative structure of certificate programs in will follow the model of another interdisciplinary program at the U of S, the graduate program in Environmental Engineering. The academic home of the undergraduate and graduate certificate programs in will be the Western College of Veterinary Medicine (WCVN). The Certificate Programs Committee will be comprised of 6-8 faculty members from various colleges who are actively engaged in the teaching and supervision of students in the program. The Chair of the Committee and members will be appointed by the Dean of WCVN for a renewable two-year term. The Chair and Certificate Programs Committee will function in a manner typical of the Chair and Committee of a Graduate Program as delineated by the College of Graduate Studies and Research (CGSR). The program requirements in the graduate certificate program will be defined by Certificate Programs Committee, consistent with requirements of the College of Graduate Studies and Research, and will be met by all graduate students in the program. The program requirements of the undergraduate certificate will be defined by Certificate Programs Committee, consistent with requirements of the WCVN. The Chair will report on matters related to the Program to the Dean, WCVN.

It is not anticipated that any current programs will be deleted or diminished as a result of the development of these certificate programs. Rather, it is likely that the availability of such programs will attract new students to the University of Saskatchewan.

**5. Does the college or school possess the resources required to implement and support the program (faculty teaching, administrative and other support, student funding, classroom space, infrastructure)? Will additional university resources be required, for example, library resources, IT support? Has the Provost's Committee on Integrated Planning (PCIP) been involved in any discussions related to resources?**

In July 2013, the Provost's Committee on Integrated Planning (PCIP) approved the strategic plan for the university's One Health Initiative which foresees the development and implementation of new graduate and undergraduate certificate programs in One Health.

The academic home of both programs will be the Western College of Veterinary Medicine (WCVN). Until 2019, the graduate certificate program will be supported administratively by the CREATE ITraP program and thereafter by the office of the Dean. From its launch, the undergraduate certificate program will be supported administratively by the office of the Dean, WCVN (see attached Letters of Support). As at present, participating faculty will contribute to teaching as part of their departmental/college assignment of duties. Assessments conducted by the

university Library, ICT services, and Facilities Management Division, conclude that no new university resources will be required to offer these programs.

By the academic year 2019/20, the undergraduate Certificate Program is projected to enroll 20 students per year, while the graduate program is projected to enroll 25 per year. At the estimated tuition rate of \$195.50 per credit unit and \$201.00 per credit unit for the undergraduate and graduate programs (Institutional Planning and Assessment), the tuition per student will be \$2412.00 and \$1155.00 for the two programs, respectively. By 2019/20, total tuition revenue of \$48,240.00 and \$28,875.00 will derive from the undergraduate and graduate programs, respectively.

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10 September 2014

Dr. Lisa Kalynchuk  
Chair, Planning and Priorities Committee  
University Council  
University of Saskatchewan

**RE: Graduate and Undergraduate Certificate Programs in One Health**

Dear Dr. Kalynchuk:

The proposed graduate and undergraduate Certificate Programs in One Health will provide outstanding training opportunities for students at the University of Saskatchewan. They will meaningfully advance the priority that the university, the Council of Health Science Deans and the Western College of Veterinary Medicine have given to interprofessional education and practice. These proposals were developed with broad, multi-college faculty input and support.

The Western College of Veterinary Medicine will be pleased to serve as the academic home for the proposed graduate and undergraduate Certificate Programs, and will provide the necessary administrative support to manage the programs effectively.

Please feel free to contact me with any comments or additional questions.

Sincerely,



Douglas A. Freeman DVM, PhD  
Dean

September 11, 2014

Dr. Lisa Kalynchuk  
Chair, Planning and Priorities Committee  
University Council  
University of Saskatchewan

**RE: Graduate Certificate Program in One Health**

Dear Dr. Kalynchuk,

I have been pleased to lead the NSERC-funded Collaborative Research and Training Experience (CRE-ATE) program called Integrated Training Program (ITraP) in Infectious Disease, Food Safety and Public Policy since it was launched at the University of Saskatchewan in 2012. We have been highly successful in attracting and training outstanding graduate students in this interdisciplinary team science program in One Health. Each year, we have carefully evaluated our experience and incorporated student and faculty feedback into our approach to teaching and learning in the program.

The ITraP program faculty are now in a position to propose the establishment of a graduate Certificate Program in One Health built on this foundation. As part of its commitment, the ITraP program will be pleased to provide the necessary administrative support for the new program for the duration of the ITraP program funding period (2012-2018), following which I understand the Western College of Veterinary Medicine has offered to provide this support.

We look forward to the success of this new endeavor!

Thank you.

Yours sincerely,

*Baljit Singh*

Baljit Singh, BVSc&AH, MVSc, PhD, FAAA  
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Professor and Associate Dean (Research)  
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