University of Windsor

Faculty of Science

COURSE TITLE: Theory and Practice of University Teaching and Learning in STEM	
Course Number (*)	SCIE 8000
Pre/Co-Requisites (*)	Admission to a Master's or PhD program in the Faculty of Science and consent of the instructor.
Lecture section	Requires a 3-hour block of time

Welcome to SCIE 8000 and the SAGES Program!

We are excited to work with you this year. Program SAGES (SoTL Advancing Graduate Education in STEM) is comprised of two main components:

1. A semester-long course (SCIE 8000) to introduce you to the principles and practices of university teaching and learning in a STEM context. This course will encourage collaborative learning and self-reflection to challenge your previous ideas about teaching. You will also be given opportunities to practice and receive feedback on evidence-based STEM teaching. In the capstone component of the course, you will put what you have learned into practice by developing specific plans for a research project that you will complete in the one-term practicum described below.
2. A practicum, where you will work in a teaching partnership with a faculty mentor in your field of study, providing you with an authentic opportunity to foster your evidence-based teaching practice. Within this partnership, you and your faculty mentor will develop and teach a course or course component together, valuing one another's experience. You will be coached and supported as you work with your mentor to develop, implement and assess a new component of an undergraduate course normally taught by your mentor. At the end of the practicum, you will prepare and present a poster at the annual SAGES Program Celebration of Teaching and Learning in June 2022.

SCIE 8000 Teaching Team	
Course coordinator and instructor	Isabelle Barrette-Ng, PhD Isabelle.barrette-ng@uwindsor.ca
Instructor's office hours and office locations	Please refer to Blackboard site for details.

OVERVIEW OF THE COURSE

In this course, we will work together to explore and critically evaluate educational theory and practice relating to university teaching and learning in STEM (science, technology, engineering and mathematics). You will be asked to critically evaluate your teaching beliefs and broaden your knowledge and skills by participating in classroom discussions and microteaching opportunities.

LEARNING RESOURCES

There are no required textbooks for this course.

All required readings will be made available through the learning management system for this course (Blackboard).

Technology Requirements:

- **Blackboard:** A shell in blackboard is set up for this course where workshop materials, as well as all assignments, will be posted. A laptop, desktop, or mobile device is required for Blackboard access.

COURSE LEARNING OUTCOMES

At the end of this course, you will be able to:

1. identify and describe the key elements essential for effective, evidence-informed teaching and learning;
2. find, evaluate and apply current research in the scholarship of teaching and learning to university teaching and learning in STEM;
3. practice and develop a broad range of teaching skills;
4. provide constructive peer feedback on teaching and learning practices, both in written and oral formats;
5. incorporate constructive peer feedback on teaching and learning practices, both in written and oral formats;
6. formulate a statement of teaching philosophy that reflects essential values and beliefs about teaching and learning; and
7. design a lesson informed by current educational approaches for a course in your discipline.

METHOD OF INSTRUCTION

To enhance your learning experience in this course, each session has been designed to follow a seminar format. Each session will examine a specific topic in a highly interactive manner, with time for hands-on work so that we can support you in the development of an evidence-based teaching practice.

To make the most of this course, your participation is critical. If you anticipate missing more than 1 session, please speak with the Program Director in advance.

ASSESSMENT COMPONENTS

In determining your overall grade in the course, the following weights will be used:

Component	Description/dates	Weight	Aligned Course Learning Outcome
Learner-led assigned workshop	Over the course of the semester, you will be asked to prepare and lead a 60-min workshop during one of the class sessions in collaboration with one of your peers. The workshop you will prepare and lead will be based on one or more assigned readings. To prepare for your workshop, you will be expected to meet with the instructor 2-3 weeks prior to the workshop. You will be asked to select your peer and topic during the first week of class. Learner-led workshops will be held on the following dates during the Fall 2021 semester: week of October 18, week of October 25, week of November 1, week of November 8, week of November 15, and week of November 29.	25%	1, 2, 3, 4, 5, 7
Teaching philosophy statement	You will be asked to develop and draft a teaching philosophy statement following the session during the week of November 15. A teaching philosophy statement consists of a description of your beliefs and views about teaching and learning. It also includes examples that illustrate how you place these beliefs and views into practice. A teaching philosophy statement often forms part of a teaching portfolio, which is usually required in applications for faculty positions. The first draft of your teaching philosophy will be due by 9 PM on Wednesday December 8.	30%	1, 2, 5, 6
Written reflections	Building a reflective practice is important for giving your teaching practice meaning, direction and purpose. To help you develop a reflective teaching practice, you will be asked to attend and participate in a workshop on this topic during the week of September 27. Following that session, you will be asked to complete four 200-word written reflections on course readings throughout the semester.	20%	1, 2, 5

	These four written reflections will be due on the following dates: October 6, October 27, November 10 and December 8. Each must be submitted through our Blackboard course website.		
SoTL literature assignment	To help you build an evidence-based teaching practice, you will be introduced to peer-reviewed literature on teaching and learning during a workshop in the week of September 20. Following this session, you will be asked to complete a short assignment that will provide you with practice accessing and analysing peer-reviewed SoTL literature.	5%	2
Microteaching session	You will be asked to prepare and deliver a 10-minute mini-lesson which uses an active learning strategy in the final week of the semester. Further details on topic selection and format will be provided to you later in the semester. Following your mini-lesson, you will receive both written and verbal feedback from your peers. Further details on the process of giving and receiving feedback will be made available later this semester.	10%	3, 4, 5, 7
Course and faculty mentor selection	Completion of the SAGES Program depends on the completion of a practicum experience, where you get the opportunity to work with a faculty mentor to design and deliver a unit in a course in your discipline. To help you frame your project as well as begin to establish a solid mentor-mentee relationship, you will be asked to record your selection of faculty mentor and course by November 24 with the Program Director. Mentor and course selection will be discussed in further detail later this semester.	10%	2, 3, 7

ASSESSMENT AND EVALUATION INFORMATION

CALCULATION OF YOUR FINAL GRADE AND CONVERSION TO LETTER GRADE:

The calculation of final grades will follow Senate Bylaw 55, 1.1.1, 1.2, 1.1.6, and the Senate Policy on Grading and Calculation of Averages.

HUMAN STUDIES:

If you agree, your course work may be used for research purposes. Your responses will remain anonymous and confidential. Grouped data (no individual responses) may be used in academic presentations and publications. Participation in such research is voluntary and will not influence grades in this course. Students' signed consent forms will be withheld from instructors until after final grades are submitted. More information will be provided at the time student participation is requested.

MISSED COMPONENTS OF TERM WORK:

In the event that you must miss any course work due to illness, the Faculty of Science policies that are consistent with bylaw 55, 1.1.1, and 1.11 will be followed. Alternate evaluations will be of the same format and difficulty as the original course component.

INTERNET AND ELECTRONIC COMMUNICATION DEVICE INFORMATION

The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. Please refrain from accessing websites that may be distracting for fellow learners (e.g. personal emails, Facebook, YouTube).

UNIVERSITY OF WINDSOR POLICIES AND SUPPORTS

FINANCIAL DROP DATE
The full tuition refund drop date is October 6, 2021.

ACADEMIC ACCOMMODATION
Students with disabilities who require academic accommodations in this course must contact an Advisor in Student Disability Services (SDS) to complete SDS Registration and receive the necessary Letters of Accommodation. After registering with Student Disability Services, you must present your Letter of Accommodation and discuss your needs with me as early in the term as possible. Please note that deadlines for the submission of documentation and completed forms to Student Disability Services are available on their website: /disability.

MISCONDUCT
Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. Plagiarism is defined in the Student Code of Conduct as:

"the act of copying, reproducing or paraphrasing significant portions of one's own work, or someone else's published or unpublished material (from any source, including the internet), without proper acknowledgment, representing these as new or as one's own. Plagiarism applies to all intellectual endeavours: creation and presentation of music, drawings, designs, dance, photography and other artistic and technical works. (Students have the responsibility to learn and use the conventions of documentation as accepted in their area of study and instructors have the responsibility of informing students in writing of any significant individual interpretations of plagiarism)."

INSTRUCTOR INTELLECTUAL PROPERTY
Course materials created by professor(s) (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the professor(s). These materials may NOT be reproduced, redistributed or copied without the explicit consent of the professor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY

This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Please identify yourself on all written work by placing your name on the front page and your ID number on each subsequent page. For more information, see Legal Services website.

MENTAL HEALTH

Feeling overwhelmed?

From time to time, students face obstacles that can affect academic performance. If you experience difficulties and need help, it is important to reach out to someone.

For help addressing mental or physical health concerns on campus, contact (519) 253-3000:

- Student Health Services at ext. 7002 (http://www.uwindsor.ca/studenthealthservices/)
- Student Counselling Centre at ext. 4616 (http://www.uwindsor.ca/studentcounselling/)
- Peer Support Centre at ext. 4551

24-hour support is available

My Student Support Program (MySSP) is an immediate and fully confidential 24/7 mental health support that can be accessed for free through chat, online, and telephone. This service is available to all University of Windsor students and offered in over 30 languages. Call: 1-844-451-9700, visit https://keepmesafe.myissp.com/ or download the My SSP app: Apple App Store/Google Play.

A full list of on- and off-campus resources is available at http://www.uwindsor.ca/wellness.

Should you need to request alternative accommodation contact your instructor, head or associate dean.

SURVEYS

At the University of Windsor, feedback through the Student Evaluation of Teaching (SET) forms provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys. It will be administered within the last two weeks of the course.

Week of	Topic and assigned readings	Learner-led workshop
September 13	**Welcome to SAGES and SCIE 8000!** Introduction to teaching and learning in higher education in STEM **Assigned readings:** None	N/A
September 20	**Current research on student learning in STEM** **Assigned readings:** • Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008). Learning styles: Concepts and evidence. *Psychological Science in the Public Interest, 9*(3), 105-119. • pp. 7-19 in Benassi, V.A., Overson, C.E., & Hakala, C.M. (2014). *Applying science of learning in education: Infusing psychological science into the curriculum*. Retrieved from the Society for the Teaching of Psychology web site: http://teachpsych.org/ebooks/asle2014/index.php	N/A
SoTL literature assignment due by 11:59 PM on Wednesday September 29		
September 27	**The habits of the reflective practitioner** **Assigned readings:** • Chapter 3 and 4 of Brookfield, S.D. (1995). *Becoming a critically reflective teacher*. San Francisco, CA: Jossey-Bass. • Edwards, L. (2013, October 3). *Self-regulated* learning [Video]. YouTube https://www.youtube.com/watch?v=3OQsT7w6MBM • Qutub, B.N. (2014, July 26). *Self-regulated learning strategies* [Video]. YouTube https://www.youtube.com/watch?v=3YIWd8Hx26A • SAGE 2YC (n.d.). *What is self-regulated learning?*. URL https://serc.carleton.edu/sage2yc/self_regulated/what.html • Pintrich, P.R. (1995). Understanding self-regulated learning. *New Directions for Teaching and Learning*, *63*, 3-12.	N/A
Written reflection #1 due by 11:59 PM on Wednesday October 6		
October 4	**Course design (constructive alignment, writing learning outcomes, planning student assessments and learning activities)** **Assigned readings:** • Blumberg, P. (2009). Maximizing learning through course alignment and experience with different types of knowledge. *Innovations in Higher Education*, *34*, 93-103. • McAlpine, L. (2004). Designing learning as well as teaching. *Active Learning in Higher Education, 5*(2), 119-134.	N/A
October 11	**READING WEEK**	

October 18	**Teaching problem solving** **Assigned readings:** • Chapter 2 from National Research Council (2000). *How people learn: Brain, mind, experience, and school (expanded edition)*. Washington, DC: The National Academies Press. • Jonassen, D.H. (2000). Toward a design theory of problem solving. *Development, 48*, 63-85. • Gassmann, O., & Zeschky, M. (2008). Opening up the solution space: The role of analogical thinking for breakthrough product innovation. *Creativity and Innovation Management, 17*(2), 97-106.	Yes
Written reflection #2 due by 11:59 PM on Wednesday October 27		
October 25	**Developing effective approaches for assessment** **Assigned readings:** • Dickson, K.L., & Treml, M.M. (2013). Using assessment and SoTL to enhance student learning. *New Directions for Teaching and Learning, 136*, 7-16. • Carless, D., & Boud, D. (2018). The development of student feedback literacy: Enabling uptake of feedback. *Assessment & Evaluation in Higher Education, 43*(8), 1315-1325. • Nicol, D.J., & Macfarlane-Dick, D. (2007). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studied in Higher Education, 31*(2), 199-218.	Yes
November 1	**Engaging and interacting with learners** **Assigned readings:** • Chapters 3 and 6 of Ambrose, S.A., Bridges, M.W., DiPietro, M., Lovett, M.C., Norman, M.K., & Mayer, R.E. (2010). *How Learning Works: Seven Research-Based Principles for Smart Teaching*. San Francisco, CA: Jossey-Bass.	Yes
Written reflection #3 due by 11:59 PM on Wednesday November 10		
November 8	**Specific teaching methods (active learning, problem-based learning, team-based learning, case-based learning)** **Assigned readings:** • Shulman, L.S. (2005). Signature pedagogies in the professions. *Daedelus, 134*(3), 52-59.	Yes
November 15	**Writing a teaching philosophy statement and preparing a teaching portfolio** **Assigned readings:** • Kearns, K.D., & Sullivan, C.S. (2011). Resources and practices to help graduate students and postdoctoral fellows write	Yes

	statements of teaching philosophy. *Advances in Physiology Education, 35*(2), 136-145. • Schussler, E., Torres, L.E., Rybczynski, S., Gerald, G.W., Monroe, E., Sarkar, P., Shahi, D., & Osman, M.A. (2008). Transforming the teaching of science graduate students through reflection. *Journal of College Science Teaching, September/October*, 32-36.	
November 22	**Assessing the effectiveness of different teaching approaches** **Assigned readings:** • Berk, R.A. (2005). Survey of 12 strategies to measure teaching effectiveness. *International Journal of Teaching and Learning in Higher Education, 17*(1), 48-62.	N/A
Practicum course and mentor selection due by 11:59 PM on Wednesday November 24		
November 29	**Effective use of technology for teaching** **Assigned readings:** • EDUCAUSE Horizon Report (2019 Higher Education Education). URL https://library.educause.edu/-/media/files/library/2019/4/2019horizonreport.pdf	Yes
December 6	**Microteaching session**	N/A
Written reflection #4 due by 11:59 PM on Wednesday December 8		
Teaching philosophy statement due by 11:59 PM on Wednesday December 8		