Syllabus
TTE 523 Curriculum Issues and Practices in Science

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Office hours: Thursday before and after class. Other times by appointment.
Class Location - Tucson: Flowing Wells High School Rm. 52 or Education 102 on selected dates (8/25, 9/15, 10/6, 10/20, 11/17).
Day and Time
> **Tucson:** Thursday 1:15 – 3:45 PM
> **Chandler:** Weekly online modules with synchronous, face-to face meetings via the Zoom meeting app 1:15 – 3:45 on 8/25, 9/15, 10/6, 10/20, 11/17.

Course Description

Current issues in science education and their application to classroom instructional practices and procedures. Topics based upon recent concerns and developments. Students will study and implement effective, research-based science instruction in conjunction with their site-based internship. Students will come away from the course with skills and dispositions necessary to meet some of the national standards set for teachers:

- The InTASC Standards:
  http://www.ccsso.org/Documents/2011/InTASC_Model_Core_Teaching_Standards_2011.pdf
- The ISTE NETS-T Standards:
  http://www.iste.org/Libraries/PDFs/NETST_Standards.sflb.ashx
- The University of Arizona Teacher Preparation Programs Professional Standards (UA TPP Professional Standards):
  http://www.coe.arizona.edu/professional_standards

<u>**Course Objectives**</u>

The learner will be able to:	Standard
Assess student prior knowledge, identify student misconceptions and build upon individual *funds of knowledge*.	InTASC Standards: 1a, 1b, 1d, 1e, 1f; 2c, 2d, 2j, 2m; 4d, 4e, 4k, 4m, 4o
Design standards-based lessons and units that provide students opportunities for authentic scientific inquiry through the integration of science content.	InTASC Standards: 1d; 3b; 4a, 4f; 5a, 5i, 5m, 5s; 7a, 7b, 7c, 7d, 7e, 7g, 7i, 7k, ;
Use a variety of formative and summative assessment strategies when planning and delivering instruction.	InTASC Standards: 6a, 6c, 6g; 7d
Ask effective questions, provide clear instructions and communicate content at a level students can comprehend.	InTASC Standards: 1a, 1d, 1f; 5d, 5e, 5f, 5g; 8b, 8f, 8i
Respect the diverse cultural backgrounds and values held by students when teaching topics some may view as controversial.	InTASC Standards: 2d; 3a,3c, 3f; 4b; 5g
Identify and use technology resources to maximize student learning and to differentiate instruction.	InTASC Standards: 2a, 2f; 3g; 4g; 5c; 6i; 8g ISTE.NETS-T Standards: 1a; 2a, 2b, 2c; 3b, 3d; 4a, 4b, 4c
Implement lessons that maximize active participation and allow students of all abilities and backgrounds to take an active role in their own learning.	InTASC Standards: 1b; 2a, 2e; 3h; 4b, 4h; 5a, 5c; 8a, 8b, 8d, 8g, 8h, 8i
Analyze and reflect upon his or her instruction using video or other digital media.	InTASC Standards: 9a, 9b, 9d, 9e, 9f ISTE. NETS-T Standards: 5c
Participate in online professional learning communities by engaging in meaningful dialog and sharing of best practices through ongoing online discussion forums	InTASC Standards: 9a, 9b, 9d, 9f; 10f, 10g ISTE. NETS-T Standards: 3a, 3b, 3c, 3d; 5a, 5c, 5d

Arizona College and Career Ready Standards

All methods courses in the Teach Arizona program require our pre-service teachers to create unit/lesson plans, instructional activities and assessments that align to the Arizona College and Career Ready Standards (modeled after the Common Core State Standards), as well as other relevant national, state, and district standards:

- The Common Core State Standards: http://www.corestandards.org/ or http://www.azed.gov/standards-practices/common-core-state-standards/
- Next Generation Science Standard (NGSS) http://www.nextgenscience.org/next-generation-science-standards
- Arizona Science Standard Articulated by Grade Level http://www.azed.gov/standards-practices/academic-standards/science-standard/

Classroom and Course Expectations

1.   Please arrive on time.

2.   Food and drinks are allowed in the classroom. Take restroom breaks as needed.

3.   Turn off cell phone ringers and alerts prior to the start of class.

4.   Assignments turned in late may be subject to a reduction in grade unless prior arrangements have been made with the instructor.

5.   It is expected that all work will be professionally presented, including having been proofread for spelling and grammatical errors.

6.   Regular attendance in class is required. Beginning with the second unexcused absence and for each unexcused absence thereafter, the <u>course participation points will be reduced</u>. All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion. Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored.

7.   Students are expected to adhere to the Code of Academic Integrity which addresses issues such as: cheating, fabrication, facilitating academic dishonesty, and plagiarism. The Code of Academic Integrity can be found at: http://deanofstudents.arizona.edu/codeofacademicintegrity

8.   Students should be familiar with the UA Code of Conduct. The Dean of Students Office has developed information about policies, procedures, rights and responsibilities that are expected to be followed by students. The UA Code of Conduct can be found at: http://deanofstudents.arizona.edu/policiesandcodes.

9.   The College of Education joins in the University of Arizona's commitment to an environment free of discrimination, harassment and retaliation based on race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, or other protected characteristics. If you have questions or concerns about possible discrimination or harassment, please contact the University's Office of Institutional Equity, 520-621-9449, http://equity.arizona.edu.

10.   Accessibility and Accommodations: It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations. http://drc.arizona.edu/ Please be aware that the accessible table and chairs in the classroom should remain available for students who find that standard classroom seating is not usable.

Note: Information contained in this syllabus, with the exception of the attendance and grading policies, may be subject to change with reasonable advanced notice, as deemed appropriate by the instructor.

Department of Teaching, Learning and Sociocultural Studies Position Statement on Social Justice:

The members of the TLSS community are committed to providing equal opportunity and nurturing an academic climate dedicated to social justice.

Injustice takes many forms. Oppressive acts are sometimes overt, but most are subtle, and are difficult to document. These hidden forms of discrimination are identified in the literature as microaggressions, often resulting from unexamined attitudes and beliefs. Macroaggressions are expressions of both the overt and systemic forms of injustice.

Our commitment to social justice reflects an orientation to our goals and practices in education and ultimately, an orientation to life that values a diversity and inclusion of viewpoints and experiences of all people as valuable contributors to the experience of schooling and society. This stance recognizes that individuals bring a variety of linguistic, social, and cognitive strengths from their families and communities into the classroom; we view these strengths as assets.

*We value and honor human diversity.
*We recognize that all relationships include dynamics of power. We are committed to relating to each other with conscious awareness and sensitivity to these power dynamics.
*We pledge to contribute to expanding the linguistic and cognitive strengths that learners possess and bring with them to the classroom.
*We understand that systemic policies, traditions, and laws along with personal beliefs, experiences and attitudes affect personal relationships and equitable treatment and opportunity for all.
*We strive to provide a context where we all have the venue, the opportunity, and the confidence to express our experiences and that these experiences will be heard constructively, critically, and with sensitivity.
*Hence, we are not color blind. We will not erase who someone is in the name of equality, nor deny the historical, material and emotional impacts of racialized and gendered identities, and colonial legacies.

We stand alongside and speak out with our colleagues, staff, students, and community members when any of us or others experience micro- or macroaggressions.

We recognize that those of us who enjoy privileged status due to our racialized, gendered, heteronormative, or otherwise privileged aspects of our identities may be unaware of the ways this privileged status marginalizes others. We pledge to listen to our colleagues, students, staff, and community members when any of us or others make efforts to remain diligent in maintaining awareness of micro, macro aggressions, and raise our awareness around issues of invisibility, marginalization, normativity, power, and privilege.

We view these goals as both crucial and ambitious. The entrenched nature of oppression requires both institutional restructuring and new social discourses. Therefore, our stance on disrupting existing and persisting inequities requires attention to micro and macro level interactions. Every interaction is an opportunity for disrupting processes of marginalization, whether overt or subtle, both through person-to-person exchange and through resisting oppressive structures and systems. We commit to holding one another and ourselves accountable, through our research and practice, to rejecting entrenched inequalities, and to cultivating new discourses as groundwork for imagining new social worlds.

Textbook

There is no assigned textbook for this class, but students are required to obtain a student membership to the National Science Teachers Association www.nsta.org . Students must also download or bookmark the Arizona State Science Standard Articulated by Grade Level. www.azed.gov and the Next Generation Science Standards (available at www.nsta.org Additional readings will be provided by the instructor.

Assignments and Grades: Below are criteria for successful completion of assignments, and alignment to the standards. This course aligns to the 6-unit morning field internship (TTE 593). The Science Talk, Backward Design Unit Plan, Video Lesson and Reflection, 5E Unit Plan, and Demonstration Lesson should be designed for your school site classroom.

- **Participation: (15% of course grade)** D2L discussions will be awarded participation points based upon the Discussion Rubric. Attendance and completion of in-class assignments will also be awarded participation points InTASC Standards: 9, 10

- **Science Talk (15% of course grade)** Plan and conduct a science talk using the models presented in the *Talk Science Primer* (Michaels and O'Connor, 2012). InTASC Standards 2,3,4,7

- **Backward Design/5E unit plan: (20% of course grade)** Design a unit plan based upon content that you will teach during the spring semester.
    - **Backward Design unit plan:** (10% of course grade) Create a unit plan following a template found in chapter one of Wiggins and McTighe's Understanding by Design. This portion of the plan will address Stage 1 (Identify Desired Results) and Stage 2 (Determine Acceptable Evidence) of the Backward Design model. Detailed assignment guidelines will be provided in class.
    - **5E unit plan:** (10% of course grade) You will apply the 5E Inquiry Model to Stage 3 – Plan Learning Experiences of your Backward Design unit plan. Detailed assignment guidelines will be provided in class.
    InTASC Standards: 1, 2, 3, 5, 6, 7

- **Video lesson reflection:** (**10% of course grade**)   Students will provide the instructor with a copy of the video either on DVD/CD or through secure online methods. Video cameras will be made available to students who require them.

    - **Required elements:**
        - Release form signed by you
        - Release form signed by students and their parents if students appear in the video
        - Copy of a video showing 15 – 20 minutes of instruction.
        - A copy of the lesson plan
        - A written analysis of your instruction focusing on key elements such as student engagement, clarity of instructions and modeling, checks for understanding, classroom management, closures, etc. Students should provide specific evidence

from the recorded lesson to support their analysis. Required length is 1 – 2 pages double spaced.
InTASC Standards: 9 - ISTE.NETST 3, 4, 5

- **Classroom observation summaries: (10% of course grade)** Field notes are required when observing other classrooms. These notes may include a description of the physical layout of the room, seating arrangement of the students, lesson objectives, instructional methodology (lecture, lab, class discussion, game or simulation, etc.) and any interesting or noteworthy actions or responses by the teacher and students. Do not refer to any school, teacher or student by name.
  - o **Required elements:**
    - ▪ A scanned or photographed copy of your field notes with any school, student or teacher identifying information redacted
    - ▪ A brief description of the instruction
    - ▪ Your analysis of the lesson… Were the stated objectives met? How do you know? How were students held at a high level of engagement? What from this lesson would you like to implement in your own instruction?
      InTASC Standards: 9

- **Demonstration lesson: (30% of course grade - This is the benchmark assignment for TTE 523 and must be passed in order to pass the course. A passing grade is defined as a score of "2" or above in all categories on the grading rubric.**
  InTASC Standards: 1, 2, 3, 4, 5, 6, 7, 8, 9 – ISTE.NETST 1, 2, 4

Demonstration Lesson Assignment Guidelines:

Each student will select a single lesson from his/her 5e unit plan and teach the lesson to his/her peers. The time allotted for the lesson is 40 minutes. The lesson will be evaluated using the Demonstration Lesson Rubric. The assignment will be weighted 50% for teaching, 30% for a detailed lesson plan and 20% for a written reflection on the lesson describing strengths, areas in need of improvement and plans for improvement.

Each student must submit a lesson plan for the demonstration lesson that follows the lesson plan format presented previously in class. Alternately, a student may use the lesson plan format mandated by his/her host school district if the district requires a specific planning model. The lesson plan will be evaluated using the Demonstration Lesson Rubric.

Lesson Plan Requirements:
- Content objective(s)
- Language objective(s)
- Standards alignment
- Task analysis including sub-objectives, Bloom's Level and time allotted

- Teaching strategies used for each sub-objective (must be varied) that include checks for understanding requiring overt student active participation
- Denote strategies targeting specific SSTELLA Practices (minimum of two practices)
- Comprehensive list of all materials required to teach the lesson

Demonstration Lesson Requirements
- Teach "bell to bell"
- Begin with an engagement activity or anticipatory set that taps into students' prior knowledge
- The lesson must address important content and the teacher must demonstrate content mastery
- The lesson must contain activities that support at least two SSTELLA Practices
- The lesson must include the use of some technology
- The students must be actively engaged
- Use questioning and/or other strategies effectively to check for understanding
- Include a closure activity

Reflective Essay Requirements:
- Describe elements of the lesson that were particularly effective and explain why they were effective
- Describe elements of the lesson that needed improvement and explain what made that part of the lesson less effective than desired
- Provide specific revisions to the lesson that you intend to make in order to improve the lesson.

Demonstration Lesson Rubric

Planning:

Criteria	4 points	3 points	2 points	1 point
Terminal Objective InTASC: 7	Provides a Terminal Objective that is appropriate for curriculum goals and content standards. The objective specifies both content and behavior.	Provides a Terminal Objective that is appropriate for curriculum goals and content standards. The Objective specifies either content or behavior but not both.	Provides a Terminal Objective with questionable alignment with curriculum goals and content standards. The Objective specifies either content or behavior but not both.	The Terminal Objective does not appear to be aligned with curriculum goals and content standards. The Objective lacks specificity.
Language Objective InTASC: 2, 7	The plan explicitly provides tools of language development including strategies for making content accessible to ELLs. The language objective is clearly stated.	The plan implies tools of language development including strategies for making content accessible to ELLs. The language objective is clearly stated.	The language objective is clearly stated but tools of language development are not evident.	The language objective is unclear or missing. Tools of language development are not evident.
Task Analysis	The plan includes a	The sub-objectives may	The sub-objectives may	The sub-objectives

InTASC: 7	series of sub-objectives that appropriately sequence learning experiences, demonstrates a variation in Bloom's level and matches the final sub-objective to the terminal objective.	not provide appropriately sequence learning experiences, or demonstrates a variation in Bloom's level. The final sub-objective may not match the terminal objective.	not provide appropriately sequence learning experiences. Reference to Blooms level may be inaccurate or missing. The final sub-objective may not match the terminal objective.	does not provide appropriately sequence learning experiences. Reference to Blooms level is inaccurate or missing. The final sub-objective does not match the terminal objective.
Teaching Strategies & Checks for Understanding InTASC: 7, 8	The plan provides teaching strategies and checks for understanding that include one strategy per sub-objective, varied strategies, one check for understanding per sub-objective and opportunities for overt active student participation.	The plan provides teaching strategies and checks for understanding that include one strategy per sub-objective. Strategies may not be varied. There is one check for understanding per sub-objective. Student active participation is implied.	The plan provides teaching strategies and checks for understanding that include one strategy per sub-objective. Strategies are not varied. There is one check for understanding per sub-objective. There is little evidence of opportunities for student active participation.	The plan contains less than one strategy and/or one check for understanding per sub-objective. There is little or no evidence of opportunities for student active participation.
Criteria	**4 points**	**3 points**	**2 points**	**1 point**
SSTELLA Practices InTASC; 2, 8	The plan clearly identifies how instruction will address a minimum of two SSTELLA practices.	The plan identifies two STTELLA practices but the connection between the instruction and the practices is not clear.	The plan only identifies a single STELLA practice.	The plan fails to identify any SSTELLA practices.
Lesson Materials InTASC: 3	The plan provides a comprehensive list of materials necessary and all listed materials are attached.	The materials are listed but not all listed materials are attached.	The list of materials is incomplete and or not all listed materials are attached.	The list of materials is incomplete or missing and few if any listed materials are attached.

Teaching:

Criteria	4 points	3 points	2 points	1 point
The instructional strategies and activities addressed participants' prior knowledge. InTASC 2	The student asks questions specifically designed to elicit participants' prior knowledge or engages students in an activity specifically designed to elicit prior knowledge throughout the lesson.	The student asks questions specifically designed to elicit participants' prior knowledge or engages students in an activity specifically designed to elicit prior knowledge at some point within the lesson.	The student appears to make some attempt to elicit prior knowledge but the method used is not specifically designed to do so.	No participant prior knowledge was elicited
The lesson involved fundamental concepts of the subject and was at an appropriate level for the students. InTASC 1, 4, 5	The entire lesson covered content essential to mastery of the subject and was at an appropriate level for the students.	A majority of the lesson covered content essential to mastery of the subject and was at an appropriate level for the students..	Some of the lesson content was essential for mastery of the subject and/or the level was slightly higher or lower than an appropriate level for the students.	The lesson content was not essential for mastery of the subject and/or the level was not appropriate for the students
Criteria	4 points	3 points	2 points	1 point
The lesson promoted strongly coherent conceptual understanding. InTASC 2, 4, 5	The entire lesson was designed and implemented in a way that targeted a strong understanding of broad concepts rather than discreet facts or minutiae.	A significant portion of the lesson was designed and implemented in a way that targeted a strong understanding of broad concepts rather than discreet facts or minutiae.	Some of the lesson addressed the broad concepts but the majority of the lesson addressed acquisition of discreet facts with little connection to the big ideas.	There was little meaningful content covered and few if any connections to the big ideas were made.
The student had a solid grasp of the subject matter content inherent in the lesson. InTASC 4,5	The student demonstrated complete understanding of every aspect of the content covered and exuded confidence in content knowledge.	The student demonstrated strong understanding of the content and/or exhibited only minor lapses in confidence in content knowledge.	The student demonstrated adequate content knowledge and/or exhibited a significant lack of confidence in content knowledge.	The student demonstrated serious gaps in content knowledge and/or demonstrated a profound lack of confidence in content knowledge.
Participants	The participants were completely engaged	The participants were actively engaged for a	The participants were engaged for a portion of	There was minimal if any active participation

were actively engaged in thought-provoking activity that often involved the critical assessment of ideas. InTASC 3, 5, 6, 8	throughout the lesson and were involved in thoughtful discussion involving analysis of the lesson material and or metacognition.	majority of the lesson and spent some time reflecting on their learning	the lesson and spent little if any time reflecting on their learning.	or reflection on the part of participants.
The teacher used questioning strategies effectively. InTASC 2, 3, 8	The student used instructional questions effectively throughout the lesson to engage students, check for understanding and guide student learning. The student used questions to elicit additional questions from participants and guided participants toward answering their own questions.	The student used instructional questions effectively at times during the lesson to engage students, check for understanding and guide student learning. The student was the primary source of the questions instead of the participants.	The student occasionally used instructional questions effectively but spent a significant amount of time "telling" rather than "asking."	The student asked few instructional questions and utilized lecture or "telling" as the primary means of instruction
Criteria	**4 points**	**3 points**	**2 points**	**1 point**
Classroom discourse was focused on the lesson topic and much of the discussion was between and among participants. InTASC 3	Participants were engaged in meaningful dialog about the lesson content throughout the lesson.	Participants were engaged in meaningful dialogue about the lesson content for much of the lesson.	Participants were engaged in meaningful dialogue about the lesson content for a portion of the lesson.	There was little dialog among students or most of the student dialog was unrelated to the lesson content.
There was a climate of respect for what others had to say. InTASC 3	Dialog was respectful and respected. Participants listened attentively to each other and responded respectfully at all times. There was evidence that the ideas of others were heard and valued.	Participants listened attentively to each other and responded respectfully most of the time. Only occasionally did participants interrupt one another or show minor disrespect.	"Side bar" conversations and other distractions occurred frequently while participants were speaking. Participants were openly critical of comments made by others.	Few rules governing classroom discussion were evident. Participants were often inattentive or rude to classmates.
Active participation of participants	Participants were encouraged to engage with the material and ask questions. Their	Participants were encouraged to engage with the material and ask questions. Opportunities	Participants' opportunities to actively engage with the material were limited. Activities were very	Participants had minimal opportunity to engage with material. Their role was

was encouraged and valued. InTASC 2, 4, 5, 8	enthusiasm was rewarded and opportunities for them to explore further or dig deeper were encouraged.	for students to explore on their own or dig deeper were not encouraged.	restrictive and did not allow for deeper exploration by participants.	primarily that of spectator.
The teacher acted as a resource person, working to support and enhance participants' learning. InTASC 3, 5	The teacher could best be described as "the guide on the side" by assuming the role of facilitator and helping participants work through the material for themselves. The teacher served as a resource rather than a purveyor of information. The teacher welcomed participants' questions.	The teacher provided many opportunities for participants to make discoveries and draw conclusions for themselves, but occasionally provided information that the participants could have determined for themselves.	The teacher provided much of the information and answers to participants even though the participants could have found this information out for themselves.	Participants were rarely given opportunities to provide input in the learning process.
The lesson included the effective use of technology. ISTE.NETST 1, 2, 4 InTASC 3, 9	The teacher used technology extensively and effectively to engage students and promote student learning. Both the teacher and the students used technology in a legal and ethical manner.	The teacher and students used some technology effectively to engage students and promote student learning. Both the teacher and the students used technology in a legal and ethical manner.	The teacher used some technology effectively. The teacher used technology in a legal and ethical manner.	Little or no technology was used or the technology was used in an inappropriate way.

Reflection:

Criteria	4 points	3 points	2 points	1 point
The student provided a thoughtful reflection regarding the lesson. InTASC 9	The student provided a detailed, thoughtful reflection to evaluate the outcomes of his/her teaching, to improve planning and practice, and develop relevant learning experiences.	The student provided a somewhat detailed reflection to evaluate the outcomes of his/her teaching and to improve his/her practice.	The student provided a somewhat detailed reflection to evaluate the outcomes of his/her teaching but strategies for improving practice were unclear.	The students reflection lacked depth of thought and/or did not provide strategies for improving practice.

Discussion Rubric

	Excellent	Above Average	Average	Below Average
Initial Post Quality (12 points)	<u>4 pts:</u> Initial post completely addresses the discussion questions. Strong personal and professional connections are included. Strong examples from course materials are included.	<u>3 pts:</u> Initial post mostly addresses the discussion questions. Some personal and professional connections are included. Good examples from course materials are included.	<u>2 pts:</u> Initial post only addresses part of the discussion questions. Personal and professional connections are minimally included. Minimal examples from course materials are included.	<u>1 pt:</u> Initial post does not address the discussion questions. Personal and professional connections are not included. No examples from course materials are included.
Response Quality (4 points)	<u>4 pts:</u> Responses are thoughtful and add to a meaningful discussion.	<u>3 pts:</u> Responses are usually thoughtful and add to a meaningful discussion.	<u>2 pts:</u> Responses are minimally thoughtful, but they do not add to the discussion in a meaningful way.	<u>1 pt:</u> Responses not thoughtful and do not add to the discussion in a meaningful way.
Organization (4 points)	<u>4 pts:</u> Information is well-organized and free of English usage errors (spelling, grammar, proper paragraphs, complete sentences…)	<u>3 pts:</u> Information is mostly well-organized and has 1-2 English usage errors.	<u>2 pts:</u> Information is unorganized and difficult to follow. There are more than 3 English usage errors.	<u>1 pt:</u> Information is unorganized and more than 5 English usage errors are present.
Time and Number (4 points)	<u>4 pts:</u> Initial post and at least 3 responses made on 2 or more different calendar dates.	<u>3 pts:</u> Initial post and at least 2 responses made on 2 or more different calendar dates.	<u>2 pts:</u> Initial post and at least 2 responses made on the same calendar date.	<u>1 pt:</u> Initial post and one or no responses made on or before the due date.