Methods in ECE II: Math and Science

X. Course Description

This course is designed to assist educators with developing the child's understanding and appreciation of mathematics and science. The course will cover effective methods, strategies, and techniques for teaching and assessing mathematics and science in varied academic settings. Recent trends in mathematics and science education will be discussed.

All assignments are required to be typed (double-spaced) and free of grammatical and spelling errors. The cover sheet for each assignment is to include the student’s name, the assignment title, date, course name and title, and the instructor’s name. All assignments are due on the date indicated in the course schedule. Late assignments will only be accepted in extenuating circumstances with prior arrangement with the course instructor. One point will be deducted for each day an assignment is late without prior arrangements. A missed assignment cannot be made up and will result in a score of 0 (zero).

XI. Course Objectives

InTASC Standards Addressed:

Standard 1.0 Learner Development
Standard 2.0 Learning Differences
Standard 3.0 Learning Environments
Standard 4.0 Content Knowledge Standard
5.1 Application of Content Standard 6.0
Assessment
Standard 7.0 Planning for Instruction
Standard 8.0 Instructional Strategies
Standard 9.0 Professional Learning and Ethical Practices
Standard 10.0 Leadership and Collaboration

NAEYC (NAEYC) Standards Addressed:
Standard 1: Promoting Child Development and Learning
Standard 2: Building Family and Community Relationships
Standard 3: Observing, Documenting, and Assessing to Support Young Children
Standard 4: Using Developmentally Effective Approaches
Standard 5: Using Content Knowledge to Build Meaningful Curriculum
Standard 6: Becoming a Professional
Standard 7: Field Experiences

Knowledge (Subject matter or discipline(s), Professional field of study, Pedagogical knowledge, Pedagogical content knowledge, Professional knowledge)

1. Assist educators with developing the child’s understanding and appreciation of science.
   In T A S C 1.d, In T A S C 2.g, In T A S C 3.p, In T A S C 4.k, N A E Y C 3 a, NAE YC3 b, NAE YC 3c, NAE YC3 d, NAE YC4 a, NAE YC4 b, NAE YC4 c, NAE YC4 d

Measurement/Evaluation: Math and Science Box and Science Unit

Performance (Skills) (The ability to use content, professional and pedagogical knowledge effectively and readily in diverse teaching settings in a manner that ensures that all students are learning.)

1. Use of scientific methods and process. In T A S C 5.b, In T A S C 6.e, In T A S C 7.a, In T A S C 8.e, N A E Y C 3 b, N A E Y C 3 c, N A E Y C 4 a, N A E Y C 4 b, N A E Y C 4 d

Measurement/Evaluation: Math and Science Rubric and Parent Brochure

Disposition(s) (Values, commitments, and professional ethics that influence behaviors toward students, families, colleagues, and communities and affect student learning, motivation, and development as well as the educator’s own professional growth—guided by beliefs and attitudes related to values such as caring, fairness, honesty, responsibility and social justice.) NAEYC 3a, 3b, 3c, 3d, 4a, 4b, 4c, 4d and InTASC 9, 10

1. Assist educators with developing the child’s understanding and appreciation of science.
   In T A S C 9.l, N A E Y C 3 a, N A E Y C 3 b, N A E Y C 3 c, NAE YC3 d, NAE YC 4a, NAE YC4 b, NAE Y4 c, NAE YC4 d

Measurement/Evaluation: Math and Science Rubric and Parent Brochure

XII.
XIII. Texts, Readings, and Instructional Resources

Required Text

XIV. Assignments, Evaluation Procedures, and Grading Policy

Academic Requirements

1. Math and Science Box
Assemble a math and science box consisting of 10 math and science lesson plans/activities suitable for early childhood aged children. Follow the lesson plan format presented in this syllabus. Activities must each be self-contained including all materials. Worksheets are not acceptable. All activities are to be designed for individual and/or small group use. (160 points)

2. Science Unit
Develop a science unit that includes: (1) table of contents, (2) the goals of the unit and a statement of the goals’ correlation to Nevada’s Academic Content Standards, (3) a concept map, (4) relevant list of five children’s literature titles and summaries, (5) six internet resources (with descriptions) (3 student and 3 teacher), (6) five or more complete lesson plans (follow the format presented in this syllabus), and (7) a reflective piece (your thoughts on the use of the unit in your future teaching). (100 points)

3. Math and Science Rubric ~ Primary Assignment
Design one math and one science rubric for a performance-based lesson in each subject area. You will present your lessons and rubrics to your classmates. Your submitted paper will include: (1) the rubrics, (2) the lesson plans upon which each rubric is based, (3) a discussion of how these rubrics will be used with children of early childhood age, (4) a discussion of the criteria used to devise the rubrics, and (5) a discussion of how the rubrics can be individualized for ALL students. (100 points)
4. **Parent Brochure**
Students will create a brochure to communicate the importance of early math and science experiences for parents (refer to the text).
The brochure should focus on a specific age group (i.e., toddler, 3 year old, Kindergarten age, etc.) and address a variety of elements of early numeracy and science awareness (i.e., questioning, varied experiences/exposures, etc.) to encourage family involvement. At least three different activities appropriate for home should be included for both math and science (a total of 6 home activities). All brochures should be comprehensive in scope, aesthetically pleasing, include language appropriate for the target audience of parents and families.
*(100 points)*

5. **Reflective Journal Discussions**

*Discussions ~ Posting ---*

- **Initial Response:** Due Thursdays 11:59
- **Response Posting:** Due Sunday 11:59

For each chapter of the text, students will reflect and discuss the reflective discussion question for the week. Each discussion must be at least 200 words in length. Post your discussion for your classmates to view via the discussion tab. Discussions must be posted in order to be graded. (7 points for posting your discussion per week and 3 points for your response to another student’s posting per discussion), (14 discussions yielding **140 points**)
Administrative Requirements

All assignments will be due on the assigned days unless arrangements have been made with the professor. If the assignment is late and no arrangements have been made, ten points will be deducted for each day an assignment is late. Course attendance is required.

Grading Policy

<table>
<thead>
<tr>
<th>Grade</th>
<th>Lower Score</th>
<th>Upper Score</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>548 – 600</td>
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<tr>
<td>A-</td>
<td>538 – 547</td>
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<tr>
<td>B+</td>
<td>520 – 537</td>
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<tr>
<td>B</td>
<td>496 – 519</td>
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<td>C</td>
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<td>F</td>
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## XV. Weekly Schedule

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<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
<th>Assignment</th>
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</thead>
<tbody>
<tr>
<td><strong>Module 1</strong></td>
<td>Introduction and overview of course requirements</td>
<td>Chapter 1</td>
<td>Buy Textbook</td>
</tr>
<tr>
<td></td>
<td>“Concept Development in Mathematics and Science”</td>
<td>PPT 1</td>
<td>Discussion: Post and Response</td>
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<tr>
<td><strong>Module 2</strong></td>
<td>Review Class Assignments Content Standards</td>
<td>Chapter 2</td>
<td>Work on Math &amp; Science Box</td>
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<tr>
<td></td>
<td>Lesson Plan Template</td>
<td>PPT 2</td>
<td>Know where to locate Math and Science Standards and become familiar with them</td>
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<td></td>
<td>Rubric – groups</td>
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<td>Discussion: Post and Response</td>
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<td><strong>Module 3</strong></td>
<td>“Fundamental Concepts and Skills”</td>
<td>Chapter 3</td>
<td>Work on Math &amp; Science Box</td>
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<td></td>
<td>PPT 3</td>
<td>Discussion: Post and Response</td>
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<tr>
<td><strong>Module 4</strong></td>
<td>“Fundamental Concepts and Skills”</td>
<td>Chapter 4</td>
<td><strong>SCIENCE UNIT TOPIC DUE</strong></td>
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<td>PPT 4</td>
<td>Work on Math &amp; Science Box</td>
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<td>Discussion: Post and Response</td>
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<td><strong>Module 5</strong></td>
<td>“Applying Fundamental Concepts and Skills”</td>
<td>Chapter 5</td>
<td>Work on Math &amp; Science Box</td>
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<td></td>
<td>Science Units</td>
<td>PPT 5</td>
<td>Discussion: Post and Response</td>
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<td>Concept Map/Science Unit</td>
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<td>“Applying Fundamental Concepts and Skills”</td>
<td>Chapter 6</td>
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<td>PPT 6</td>
<td>Work on Rubrics</td>
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<td>Discussion: Post and Response</td>
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<tr>
<td><strong>Module 7</strong></td>
<td>“Symbols and Higher Level Concepts and Activities”</td>
<td>Chapter 7</td>
<td><strong>MATH &amp; SCIENCE BOX DUE</strong></td>
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<td>PPT 7</td>
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<td>Chapter 7</td>
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<td>Discussion: Post and Response</td>
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<td>“Mathematics Concepts and Operations for the Primary Grades”</td>
<td>Chapter 8</td>
<td>Work on Science Units and Rubrics</td>
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<td>Discussion: Post and Response</td>
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| Module 10 | “Mathematics Concepts and Operations for the Primary Grades” | Chapter 9  
PPT 9 | Work on Science Units and Rubrics  
Discussion: Post and Response |
|-----------|--------------------------------------------------------|-----------------|--------------------------------------------------|
| Module 11 | “Investigations in Primary Science”                    | Chapter 10  
PPT 10 | Work on Science Units and Rubrics  
Discussion: Post and Response |
| Module 12 | “Investigations in Primary Science”                    | Chapter 11  
PPT 11 | SCIENCE UNITS DUE - submit Online via Web Campus  
Discussion: Post and Response |
| Module 13 | “The Math and Science Environment”                     | Chapter 12  
PPT 12 | Discussion: Post and Response |
| Module 14 | “The Math and Science Environment”                     | Chapter 12  
PPT 12 | MATH & SCIENCE RUBRICS DUE - submit Online via Web Campus  
Discussion: Post and Response |
| Module 15 | Submit CLASS PRESENTATIONS  
Final Assignment | | PARENT BROCHURE DUE – submit Online Via Web campus |
XV: Provost Statements

Academic Misconduct – Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV’s function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the Student Academic Misconduct Policy (approved December 9, 2005) located at http://studentconduct.unlv.edu/misconduct/policy.html.

Copyright – The University requires all members of the University Community to familiarize themselves with and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: http://www.unlv.edu/provost/copyright.

Disability Resource Center (DRC) – The UNLV Disability Resource Center (SSC-A 143 http://drc.unlv.edu/, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

Religious Holidays Policy – Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: http://catalog.unlv.edu/content.php?catoid=6&navoid=531
Transparency in Learning and Teaching – The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information: https://www.unlv.edu/provost/teachingandlearning

https://www.unlv.edu/provost/transparency

Incomplete Grades - The grade of I – Incomplete – can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student’s control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving “I” grades in 500-, 600-, or 700- level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

Tutoring and Coaching – The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit http://www.unlv.edu/asc or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

UNLV Writing Center – One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student’s Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: http://writingcenter.unlv.edu/

Rebelmail – By policy, faculty and staff should e-mail students’ Rebelmail accounts only. Rebelmail is UNLV’s official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students’ e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. Emailing within WebCampus is acceptable.

Final Examinations – The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule.
LESSON PLAN FORMAT

Subject

Grade:

Date: Lesson
Title: Goal
(s):

Objective (s): *Nevada Academic Content Standards or Pre-K Content Standards*

Vocabulary:

Material (s):

Procedure / Method (s) / Differentiated Instruction:

Evaluation:
Develop a science unit that includes: (1) table of contents, (2) the goals of the unit and the goal’s correlation to Nevada’s Academic Content Standards, (3) a concept map, (4) relevant list of five children’s literature titles, (5) six internet resources (3 student and 3 teacher), (6) five or more complete lesson plans (follow the format presented in this syllabus), and (7) a reflective piece (your thoughts on the use of the unit in your future teaching). (100 points)

NAME:

<table>
<thead>
<tr>
<th>Element</th>
<th>Points Possible</th>
<th>Points Earned</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table of Contents</td>
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</tr>
<tr>
<td>Goals of the unit and the goal’s correlation to Nevada’s Academic Content Standards</td>
<td>10 points</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Concept Map</td>
<td>20 points</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relevant List of 5 Children’s Literature titles</td>
<td>10 points</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six Internet Resources (3 teacher, 3 student)</td>
<td>5 points</td>
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<tr>
<td>Three Completed Lesson Plans</td>
<td>45 points</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflective piece</td>
<td>5 points</td>
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</table>

TOTAL
ECE 454 Early Childhood Methods: Math and Science
Math and Science Lessons/Activities and
Rubric

Each student will develop an original math lesson/activity and an original science lesson/activity and a corresponding rubric for assessment of student learning for each lesson/activity. Present your lesson/activity to your classmates. (150 points)

Name: ____________________________

<table>
<thead>
<tr>
<th>Proficiency</th>
<th>Format (30 points possible)</th>
<th>Completeness of Information (100 points possible)</th>
<th>Presentation</th>
</tr>
</thead>
</table>
| Exceeds Expectations | • Clear and logical sequence and order  
• Easy to follow  
• Typed  
• Appropriate grammar and spelling | • Follows lesson plan format and is not missing any components  
• Goals, objectives, and procedures are developmentally/age appropriate  
• Gives appropriate plans to simplify and extend lesson  
• Information is consistent | • Clear and logical sequence  
• Understandable to audience  
• Posts a typed, logically sequenced one page handout to each class member |
| 180-200 points       |                                                                                             |                                                  |                                                                            |
| Meets Expectations   | • Somewhat logical sequence and order  
• Somewhat easy to follow  
• Typed  
• Minimal grammar and spelling errors | • Somewhat follows lesson plan format and/or missing one of the components  
• Most of the goals, objectives, and procedures are developmentally/age appropriate  
• Plans to simplify and extend lesson are inappropriate  
• Most information is consistent | • Semi-logical sequence/order  
• Difficult to understand  
• Posts an illogical, handwritten, or otherwise confusing handout to each class member |
| 150-170 points       |                                                                                             |                                                  |                                                                            |
| Below Expectations   | • Difficult to follow  
• Illogical and unclear sequence and order  
• Not typed  
• Poor grammar and spelling are present  
• Illegible | • Does not follow lesson plan format and/or missing more than two of the components  
• Goals, objectives, and procedures are not developmentally/age appropriate  
• Most information is inconsistent | • Illogical sequence/order  
• Does not provide a handout |
| 0-140 points         |                                                                                             |                                                  |                                                                            |
Reflective Journal Discussions

Discussions ~ Posting ---
Initial Response: Due Thursdays 11:59
Response Posting: Due Sunday 11:59

For each chapter of the text, students will reflect and discuss the reflective discussion question for the week. Each discussion must be at least 200 words in length. Post your discussion for your classmates to view via the discussion tab. Discussions must be posted in order to be graded. (7 points for posting your discussion per week and 3 points for your response to another student’s posting per discussion), (14 discussions yielding 140 points). This assignment must be completed in your assigned group via the discussion icon/link. You will be assigned to a discussion group. Discussion participation must be completed the due date/times noted. (140 points)

Discussion 1.
* Define concept development, and identify concepts children are developing in early childhood.

Discussion 2.
* Provide a science learning experience (briefly) and explain how science concepts are developed and learned.

Discussion 3.
* Discuss what you might do if a 5-year-old seemed not to have the concept of one to one correspondence beyond two groups of three

Discussion 4.
* How are the concepts children construct during the preprimary periods essential to investigating science?

Discussion 5.
* Discuss strategies in which children can be encouraged at home and at school to develop concepts of measurement.

Discussion 6.
* Explain the importance of language and literacy to math, science, and engineering concept formation.
Discussion 7.

* Generate one activity that encourages the development of grouping and symbol skills, along with recommendations for assessment and evaluation.

Discussion 8.

* Look through some early childhood materials catalogs for groups and symbols materials. If you had $400 to spend, what would you purchase?

Discussion 9.

* Generate two activities that encourage development in primary grade whole number and algebraic thinking lessons along with recommendations for assessment and evaluation.

Discussion 10.

* Why is it important to understand concepts such as line, angle, point, curve symmetry and congruence? Include a learning experience that would include some of these concepts.

Discussion 11.

* What is the purpose of introducing young children to earth science concepts and explain why primary age children should explore physical science activities (give at least two reasons).

Discussion 12.

* What are typical topics and concepts included in environmental awareness programs? Why should this be included?

Discussion 13.

* Why are learning centers essential for science and math learning?

Discussion 14.

* Explain how finger plays and action songs can support math concept development?