Knowing and Learning in Mathematics and Science
UTCH 3001-01

Semester/Year Fall 2014
Time/Location Fridays 1:00-3:30, EA 167
Instructor Dr. Jennifer Edelman
Office Location Coliseum 2040
Office Hours Monday through Thursday, 2:30-5:00 pm
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Department Line: 678-839-6530
Email jedelman@westga.edu
Online Support CourseDen Home Page
https://westga.view.usg.edu/
CourseDen Help & Troubleshooting
http://www.westga.edu/~distance/webct1/help
Ingram Library Services
http://westga.edu/~library/info/library.shtml
University Bookstore
http://www.bookstore.westga.edu/

COURSE DESCRIPTION
The goal of this course is to develop a powerful tool kit of approaches to knowing and learning in mathematics and science. This course focuses on issues of what it means to learn and know science and mathematics. What are the standards for knowing we will use? How are knowing and learning structured, and how does what we know change and develop? For the science and mathematics educator, what are the tensions between general, cross-disciplinary characterizations of knowing (e.g., intelligence) and the specifics of coming to understand powerful ideas in mathematics and science? What are the links between knowing and developing in learning theory, and the content and evolution of scientific ideas? What are the connections between kinds of assessments and theories of knowing? How are various uses of technology associated with specific approaches to learning? Also, current issues and tensions in education will be discussed, especially as they relate to mathematics and science instruction. Course Prerequisite(s): Successful completion of Step 1 and Step 2 AND an interest in exploring teaching and learning in-depth.
COE Vision
The College of Education at the University of West Georgia will be recognized for Leading a New World of Learning, with relevant and innovative programs that contribute to educational improvement and the betterment of society.

COE Mission
Locally connected and globally relevant, the Mission of the College of Education is to prepare graduates for meaningful careers in diverse settings. Spanning undergraduate through doctoral study, we are committed to depth of knowledge and excellence in teaching, professional practice, and applied research.

The vision and mission of the College of Education at UWG forms the basis on which programs, courses, experiences, and outcomes are created. National and state standards (INTASC, NBPTS, Learned Societies) are incorporated as criteria against which candidates are measured. This course’s objectives, activities, and assignments are related directly to the appropriate standards, as identified below.

APPROACHES TO INSTRUCTION
The instructor of this course will employ a variety of instructional strategies in teaching the content of this course. Those strategies include but are not limited to: guided discussion, modeling and simulations, cooperative and collaborative grouping, student presentations, and hands-on activities that actively engage students in the learning process.

Readings and discussions are a significant component of this course. Students can expect to devote 6 or more hours per week outside of class to complete the assigned readings and responses. Class discussions and activities are structured, in part, by these responses.

NOTE: Students must use a word processor and E-mail, and have access to a web browser.

COURSE OBJECTIVES

<table>
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<tr>
<th>Students will be able to...</th>
<th>Evidence of Student Learning:</th>
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| Construct models of knowing and learning to guide classroom practice. | • Meaningful contributions to class discussions and activities  
• Reading responses  
• Expert/novice interviews, midterm exam, and final project |
| Articulate various standards for knowing science and mathematics and articulate the implications of these standards for assessment, especially standardized assessment. | • Meaningful contributions to class discussions and activities  
• Reading responses  
• Expert/novice interviews, midterm exam, and final project |
### Students will be able to…

<table>
<thead>
<tr>
<th>Evidence of Student Learning:</th>
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<tr>
<td>Articulate what it means to know and learn relative to cognitive structures and describe how what people know changes and develops.</td>
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<tr>
<td>• Meaningful contributions to class discussions and activities</td>
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<td>• Reading responses</td>
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<tr>
<td>• Expert/novice interviews, midterm exam, and final project</td>
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<td>Describe various paradigms for evaluating science and mathematics understanding.</td>
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<tr>
<td>• Meaningful contributions to class discussions and activities</td>
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<td>• Reading responses</td>
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<tr>
<td>• Expert/novice interviews, midterm exam, and final project</td>
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<tr>
<td>Use the clinical interview method to make sense of someone's reasoning about a topic in science or mathematics.</td>
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<tr>
<td>• In-class interview experience and reflection</td>
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<td>• Novice/expert interview report including transcription and analysis</td>
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<tr>
<td>Express informed opinions on current issues and tensions in education, especially as they relate to mathematics and science instruction.</td>
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<tr>
<td>• Meaningful contributions to class discussions and activities</td>
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<tr>
<td>• Reading responses</td>
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### TEXTS, READINGS, INSTRUCTIONAL RESOURCES, AND REFERENCES

**Required Text(s)**


Other assigned readings may be accessed through CourseDen and may require a login for the UWG library.

**Required Instructional Resource:** Tk20 Subscription

Tk20 Subscription (These are available at the University Bookstore or at [http://westga.tk20.com/campustoolshighered/start.do](http://westga.tk20.com/campustoolshighered/start.do)).

If you have purchased a subscription previously, DO NOT re-subscribe.


For assistance, email tk20@westga.edu.

**Course References**


ASSIGNMENTS, EVALUATION PROCEDURES, AND GRADING

Assignments and core requirements: Written assignments are final products that will be graded on both what is written (clarity, depth, insight) and how it is written (the form of the written work). Therefore, it is crucial to realize that correct grammar and spelling, proper punctuation, neatness, and adherence to assignment guidelines will affect your grade. As an educator, you will be expected to demonstrate high levels of competence not only in verbal but also in written communication with parents, administrators, and other educators. Evaluation of written assignments will be accomplished through rubrics, which will be distributed as assignments are given. All assignments must be completed in a typed, double space format, with Times/Times New Roman font, size 12 and 1-inch margins on all sides unless otherwise indicated.

Course Papers and Projects are due by 11:59 p.m. on the designated date. Due dates are listed on the course schedule; full instructions for each assignment are posted on CourseDen. Assignments are to be typed and submitted to the appropriate dropbox on CourseDen (except for the final project which will also be turned in on TK20). The dropboxes will close at 11:59 p.m. on the Thursday before class. Late papers and projects will have their grades reduced by 10% for each day they are late. Please do not wait until the last minute to upload your assignments; technical/computer issues will not excuse the lateness of the assignment. Your final paper must be turned in on both CourseDen and Tk20 on the due date in order to receive credit.

Assignments: This is a brief overview of how you will demonstrate your learning in this course. Each assignment will have further instructions posted in CourseDen and will be discussed in class.

1. Professional Conduct: Each student is expected to follow the guidelines for professional conduct as spelled out in this syllabus and in the PLC charter they develop. Each member of the PLC will evaluate themselves and each other. The instructor will also evaluate your professionalism at the mid-point and end of the semester.

2. Reading Responses: Because our activities will be centered on the analysis and application of the ideas we read, you will be completing a reading response activity for each theory reading. Reading responses are due by 11:59 p.m. on the Thursday before we discuss the readings in class. Late reading responses will count as 75% of an on-time entry (50% if submitted a week or more late). Please check the course outline for assigned readings and due dates.

3. Novice/Expert Interview: As an application of what you learn in this course, you will be asked to engage a Novice/Expert pairing in a problem-based interview on a topic of your choice. This assignment will be practiced and scaffolded in class before you work on it independently.

4. Midterm: This is a comprehensive mid-term exam, sampling from all that we have read, discussed, and experienced to date. The exam will be completed in-class.

5. Concept Maps: Each PLC will have a combination of mathematics and science majors. Mathematics majors will read the assigned “mathematics” articles and science majors will read the assigned “science” articles. You will work together to create a concept map for each learning theory we cover in the course. The concept maps must include 5 key elements of each theory as well as applications to teaching and learning in secondary mathematics and science classrooms (from the assigned mathematics and science articles).

6. Final project: Students are expected to collaborate with an assigned partner to produce, teach, and reflect on a standard-based lesson using pre/post assessments and literature from this course to inform their lesson planning and instruction. A group paper and presentation of the
paper are also included in the final project. This is a “key assessment” and will be turned in on Tk20.

**Evaluation Procedures**

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<tr>
<th>Assignment</th>
<th>Points</th>
<th>Assessment Tools</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>1. Professionalism</td>
<td>125</td>
<td>Peer Evaluation</td>
<td>Fridays 1:00-3:30</td>
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<td></td>
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<td>Rubric</td>
<td>CATME due September 25, October 30, November 27</td>
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<tr>
<td>2. Reading Responses</td>
<td>150</td>
<td>Rubric</td>
<td>Thursdays, 11:59 pm</td>
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<tr>
<td>3. Theory Concept Maps</td>
<td>125</td>
<td>Rubric</td>
<td>Done in-class</td>
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<tr>
<td>4. Novice &amp; Expert Interview Part 1</td>
<td>50</td>
<td>Rubric</td>
<td>September 11, 11:59 pm</td>
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<tr>
<td>6. Midterm</td>
<td>200</td>
<td>Exam</td>
<td>October 10</td>
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<tr>
<td>7. Final Project Paper</td>
<td>150</td>
<td>Rubric</td>
<td>December 11</td>
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<tr>
<td>8. Final Project Presentation</td>
<td>50</td>
<td>Rubric</td>
<td>December 12</td>
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**Grading**

900-1000 points = A  
800-899 points = B  
700-799 points = C  
699 or fewer points = F

**CLASS, DEPARTMENT, AND UNIVERSITY POLICIES**

Please carefully review the information at [Common Language for Course Syllabi](#). It contains important information related to your rights and responsibilities in this class. Because these statements are updated as federal, state, university, and accreditation standards change, you should review the information each semester. In addition to the above information the following policies apply to this course.

**Academic Honesty:** All work completed in this course must be original work developed this semester. Students are expected to adhere to the highest standards of academic honesty. Plagiarism occurs when a student uses or purchases ghostwritten papers. It also occurs when a student utilizes ideas or information obtained from another person without giving credit to that person. If plagiarism or another act of academic dishonesty occurs, it will be dealt with in accordance with the academic misconduct policy as stated in the latest Student Handbook and the Graduate Catalog.

**Americans with Disabilities Act:** The official UWG policy is contained in the link to the Common Language for Course Syllabi located on the Provost’s website. All students are provided with equal access to classes and materials, regardless of special needs, temporary or permanent disability, special needs related to pregnancy, etc. For more information, please contact Disability Services at the University of West Georgia: [http://www.westga.edu/studentDev/index_8884.php](http://www.westga.edu/studentDev/index_8884.php).

**Extra Credit:** Extra credit will not be available in this course. Please do your best work on the assigned activities.

**Late Work:** Course Papers and Projects are due by 11:59 p.m. on the designated date. Due
dates are listed on the course schedule; full instructions for each assignment are posted on CourseDen. Assignments are to be typed and submitted to the appropriate dropbox on CourseDen (except for the final project which will also be turned in on TK20). The dropboxes will close at 11:59 p.m. on the Thursday before class. **Late papers and projects will have their grades reduced by 10% for each day they are late.** Please do not wait until the last minute to upload your assignments; technical/computer issues will not excuse the lateness of the assignment.

**Professional Conduct:** As teachers you have made a commitment to the education profession. As such, you should conduct yourself at all times in a professional manner. You will demonstrate your professionalism through the following behaviors:

**Attendance and punctuality**

Much of the value of the course will be through the experiences that occur during our class sessions. You must be present to learn, and to contribute to the learning of others. If you must be absent, please notify the members of your PLC. Missing class sessions, arriving late to class, and/or leaving early will negatively impact your professionalism grade for the semester.

**Active participation**

To learn anything more deeply, you must actively participate in it. The pedagogy being advocated and modeled through our course is the belief that our students must commit to, and be involved actively in, the problems and situations being posed. Be involved. Developing collegial, supportive relationships is an important aspect of the teaching profession.

**Use of laptops, cell phones, and tablets**

Teachers must learn to manage and incorporate technology in their classrooms. We will use laptops, cell phones, and tablets for specific course-related activities (e.g., composing notes, using math applets/excel/or other tools, looking up information as necessary, preparing mini-presentations). In general, you should not engage in web browsing, email, or other questionable unrelated activities during class time. Texting is not a course-related activity unless we are using Poll Everywhere.

**Student Email Policy:** The official email policy is contained in the link to the Common Language for Course Syllabi located on the Provost’s website. Please do not use the email function in CourseDen to contact your instructor. A message sent to jedelman@westga.edu will receive a quicker response.

**UWG Cares:** If you or someone you know is in a distressing situation, support is available at http://www.westga.edu/UWGCaress The website contains access to helpful resources and phone numbers related to emergency or crisis situations and safety concerns, medical concerns, multicultural, psychological and personal issues and interpersonal conflict.