SCED 491: Methods in Secondary Education for Science Teachers (5 credits)
Spring Term CRN 20745
Meet at SMATE Learning Resource Center (LRC) Second floor

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SMATE LRC cubicle by copier and By Appt.

PREREQUISITES: Admission to the secondary teaching program; a major or concentration in natural sciences; SEC 431 or 532; SCED 481. Fingerprint clearance.

Covid Compliance: I believe that you are all Covid compliant and willing to follow University and School protocols for vaccination and masking. I think most of you have been approved as Volunteers for Bellingham School District (BSD) linked here. They require ID and proof of vaccination. I will ask that you retrieve the BSD approval email and print or email to me by the end of the first week of class so that I have physical evidence when we enter schools in case we are ever asked. If you have a variance, please let me know.

Catalog Course Description
Catalog: Study of literature, curriculum and teaching strategies in life, earth and physical sciences for grades 4-12, plus peer teaching and school observations.

Syllabi Policies for Students
In this course, we will follow the syllabi policies for academic honesty, reasonable accommodation (disability resources and religious), ethical conduct with network and computer resources, equal opportunity, finals, medical excuse and student conduct code.

Course Calendar Tentative Course Calendar

Friday Field Trips and Guest Speakers Field trip and speaker calendar

Course Readings
Ambitious Science Teaching (2019), Windschitl, Thompson, Bratten - available in the bookstore. Additional relevant readings will be linked on Canvas.

Course Objectives
Throughout this course, you will engage in experiences that facilitate learning and growth towards the following learning targets and will be asked to evidence that depicts your learning and growth in these areas expressed here as success criteria:
1. I can employ the principles of differentiated instruction to make instructional planning decisions that ensure effective learning for all individuals in my classes.
2. I can design instructional units using learning progressions and lesson plans
3. I can use an inquiry approach in my Middle School and High School science class.
4. I can apply principles of assessment for learning in a science class.

5. I can plan to evaluate various types of student-based information to make short and long term instructional decisions.
6. I can integrate sustainability, climate science and art in my Middle School and High School science class.
7. I can plan a safe, productive justice-oriented and equitable learning environment for all of my students.

NEXT GENERATION SCIENCE STANDARDS
We will be working with the **Next Generation Science Standards** in this class. You can access these online from the NGSS. Consider downloading the NGSS App on devices.

Alignment with InTASC Model Core Teaching Standards:

Teacher candidates enrolled in SCED 491will collect evidence of their *own growth and learning* (candidate-based learning) <u>as well as,</u> your own *impact on K-12 students' growth and learning* (student-based evidence) in relation to the Interstate Teacher Assessment and Support Consortium (InTASC) Model Core Teaching Standards and Teaching for Justice's Social Justice Standards and Anti-Bias Framework. Just as you have done in your methods courses, evidence will be based on your practicum placement, notebook entries, lesson plans, self-assessments, narratives and peer/instructor feedback.

Here are the 10 InTASC standards aligned for this course color coded to:
performances, essential knowledge and critical dispositions

Standard #1: Learner Development	1(b) The teacher creates developmentally appropriate instruction that takes into account individual learners' strengths, interests, and needs and that enables each learner to advance and accelerate his/her learning.	Rating: Midterm Final

Standard #2: Learning Differences	1(2(d) The teacher brings multiple perspectives to the discussion of content, including attention to learners' personal, family, and community experiences and cultural norms.	Rating: Midterm Final

Standard #3: Learning Environment	3(j) The teacher knows how to help learners work productively and cooperatively with each other to achieve learning goals.	Rating: Midterm Final

Standard #4: Content Knowledge	4(d) The teacher stimulates learner reflection on prior content knowledge, links new concepts to familiar concepts, and makes connections to learners' experiences.	Rating: Midterm Final

Standard #5: Application of Content	5(b) The teacher engages learners in applying content knowledge to real world problems through the lens of interdisciplinary themes (e.g., financial literacy, environmental literacy).	Rating: Midterm Final

Standard #6: Assessment	6(t) The teacher is committed to using multiple types of assessment processes to support, verify, and document learning.	Rating: Midterm Final

Standard #7: Planning for Instruction	7(g) The teacher understands content and content standards and how these are organized in the curriculum.	Rating: Midterm Final

Standard #8: Instructional Strategies	8(n) The teacher knows how to use a wide variety of resources, including human and technological, to engage students in learning.	Rating: Midterm Final

Standard #9: Professional Learning and Ethical Practice	9(m) The teacher is committed to deepening understanding of his/her own frames of reference (e.g., culture, gender, language, abilities, ways of knowing), the potential biases in these frames, and their impact on expectations for and relationships with learners and their families.	Rating: Midterm Final

Standard #10: Leadership and Collaboration	10(l) The teacher understands schools as organizations within a historical, cultural, political, and social context and knows how to work with others across the system to support learners.	Rating: Midterm Final

In addition, you will collect evidence from coursework and practica of your ability to address a personalized selection of four standards based on *identity, diversity, justice and action* from the [Social Justice Standards and Anti-Bias Framework](). You will choose a standard from the gradebands 6-8 or 9-12.

Identity	Place you standard here	Rating: Midterm Final

Diversity	Place you standard here	Rating: Midterm Final

Justice	Place you standard here	Rating: Midterm Final

Action	Place you standard here	Rating: Midterm Final

Assignments / Evidence of Learning and Growth Over Time

The following eight assignments/assessments will be used as a means of looking at your learning and growth in relation to the Course Learning Targets and Standards above and will be assessed using the SCED 491 Assessments and rubrics aligned with the specific assignments. You will be receiving formative feedback as we work together and all work will be self, peer, and faculty assessed.

Educators need to have three kinds of knowledge to function effectively in the classroom:

- Content knowledge—an understanding of the subject area to be taught. You are getting this through your academic major.
- Pedagogical knowledge—an understanding of how people learn and how to teach. We will work on this in SCED 481 and 491, but you have been covering this in your classes in Woodring.
- Pedagogical content knowledge—the major point to this course. What are the specific issues that are unique to teaching science? How is teaching science different from teaching art or social studies? You have already begun thinking about this in SCED 481.

To demonstrate your preparation in all these areas you will need to collect evidence of your ability to plan lessons, implement at least portions of a lesson or demo, and be reflective about your own practice. You will have the opportunity to demonstrate these skills through a variety of major assignments.

ASSIGNMENTS
1) <u>Reading Discussions</u> (linked in Discussions and syllabus) Read the assigned chapter/article/module. As you read, please respond to the prompt written in the COURSE AGENDA or the assigned protocol to prepare for class discussion, and also jot down any additional responses/questions/and ideas. You will want to draw meaningful connections between what you are reading and your own teaching and learning experiences. Consider the Course Learning Objectives as your aim in developing into a competent and reflective beginning teacher.
2) <u>Science Autobiography</u> A science autobiography is an essay in which you describe your personal experiences with science, in or out of school, and then use your own experiences to define the kind of science teacher you hope to become.
3) <u>Semester or Year Plan</u> One of your first tasks will be to create a semester or year-long plan (also called scope and sequence) based on your disciplinary standards (NGSS).*Consider interviewing your practicum teacher and getting a copy of their planning documents.*How much can you fit in a year or semester?
4) <u>Learning Progression</u> You will create a Learning Progression based on one of your big ideas from your year-long plan.

5) Learning Segment - Three Lesson Plans
A major outcome of this course will be the development and presentation of a set of cohesive lessons that include all of the fundamental components for effective science teaching.

6) Classroom Demonstration
Every student in the class will be required to set up and perform a science demonstration to the rest of the class sometime during the quarter.

7) Laboratory Safety Course for Science
You will enroll in one of the Flynn Safety Courses and earn a Certificate of Completion. Flynn Scientific offers free safety training courses for high school and middle school.

8) Practice Teaching Self-Evaluation - InTASC Standards, Social Justice Standards and Narrative

There are three sections:

1. **You** will self-evaluate your teaching and learning (e.g., practicum, demo, service learning, guided teach, subbing, reading discussions and class assignments) using the Interstate Teacher Assessment and Support Consortium (InTASC) Model Core Teaching Standards that outline what teachers should know and be able to do to ensure every K-12 student reaches the goal of being ready to enter college or the workforce in today's world. These standards outline the common principles and foundations of teaching practice that cut across all subject areas and grade levels and that are necessary to improve student achievement.
2. **You** will also utilize Teaching Tolerance's Social Justice Standards and Anti-Bias Framework to build your own self assessment tool. Divided into four domains—identity, diversity, justice and action (IDJA)—the Standards recognize that, in today's diverse classrooms, students need knowledge and skills related to both prejudice reduction and collective action.
3. **You** will also write a short 2-3 page reflective narrative for the final.

Assessment & Grading
SCED 491 is the last science methods course in your program before you enter your internship. Assessment of your growth and learning this term will be accomplished together as teacher-candidate (you) and your professor and evaluated by rubrics tied to your assignments. You will be collecting evidence (candidate-based) throughout the quarter to support your rating.

In his book *Grading For Equity*, Feldman (2019) defines grading for equity using three pillars: equitable grading is accurate, bias-resistant, and motivational. Linking theory and practice, Feldman provides a practical guide using research-informed examples to convince readers that commonly used assessment practices are ineffective and should be replaced with equitable grading practices to improve learning for all students, particularly those who are underserved or vulnerable. In this course, we will apply the following principles to our grading practices:

● **Apply mathematically sound approaches**, using a 0-4 instead of a 0-100 point scale; avoid giving students scores of zero; and weigh more recent performance and growth instead of averaging performance over time.

- **Value knowledge, not environment or behavior**. They reflect what students know and can do, not how teachers perceive or interpret their behavior. Grades are not used to reward compliance.
- **Support hope and a growth mindset**, encouraging mistakes as necessary for learning and building students' persistence. Teachers allow test or project retakes and replace previous scores with current scores.
- **Make grades simpler to understand and more transparent**. Teachers create detailed rubrics to evaluate student performance and use simplified grade calculations and standards-based scales and grade books.
- **Build soft skills without including them in the grade**, supporting students' intrinsic motivation to learn rather than relying on an external system where every action is worth "points."

As Joe Feldman writes, "Grading practices are a mirror not just for students, but for us as their teachers." Each one of us should start by asking, "What do my grading practices say about who I am and what I believe?"

OVERALL COURSE GRADE (HOLISTIC based on learning objectives and rubrics for all assignments).
What is the best fit?

Rating		Descriptor
Proficient	**A (4)**	Meets or Exceeds Standard, most, if not all rubric scores fall within the *Proficient (4) and Developing (3)* level; the teacher candidate is able to provide multiple forms of evidence for each standard.
Developing	**B (3)**	Meets or Exceeds Standard, most rubric scores fall within the *Developing (3) and Unsatisfactory (2)* range; the teacher candidate is able to provide at least one form of evidence for each standard.
Unsatisfactory	**C (2)**	Approaching Standard, most rubric scores fall in *Unsatisfactory* (2) and a few fall in *Little Evidence (1)* range; the teacher candidate provides scattered or inconsistent evidence for some of the standards.
Little evidence	**D (1)**	Candidate provides minimal evidence toward Standard, most, if not all rubric scores fall in *Little Evidence* (1) range or work is incomplete; the teacher candidate's evidence is fragmented and minimal.
No Evidence	**F (0)**	Candidate is unable to provide evidence of reaching toward Standard, most, if not all rubric scores fall in No Evidence (0) range; the teacher candidate unable to show evidence.