EDUC 542.962 Planning for Mathematics Instruction, Gr. 6-12

Description:	All courses for professional studies leading to licensure must use the SOE syllabus template.
Program Course Information:	**PROGRAM:** Carolina Online Lateral Entry, NC TEACH **EDUC** 542.962 **COURSE TITLE:** Planning for Mathematics Instruction, Grades 6 – 12 **INSTRUCTOR NAME and CONTACT INFORMATION:** Mrs. Jenn Persson, perssonj@email.unc.edu Phone: 919-239-2041 Office Hours: By email, anytime **DATE SYLLABUS REVISED:** Jan. 2009 **COURSE DESCRIPTION:** In this graduate-level methods course for lateral entry math teachers, gr. 6-12, teachers will reflect upon student learning as the basis of effective instruction. Teachers will become better prepared to teach any mathematics course at the middle and/or secondary level. This course integrates math content with multiple pedagogical strategies for teaching to an increasingly diverse group of learners. Each teacher will reflect upon his/her current year of teaching and build upon the strengths he/she already brings to the teaching profession. (2 graduate credits)
	Preparing Leaders in Education The School of Education is committed to the preparation of candidates who can assume leadership roles in the field of education. Such preparation is accomplished through the coherent integration of the abilities and predispositions of candidates, the knowledge and abilities of faculty, and the contextual elements of academic and field settings. Candidates accept their professional responsibilities and focus their expertise and energy on supporting Birth-12 student development and learning. They must work to maintain a meaningful involvement in activities within schools and in partnership with parents and the community. The growth and development of candidates is promoted through curriculum, instruction, research, field experiences, clinical practice, assessments, evaluations, and interactions with faculty and peers. All of these elements work together to build a solid foundation for exemplary practice in education, creating educational practitioners who are prepared to better serve children, families and schools, as well as business and agencies of government within North Carolina, across the nation and throughout the world. **For Equity and Excellence** Preparation of educational leaders for today's society is based in values of equity and excellence that assure our candidates' and their students' future success. Attending to the challenge of promoting both equity and excellence is imperative. To address only one of these goals would, on the one hand, sacrifice those put at risk by social and cultural hierarchies in society or would, on the other hand, fail to press for the highest possible levels of accomplishment. Equity and excellence must be pursued concurrently to assure that all students are well served and that all are encouraged to perform at their highest level. Within the School of Education, equity is seen as the state, quality, or ideal of social justice and fairness. It begins with the recognition that there is individual and cultural achievement among all social groups and that this achievement benefits all students and educators. Equity acknowledges that ignorance of the richness of diversity limits human potential. A perspective of equity also acknowledges the unequal treatment of those who have been historically discriminated against based on their ability, parents' income, race, gender, ethnicity, culture, neighborhood, sexuality, or home language, and supports the closure of gaps in academic achievement. Decisions grounded in equity must establish that a wide range of learners have access to high quality education in order to release the excellence of culture and character which can be utilized by all citizens of a democratic society. Within the School of Education, excellence is seen as striving for optimal development, high levels of achievement and performance for all and in all that is done. In preparatory programs across grade levels, curriculum and instruction furthers excellence when it moves a learner as effectively as possible toward expertise as a thinker, problem solver and creator of knowledge. Excellence entails a commitment to fully developing candidates, not only academically but also in moral and political senses.

	In a Democratic Society The preparation of exemplary practitioners in education to meet the challenges of equity and excellence is best accomplished through preparation for a democratic society. Democracy around the globe is an ideal, one with the potential to meet the needs, recognize the interests and establish the rights of all citizens. Education is a necessary foundation for this ideal, and both must be subscribed to and participated in by all. **School of Education Conceptual Framework Principles** The School of Education is committed to diverse, equitable, democratic learning communities. As a result, candidates are expected to acquire and apply the knowledge, skills and dispositions that prepare them to support the development and education of all students. The School of Education uses the following unit principles, applicable at all program levels, to identify the knowledge and skills that are central to preparation of candidates. It is the School of Education 19s goal that candidates will become leaders supporting and promoting the development, teaching and learning of all students in multiple contexts. 1. Candidates possess the necessary content knowledge to support and enhance student development and learning. 2. Candidates possess the necessary professional knowledge to support and enhance student development and learning, including meeting student needs across physical, social, psychological, and intellectual contexts. Candidates incorporate a variety of strategies, such as technology, to enhance student learning. 3. Candidates possess the necessary knowledge and skills to conduct and interpret appropriate assessments. 4. Candidates view and conduct themselves as professionals, providing leadership in their chosen field, including effective communication and collaboration with students and stakeholders. **SOE Conceptual Framework Dispositions** Certain dispositions are essential to prepare leaders who support equity and excellence in education within a democratic society. Dispositions are beliefs that foster commitments, leading to actions within educational environments with students, colleagues, families, and communities. Candidates strengthen these dispositions as they think deeply, reflect critically and act responsibly in their professional practice. These dispositions are interconnected with knowledge and skills; specific dispositions connect to and exemplify unit principles, facilitating their enactment in particular programs. 1. Candidates will exhibit behavior that demonstrates a belief that all individuals can develop, learn, and make positive contributions to society. 2. Candidates will exhibit behavior that demonstrates a belief that continuous inquiry and reflection can improve professional practice.
Technical Requirements	Internet Access (broadband is recommended) Access to Adobe Acrobat Connect Microsoft Word
Course Objectives:	The main emphasis of this semester is self-reflection. I want you to begin to think deeply about your teaching practice and the ways in which you can grow as a professional.
Course Standards (Addressed):	SOE Principles 1. Candidates process the necessary content knowledge to support and enhance student development and learning. 2. Candidates possess professional knowledge to support and enhance student development and learning. 3. Candidates possess the necessary knowledge and skills to conduct and interpret appropriate assessments. 4. Candidates view and conduct themselves as professionals, providing leadership in their chosen field. SOE Dispositions 1. Candidates will exhibit behavior that demonstrates a belief that all individuals can develop, learn, and make positive contributions to society. 2. Candidates will exhibit behavior that demonstrates a belief that continuous inquiry and reflection to improve professional practice.

	INTASC Standards: 1. The teacher understands the central concepts, tools of inquiry, and the structures of the discipline(s) he or she teachers and can create learning experiences that make these aspects of subject matter meaningful for students. 2. The teacher of science understands how students learn and develop and can provide learning opportunities that support students' intellectual, social, and personal development. 3. The teacher of science understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners. 4. The teacher understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills. 6. The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom. 7. The teacher plans instruction based upon knowledge of subject matter, students, the community, and curriculum goals. 8. The teacher of science understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the student. 9. The teacher of science is a reflective practitioner who continually evaluates the effects of his/her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally. NC Core Standards 1. Teachers know the content they teach. 2. Teachers know how to teach students. 5. Teachers are reflective about practice. NC Diversity Standards 1. Teachers understand central concepts, tools of inquiry, and structures of the discipline they teach and can create classroom environments and learning experiences that make these aspects of subject matter accessible, meaningful and culturally relevant for diverse learners. 4. Teachers acknowledge and understand that diversity exits in society and utilize this diversity to strength the classroom environment to meet the needs of individual learners. 6. Teachers of diverse students are reflective practitioners who are committed to education equity. NC Technology Standards 1. Students plan and design effective learning environments and experiences supported by technology. 3. Teachers Implement curriculum plans that include method and strategies for applying technology to maximize student learning. 4. Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies. NC Mathematics Standards 5. Process Skills – Teachers understand the use of processes of problem solving, reasoning and proof, communication, connection, and representation as the foundation for the teaching and learning of mathematics. 6. Curriculum pacing and alignment – Mathematics teachers are aware of the importance of and implement effective instructional pacing and alignment. 7. Instructional strategies - Mathematics teachers use a variety of instructional strategies to promote student understanding of mathematics. 8. Instructional tools – K-12 math teachers understand and use effectively the hierarchy of the use of instructional tools. 9. Ethnicity, gender, race, and socioeconomic status – Mathematics teachers recognize that all students, regardless of their personal characteristics, backgrounds, or physical challenges, must have opportunities to study and learn mathematics. 10. Accommodating individual needs – To promote diversity as a strength, teachers are knowledgeable about and sensitive toward various teaching /learning styles. 11. Historical perspectives – Mathematics teachers understand that historically based pedagogy can give all students, regardless of their learning preferences, the opportunity to learn mathematics. It provides an opportunity to focus on special interests, and it provides the teacher with insights into the diversity in the development of mathematics.

	NCTM /NCATE Middle School/ Secondary Math Standards 1. Knowledge of mathematical problem solving. 2. Knowledge of reasoning and proof. 3. Knowledge of mathematical communication. 4. Knowledge of mathematical connections. 5. Knowledge of mathematical representation. 6. Knowledge of technology. 7. Dispositions. 8. Knowledge of mathematics pedagogy.
Course Standards (Assessed):	SOE Principles: 3. Candidates possess the necessary knowledge and skills to conduct and interpret appropriate assessments SOE Dispositions: 1. Candidates will exhibit behavior that demonstrates a belief that all individuals can develop, learn, and make positive contributions to society. INTASC Standards: 1. The teacher understands the central concepts, tools of inquiry, and the structures of the discipline(s) he or she teachers and can create learning experiences that make these aspects of subject matter meaningful for students. 7. The teacher plans instruction based upon knowledge of subject matter, students, the community, and curriculum goals. 8. The teacher of science understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the student. 9. The teacher of science is a reflective practitioner who continually evaluates the effects of his/her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally. NC Core Standards: 6. Teachers respect and care about students. NC Diversity Standards: 1. Teachers understand the central concepts, tools of inquiry, and structures of the discipline(s) they teach and can create classroom environments and learning experiences that make these aspects of subject matter accessible, meaningful and culturally relevant for diverse learners. 4. Teachers acknowledge and understand that diversity exists in society and utilize this diversity to strengthen the classroom environment to meet the needs of individual learners. 6. Teachers of diverse students are reflective practitioners who are committed to educational equity. NC Mathematics Standards: 6. Curriculum pacing and alignment – Mathematics teachers are aware of the importance of and implement effective instructional pacing and alignment. 7. Instructional strategies - Mathematics teachers use a variety of instructional strategies to promote student understanding of mathematics. 9. Ethnicity, gender, race, and socioeconomic status – Mathematics teachers recognize that all students, regardless of their personal characteristics, backgrounds, or physical challenges, must have opportunities to study and learn mathematics. 10. Accommodating individual needs – To promote diversity as a strength, teachers are knowledgeable about and sensitive toward various teaching /learning styles. NCTM /NCATE Middle School/ Secondary Math Standards: 1. Knowledge of math as problem solving. 3. Knowledge of mathematical communication. 4. Knowledge of mathematical connections. 6. Knowledge of technology. 8. Knowledge of mathematics pedagogy.

Requirements:	**Policies:** You are responsible for knowing and adhering to due dates. Please do not request extensions or make-ups except under extraordinary circumstances. You are expected to abide by the UNC Honor Code. Plagiarism and cheating are not accepted and all suspected cases will be pursued. All work turned in is expected to be of professional quality. This means that it will be free of typos, grammatical errors, and slang, and that written and oral presentation will be coherent and follow a logical progression. **Grading:** A grade of HIGH PASS (H) is reserved for students who excel at all assignments, who attend each class session, and who evince quality participation. A grade of PASS (P) will be assigned to students who complete all assignments, attend class, and competently prepare and participate. A grade of LOW PASS (L) will be assigned to students whose work is consistently less than proficient.
Topics:	Inquiry Teaching & Learning, Reflective Practices, Assessment
Schedule:	**ONLINE MEETINGS:** We will have four Acrobat Connect online class sessions this semester: **Wednesday, January 28th, 6-7:30 pm** **Sunday, February 8th Assignment #1 DUE** **Thursday, February 19th, 6-7:30 pm** **Sunday, March 1st Assignment #2 DUE** **Sunday, March 22nd Assignment #3 DUE** **Thursday, March 26th, 6-7:30 pm** **Sunday, April 12th Assignment #4 DUE** **Thursday, April 23rd, 6-7:30 pm** The website to enter the meeting space is http://breeze.unc.edu/perrsonjeduc542s09/ These online class sessions are MANDATORY – you are expected to be in attendance and to be on time!
Major Course Assignments:	**ASSIGNMENT #1** **Student Inquiry: Hands-on Learning Math Lab** PART 1 – POWERPOINT PRESENTATION Using the provided websites and readings (or any additional resources you may find), prepare a 5-10 slide Powerpoint presentation that you could use in your own classroom. (Please include a final slide to cite all sources.) The presentation should be grade level/course level appropriate. The actual content is up to you, but here are a few suggestions to get you started: * Introduce a new topic/concept in a fun and intriguing way. How are you going to hook the students? * Propose a problem or situation that needs to be solved. * Have students investigate the issue. Note a list of materials the student will need. * Have students prepare their findings and share with the whole group. PART 2 – REFLECTION PAPER Compose a 2-3 page reflection about this activity that addresses ALL of the following questions: (1) What principles of an inquiry pedagogy does this activity demonstrate? (Go back to your readings from past semesters if necessary.) (2) Is this an activity you would actually use in your classroom? Why or why not? (3) What 2 or 3 modifications would you make so that this activity fit better with your own teaching style, students, and school environment (still needs to retain the principles of an inquiry pedagogy)? (4) What are some alternative ways this activity could be assessed? (Again, go back to readings and websites from previous semesters.) The Powerpoint and Reflection are both due via email (perssonj@email.unc.edu) by midnight on **Sunday, February 8th!!!**

ASSIGNMENT #2

Video Reflection: Do they see what you Think they see?

PART 1 - VIDEO

You will record a 30 minute, unedited video of your teaching. This video should incorporate more than one teaching pedagogy (interactive lecture, small group instruction, group activity, demonstration, etc.) and ***must*** include an inquiry-oriented activity. You will then analyze the video according to the criteria below.

PART 2 - REFLECTION

Your analysis of the video should be approximately 8-10 pages in length. Make sure you address each topic and question listed below! (You may want to use this table as the outline for your paper.)

Lesson Plan (doesn't count toward page total)	Include your lesson plan for the video segment. It can be in any format, but should include a purpose/objective, NCSCOS standards addressed, content, and pedagogy.
Content and Pedagogy (2 pages)	Where did this lesson fall within the current unit? What related content had been covered prior to this class session? What will be covered next? What aspects of this content were particularly difficult for the students? What specific features of the lesson were inquiry-oriented? How? Were the students engaged? How could you tell? What did you do when students were inattentive? How did you encourage student participation?
Planning (2 pages)	Provide details about the students in this class such as: range of ability levels, overall personality of the class, considerations for special needs, gender and race, etc. How did the makeup of the class influence your instruction? Did your actual instruction vary from your lesson plan? Why or why not? How did student questions, responses and work influence your instruction? Were you able to cover all content topics and concepts that you had planned? Did the students have opportunities to ask questions, receive clarification, and understand alternative approaches? Why or why not?
Professional Demeanor (1 page)	What did you most often do with your hands? Fidgeting? Where did you most often stand or sit? Where did your eyes most often focus? What did you do when you finished one activity and were ready to move onto the next? When did you speak louder/softer? Faster/slower? Did you laugh or smile in class? Anything else you noticed about your body language and/or speech? Note how you would like to change any of these behaviors in the future, if necessary.
Analysis and Reflection (5 pages)	What evidence is available to illustrate student learning? (cite specific examples from the video) In what ways do you think your inquiry activity was successful? In what ways was it unsuccessful? Why? (cite specific examples from the video) Do you think students enjoy learning in reform-based (inquiry) ways in mathematics classrooms? Why or why not? What are some barriers to inquiry-based instruction that you find in your own classroom? How did the events documented in the video affect your thinking about teaching the same content in the future? What additional and/or different instructional strategies would you use in the future? Why? Additional thoughts and comments?

I hope this assignment will enable you to see your teaching from the students' perspective, view and review your classroom practice, and come to know yourself more thoroughly as a teaching professional. This assignment (video and paper) is due via Taskstream by midnight on **Sunday, March 1st!!!**

ASSIGNMENT #3

Innovative Techniques: How could $$$ help you?

Choose a detailed lesson plan that you have already taught in your classroom. Given the particular topic and its objectives, think about how you could use a small grant to significantly improve the instruction. Write a detailed 3-5 page plan for the activity which describes the original activity, identifies the new material and resources you would use, and explains how the new materials and resources would be put into practice. Additionally, discuss the new ways in which this enhanced instruction would allow you to evaluate student learning (both formally and informally).

This 3-5 page paper is due via email (perssonj@email.unc.edu) by midnight on **Sunday, March 22nd!!!**

ASSIGNMENT #4

Innovative Techniques: Mathematics Unit

Choose a unit that you would like to redesign to better meet the diverse needs of your students. Your unit should include 2–3 weeks of instruction. It may include one or more chapters in your text. Include a concept map, sequence of instruction, inquiry lesson with an applet, assessment plan and your 2 sample assessments: a critical-thinking multiple-choice question and a set of homework questions.

Write an analysis (3.5 to 5 pages long) to include:
Introduction – Describe the student population that your unit is designed for, including grade level(s), course, diversity of students in terms of levels of learning, ethnicity, and special needs. Include learning needs based upon learning theory from other courses and any other special needs you must consider.

Unit Concept Map - Using the draw tools in Microsoft Word, software such as Inspiration, or a neat hand drawing, design a concept map that shows the concepts within your unit and their connections. In your paper, briefly describe the main concepts, and how and why their connections are important to building student learning. How has making a concept map been beneficial to thinking about student assessment?

Sequence of Instruction for the Unit – Write 1–3 objectives for each day. Describe two instructional tasks or activities for each day to meet your objectives. Include each of the following within your unit:

technology	manipulatives or "hands-on" activities
cooperative learning	writing activity
applications	historical activity
multicultural activity	game or puzzle
strategy for special needs	critical thinking multiple choice question
inquiry lesson with applet	Hawaii homework problems

You may use for ideas: your textbook, articles, internet sites, materials from our courses, and other resource books. Include a bibliography with your paper. Overall your unit activities should meet the NCTM Process Standards.

Handout for Inquiry Lesson using a computer applet – Include a lesson plan for an inquiry lesson using a computer applet.

Assessment Plan – Write an assessment plan by the week. First list the objectives for the week, then include a description of how you will assess each. Include how you will record your assessments, what you will do to remediate the students who have not met the objective, and what you will do to meet diversity needs. Describe how your assessment methods will provide you feedback on individual student and class learning. Include the sample assessments you have written at the end of your assessment plan: (a) the critical thinking multiple choice task and (b) the sample of "Hawaii homework" problems that you have written (5–6 problems).

Reflection/conclusion – Now that you have redesigned your unit, what are 2–3 aspects of your unit that you feel will most benefit student learning in your classroom? Why are your assessment methods important to these? How does your unit meet the NCTM process standards?

This paper is due via email (perssonj@email.unc.edu) by midnight on **Sunday, April 12th!!!**

References & Resources:	**REQUIRED TEXT:** Brahier, Daniel J. (2005). *Teaching secondary and middle school mathematics, 2nd edition.* New York: Pearson Education, Inc. **ADDITIONAL RESOURCES:** Algebra lessons and videos (flash), website: http://www.algebra.com/ Algebra lessons, calculators and worksheets, website: http://www.algebrahelp.com/ Geometry lessons and homework, website: http://www.math.com/homeworkhelp/Geometry.html Geometry topics and facts, website: http://www.aaamath.com/geo.html Graphing Calculator online by FooPlot, website: http://www.fooplot.com/ Membership in the National Council of Teachers of Mathematics Electronic membership in NCTM will allow you to access 10 articles free a year from the journal that you select when you join (electronic membership cost = $53). For secondary teachers, the *Mathematics Teacher* is the most relevant journal and for middle school *Mathematics Teaching in the Middle School* is recommended. To join: http://my.nctm.org/ebusiness/emember.aspx National Council of Teachers of Mathematics website: http://www.nctm.org/ National Library of Virtual Manipulatives website: http://nlvm.usu.edu/en/nav/vLibrary.html Noddings, Nel. (1992) The challenge to care in schools: an alternative approach to education, New York: Teachers College Press. Smith, M. K. (2004) Nel Noddings, the ethics of care and education, the encyclopedia of informal education, www.infed.org/thinkers/noddings.htm. Other references for further study are listed at the end of each chapter in your textbook.