Calendar Copy:

An introduction to curriculum and pedagogy in science with particular focus on pedagogical practice and Ontario secondary school science curricula. Theoretical perspectives including the nature of science, cognitive, behavioural, and social theories of science learning, and adolescent development are examined. Significant attention is paid to environmental and sustainability education. Four hours per week, 1.0 credit

Course Description:

This course is provided for IS teacher candidates in General Science. The course explores a number of topics, materials and teaching strategies which will extend candidates’ knowledge and skills for the teaching of science. Three major areas of focus are addressed:

- Theoretical perspectives in science teaching.
- Constructivist, cognitive, behavioural and social theories of science learning.
- An introduction to curriculum and pedagogy in science which includes examination of the Ontario secondary science curricula.
Learning Outcomes:

On completion of this course, teacher candidates will:

- demonstrate their growing understanding of the **Ontario College of Teachers’ Standards of Practice** (Professional Knowledge, Professional Practice, Leadership in Learning Communities and Ongoing Professional Learning) and **Ethical Standards** (Care, Respect, Trust, and Integrity) by conducting themselves as an educator both in the faculty and on placement.
- participate actively in classroom management scenarios to become familiar with the expectations of student behaviour and appropriate student engagement in classroom participation as modelled by the instructor.
- be advised of the expectations when on their practicum (ex: appropriate attire, behaviour, teacher-student role, teaching students).
- appreciate the constructivist, cognitive and behavioural research theories which inform the learning and teaching of science.
- identify the characteristics of a good lesson plan.
- combine pedagogical content knowledge with chemistry content knowledge to produce a lesson plan which reflects current best practice in science teaching.
- Appreciate the intricate links between student outcomes, unit design, lesson sequencing, planning and delivery as well as assessment and evaluation.
- successfully apply the Ontario Ministry of Education Course guidelines (IS) General Science courses and the Growing Success document to create lesson plans and construct a unit guide for a specific strand.
- demonstrate knowledge and use of current assessment practices including assessment for, as and of learning.
- Articulate key differences between assessment and evaluation.
- Demonstrate an awareness of the ways in which literacy, numeracy and technology can be incorporated into science education.
- utilize a variety of teaching strategies (e.g. differentiated instruction, inquiry-based learning, PEOE, graphical organizers, think-pair-share, jigsaw, placemat) in lesson planning.
- incorporate technologies where appropriate in their lesson planning and presentation to their colleagues such as: overhead projector, SMART Board, electronic presentation, document camera, smart phones, videos, apps on tablets, in demonstrations to their colleagues and in incorporating these in lesson planning.
- recognize and incorporate in both their assignments and teaching opportunities strategies such as the constructivist approach to science education, multiple-intelligences, learning styles, application and implication of technology in education both in terms of positive aspects (e.g. research) and issues of negative (e.g. safety, computer use contract).
- conduct presentations that offer teaching strategies and planning ideas to their peer group in a professional manner and engage positively as an audience member during the sessions led by colleagues.
- Critically discuss issues such as gender, multiculturalism, ethics and special needs learners that currently inform science education.
- Appreciate and enforce the need for safe practices at all times in the science laboratory.
- Understand the importance of reflective practice on future growth and competence in the teaching profession.
**Course Content:**

Throughout the course students will be provided with opportunities to develop strategies which engage student learning; to become knowledgeable about the intermediate-senior science curriculum; to collaborate with colleagues in developing a program for the classroom; to experiment with various teaching styles and to grow professionally as an educator.

Specific topics for the course will be chosen from the following list:

- Nature of Science
- Learning in Science/ Learning theories
- Secondary school learners
- Teaching strategies
- Lesson planning and unit planning
- Classroom management
- Assessment and evaluation
- Science and the laboratory
- Reflective teaching and professional practice
- Science curricula and subject material
- Scientific literacy and numeracy
- Inquiry based learning
- Gender issues in Science
- Differentiated instruction and assessment
- Cooperative learning
- Teaching controversial issues

**Course Materials:**

Access to:

- The Ontario Curriculum, Grades 9 and 10: Science, 2008 (revised)
- The Ontario Curriculum, Grades 11 and 12: Science, 2008 (revised)
- Growing Success

Recommended Reference:

- Tips & Strategies for the Novice Science Teacher (STAO)
- Stay Safe! (2002) (STAO)
- Laboratory Recipes (2001) (STAO)
Assignments and Other Course Requirements:

Students are expected to be present and to participate positively in ALL class sessions and inform the instructor by email prior to a class if they can not be present due to exceptional and/or unavoidable circumstances. Students are also required to complete all assignments on schedule unless arrangements have been made with the instructor in advance of the due date. A penalty of 5% per day will be automatically deducted for any assignment that is not submitted on time. Some assignments will be facilitated by your collection of materials throughout the year. I highly recommend that you keep, organize and store ALL the work you do in this course and in your practicum placements.

The following is an OVERVIEW of the assignments in this course. Detailed descriptions will be provided when each assignment is discussed in class.

A. UNIT OVERVIEW – Due September 27, 2017 5%

B. MICROTEACHING REFLECTION - Due October 4, 2017 10%
   Using the feedback you receive from your classmates and the guidelines provided in class, you will provide a written reflection of your microteaching lesson.

C. UNIT INTRODUCTION AND LESSON PLAN- Due October 18, 2017 15%
   Using your microteaching topic and class discussions as a guide you will develop a formal chemistry lesson plan.

D. STSE Science - Due October 25, 2017 10%
   The purpose of this assignment is to familiarize yourself with a current science-based issue and to provide you with valuable resource material that can be used in the classroom.

E. INTERACTIVE LEARNING OBJECT – Due November 6, 2017 10%
   Working individually you will create an interactive teaching aid.

F. JOURNAL/BLOG - Due January 24, 2017 20%
   You are expected to keep a journal/blog that not only documents your experiences, feelings and activities, but also maps your reflections and learning throughout the course and year.

   The journal/blog will involve weekly entries to be submitted every Wednesday during first term.

   Your weekly journal/blog entries are worth 10%

   Once you have completed your entries you will re-read your journal and choose one issue to focus on. You will create a product (e.g., essay) supported by the research literature.

   This portion of the assignment is worth 10%

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G. **KICA Workbooks - Due as scheduled February 2014**  

For this assignment you will work in groups. Workbooks will be based on the Grade 9 and 10 Science units.

H. **Classroom Contribution**  


**Policy Statements:**

**Accessibility:** The University of Western Ontario is committed to recognizing the dignity and independence of all students and seeks to ensure that persons with disabilities have genuine, open and unhindered access to academic services. Please contact the course instructor if you require course materials in an alternative format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for information about requesting academic accommodation, or go to the following website: [http://www.edu.uwo.ca/programs/preservice-education/documents/policies/Accessibility_Western.pdf](http://www.edu.uwo.ca/programs/preservice-education/documents/policies/Accessibility_Western.pdf)

**ATTENDANCE:** The B.Ed. program is an intense and demanding program of professional preparation. You are expected to demonstrate high levels of both academic and professional integrity. Such integrity is demonstrated in part by your commitment to and attendance at all classes, workshops, tutorials, and practicum activities. Read more about the Faculty’s attendance policy on-line: [http://www.edu.uwo.ca/programs/preservice-education/Attendance%20Policy%202016.pdf](http://www.edu.uwo.ca/programs/preservice-education/Attendance%20Policy%202016.pdf)

**EXCUSED ABSENCES:** If you are ill, require compassionate leave, or must miss classes for religious observance, your absence is excused; you will not be penalized but you are responsible for work missed.

**UNEXCUSED ABSENCES:** Any absence that is not a result of illness, bereavement, or religious observance is an *unexcused* absence. Three unexcused absences will result in you being referred to the Associate Dean and placed on academic probation. Any further unexcused absence will result in failure of the course and withdrawal from the program.

**Language Proficiency:** In accordance with regulations established by the Senate of the University, you must demonstrate the ability to write clearly and correctly. Work which lacks proficiency in the language of instruction is unacceptable for academic credit, and will either be failed or, at the discretion of the instructor, returned to you for revision to an acceptable level.

**Late Penalties:** Normally, the only acceptable reasons for late or missed assignments are illness (which you must report to the Teacher Education Office) or extreme compassionate circumstances. Unexcused late assignments will be penalized at a rate of 5% per day day, and will not be accepted more than 7 days after the due date unless prior arrangements have been made with the instructor.

**Academic Offences:** Scholastic offences are taken *very seriously* in this professional Faculty. You are, after all, going to be a teacher. Read about what constitutes a Scholastic Offence at the following Web site: [http://www.edu.uwo.ca/programs/preservice-education/documents/policies/WEB_ScholasticDiscipline.pdf](http://www.edu.uwo.ca/programs/preservice-education/documents/policies/WEB_ScholasticDiscipline.pdf)

**Plagiarism:** Plagiarism means presenting someone else’s *words* or *ideas* as your own. The concept applies to all assignments, including lesson and unit plans, laboratory reports, diagrams, and computer projects. For further information, consult your instructors, the Associate Dean’s Office, and current style manuals. *Advice about plagiarism and how to avoid it can also be found here:* [http://www.edu.uwo.ca/programs/preservice-education/documents/policies/WEB_PlagiarismPolicy.pdf](http://www.edu.uwo.ca/programs/preservice-education/documents/policies/WEB_PlagiarismPolicy.pdf)

**Plagiarism-Checking:**

1. All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com ([http://www.turnitin.com](http://www.turnitin.com)) and [j10] and [j11]
b. Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Use of Laptops & Notebooks in Class: As a courtesy to members of the class, please put your cell phone on ‘vibrate’ or turn it off during class. Laptops and other electronic devices may be used in a professional manner to facilitate your activities in the course, but out of courtesy to colleagues and the instructor, please do not engage in personal networking and non-course communication during class time – save it for before or after class, or for the break.

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**SUPPORT SERVICES**

A variety of support services are available at Western.

If you need advice or assistance, do not hesitate to get in touch with any of these services.

**FINANCIAL ASSISTANCE:** Registrarial Services [http://www.registrar.uwo.ca](http://www.registrar.uwo.ca)

**WRITING SUPPORT:** Student Development Centre [http://www.sdc.uwo.ca/](http://www.sdc.uwo.ca/)

**LEARNING SKILLS SUPPORT:** Student Development Centre [http://www.sdc.uwo.ca/](http://www.sdc.uwo.ca/)

**INTERNATIONAL STUDENTS:** Student Development Centre [http://www.sdc.uwo.ca/](http://www.sdc.uwo.ca/)

**ABORIGINAL STUDENTS:** Student Development Centre [http://www.sdc.uwo.ca/](http://www.sdc.uwo.ca/)

**STUDENTS with DISABILITIES:** Student Development Centre [http://www.sdc.uwo.ca/](http://www.sdc.uwo.ca/)

**SOCIAL & CULTURAL ISSUES:** University Students’ Council [http://westernusc.ca/services/](http://westernusc.ca/services/).

**EMOTIONAL or MENTAL DISTRESS:** Students who are in emotional or mental distress should refer to Mental Health @ Western [http://www.uwo.ca/uwocom/mentalhealth/](http://www.uwo.ca/uwocom/mentalhealth/) for a complete list of options about how to obtain help.

**B.Ed./Dip.Ed. PROGRAM ISSUES:** zuber@uwo.ca, Teacher Education Office, room 1131

**NEED HELP but not sure what to do:** zuber@uwo.ca, Teacher Education Office, room 1131

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Resources:

**THERE IS NO TEXTBOOK FOR THIS COURSE.**
The following books are excellent resources:


Houtz, B. (2008). *Teaching science today.* Shell Education

Hume K. (2008) *Start Where They Are: Differentiating for Success with the Young Adolescent.* Toronto, ON: Pearson


Marcarelli, K. (2010). *Teaching science with interactive notebooks.* Corwin


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Additional readings will be required. Further details will be given on monthly course outlines to be handed out in class.

Students should also become familiar with the current Education Library holdings which are relevant to teaching science (e.g. journals such as Crucible, Science and Children, Science Scope and The Science Teacher) as well as books about teaching science and the available intermediate and senior science textbooks used in Ontario.