School of Education Mission Statement
“To equip Christian educators to impact public, private, mission, and homeschools through Biblically-centered education, scholarship, and service.”

School of Education Vision Statement
“To equip a generation of educators focused on God’s calling, devoting their strengths, gifts, and scholarship, to meet the needs of diverse students and advance the Kingdom of God.”

Course Description:
This course is designed to prepare teacher candidates to teach mathematics and science in the elementary school setting. It provides an understanding of the interrelated components of a balanced program of both mathematics and science instruction. The California Mathematics and Science Framework is utilized to teach candidates how to design standards-based instruction that engages elementary students and equips them in mastering the academic content of mathematics and science at each particular grade level.

Required Textbooks:

Additional Reading:
CA Science Framework (excerpts), available at http://www.cde.ca.gov/ci/sc/cf/

Optional:

Course Goals and Objectives
Course objectives correspond to the following IDEA objectives:
IDEA Objective #3 Learning to apply course material (to improve thinking, problem solving, and decisions)
IDEA Objective #4 Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course
IDEA Objective #10 Developing a clearer understanding of, and commitment to, personal values
IDEA Objective #11 Learning to analyze and critically evaluate ideas, arguments, and points of view

The Math component of this course will support Multiple Subject candidates, during interrelated activities in program coursework and fieldwork, to understand how to:
a. Demonstrate a basic understanding of the foundational concepts, including logical connections across major mathematical concepts and principles of the state-adopted academic content standards for students in mathematics. [Assessment – Scope and Sequence Exercise, Lesson Plans, Model Lesson Analyses]

b. Understand God’s mathematical pattern structure and appreciate the complexity of God’s creation as we learn how to teach students to solve problems using multiple strategies. [Assessment: Lesson Plans]

c. Implement various models of instruction and specific teaching strategies for classroom use in the teaching of mathematics to all types of learners [Assessment: Lesson Plans with adaptations for ELLs and special needs, Cooperating Teacher Field Feedback on Candidate’s Teaching]

d. Design appropriate assignments and develop student understanding through appropriate problems and practice. [Assessment of Series of Five Math Lesson Plans; Cooperating Teacher Field Feedback on Candidate’s Teaching]

e. In keeping with the importance of fostering individual God-given abilities and learning preferences, support the application of learned skills to novel and complex problems. [Assessment of Series of Five Math Lesson Plans; Model Lesson Analyses; Field Feedback; Cooperating Teacher Field Feedback on Candidate’s Teaching]

f. Anticipate, recognize and clarify mathematical misunderstandings that are common to K-8 students, partially through critical analysis of math curricular materials and understanding of the scope and sequence of mathematical learning. [Assessment: In-class Textbook Analysis; In-class Error Pattern Analysis; Assessment of Series of Five Math Lesson Plans; Scope and Sequence Exercise]

g. Interrelate ideas and information within and across mathematics and other subject areas through thematic planning of lessons. [Assessment: Series of Five Math Lesson Plans with cross-curricular connections]

h. Design and implement appropriate evaluation measures for the assessment of grade-appropriate skills and problem-solving abilities [Assessment: Series of Five Math Lessons with appropriate summative assessment]

2. The Science component of this course will support Multiple Subject candidates, during interrelated activities in program coursework and fieldwork, to understand how to:

a. Relate an understanding of the state-adopted academic content standards for students in Science (K-8) to major concepts, principles and investigations in the science disciplines [Assessment: Scope and Sequence Exercise]

b. Plan and implement instruction that utilizes hands-on lessons through the use of investigations and experiments to meet requirements in the standards for teaching K-8 science. [Assessment: Field Feedback of Lesson, Lesson Plans]

c. Plan and organize effective laboratory and field activities which encourage K-8 students to ask important questions and develop increasingly complex investigation skills [Assessment: Field Feedback of Lesson, Lesson Plans]

d. Interrelate ideas and information within and across science and other subject areas through thematic instruction. [Assessment: Lesson Plans with cross-curricular connections]

e. Discuss the implications of teaching state-approved science concepts from a Christian Worldview. [Lesson Plans with Biblical Integration Connection]
## TENTATIVE COURSE SCHEDULE

<table>
<thead>
<tr>
<th>DATES</th>
<th>TOPIC</th>
<th>ASSIGNMENTS</th>
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</thead>
</table>
| Session #1 Sept. 1 | Course Introduction - Syllabus  
Part I : Teaching Mathematics  
Developing Early Math Concepts | Burris, ch. 1 & 3   |
| Session #2 Sept. 8 | Assessment  
Place Value and Numeration  
Addition and subtraction  
Error Pattern Analysis | Burris, ch. 2, 4 & 5 |
| Session #3 Sept. 15 | Multiplication and Division  
Factors/Multiples  
Textbook Analysis | Burris, ch. 6 & 7 |
| Session #4 Sept. 22 | Fractions and Decimals  
Data, Statistics, & Probability | Burris, ch. 8 & 9 |
| Session #5 Sept. 29 | Geometric figures  
Measurement | Burris, ch. 10 & 11 |
| Session #6 Oct. 6 | **Part II: Teaching Science**  
Inquiry  
Knowledge and Meaning | A & D ch. 1 & 2   |
| Session #7 Oct. 13 | Inquiry Process Skills  
Planning and Managing  
Scope and Sequence Activity | A & D ch. 3 & 4   |
| Session #8 Oct. 20 | Assessment  
Integrating Science | A & D ch. 6 & 7  
Science Framework, pp. ix-x |
| Session #9 Oct. 27 | Using Technology  
Adapting the Science Curriculum  
Textbook Analysis Activity | A & D ch. 8 & 9  
Science Framework, pp. 18-20 |
| Session #10 Nov. 3 | Teaching Strategies  
EXAM WEEK | A & D ch. 5  
Science Framework, pp. 288-291 |

*Students with disabilities  
Students desiring accommodations for this class on the basis of physical, learning, or psychological disabilities are to contact Disability Services. Disability Services is located in the Learning Center (upstairs in the Biola Library) and can be reached by calling 562.906.4542 or extension 4542 from on campus.
## ASSIGNMENTS

<table>
<thead>
<tr>
<th>ASSIGNMENTS</th>
<th>PTS</th>
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</thead>
<tbody>
<tr>
<td><strong>Attendance and Participation</strong></td>
<td>20</td>
</tr>
<tr>
<td>All students begin with 20 points for attendance and participation. Five (5) points are deducted for each absence. Partial points are deducted for partial absences, late arrival, early departure, and/or unprofessional/unsatisfactory class participation, including preparing for class by completing assigned reading.</td>
<td></td>
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<tr>
<td><strong>Model Lesson Analysis</strong></td>
<td>10</td>
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<tr>
<td>Model lessons will be taught in class by the professor. For each lesson as instructed, complete the “Model Lesson Analysis” form through which you will identify the concepts being addressed, identify and comment on the instructional models and teaching strategies, identify student modalities, identify assessment strategies used, consider the levels of problem-solving and questioning, and suggest possible cross-curricular connections.</td>
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<tr>
<td><strong>Error Pattern Analysis</strong></td>
<td>5</td>
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<tr>
<td>During class, samples of math problems will be provided that illustrate common error patterns made by K-8 students in addition, subtraction, multiplication, and division. Analyze and discuss re-teaching procedures to address these error patterns.</td>
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<tr>
<td><strong>Curriculum Evaluation</strong></td>
<td>10</td>
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<tr>
<td>During class you will develop criteria and critically examine examples of curriculum. Discuss possible teacher responses to errors or misunderstandings.</td>
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<tr>
<td><strong>Math Lesson Plan Series</strong></td>
<td>25</td>
</tr>
</tbody>
</table>
| • Select any grade level and math concept included in the State Math Standards. Develop a series of five math lesson plans on this concept, one of which you will teach in your field placement. In the first lesson, introduce the concept; the next four lessons will use different ways to teach the concept. The fifth lesson must include a summative assessment. Each lesson will include an activity/exercise to hold students accountable for lesson content and promote student engagement.  
• Follow the lesson format provided in class. Reflect only the lesson that you teach. Evaluation tools will be provided in class. |     |
| **Science Lesson Plans**                        | 15  |
| • Select a grade level and State Science Standards. Create three science lesson plans, one in each area: physical science, life science, and earth science. Each will include at least one of the following: hands-on activity, demonstrations, experiment, or laboratory experience. One lesson must include an assessment from which a grade can be taken. Include possible implications of teaching state-approved science concepts from a Christian Worldview as it applies to the selected concepts.  
• Look up your lesson concept in *Encyclopedia of Bible Truths* and comment at the end of your science lesson plans regarding the connections of the concept to Scripture.  
• Follow the lesson format provided in class. Reflect only the lesson that you teach. Evaluation tools will be provided in class. |     |
| **Scope and Sequence Activity**                 | 10  |
| This is an in-class activity during which we will examine State Frameworks to examine concepts, principles and investigations in both math and science. |     |
| **Cooperating Teacher Assessment**              | 5   |
| **TOTAL**                                       | 100 |
Attendance and participation

Students are expected to arrive on time to all sessions of this course prepared to participate in class. If a student must miss a session, the student may choose either an additional independent assignment or a grade adjustment with approval by the professor. Late arrival and/or early departure may constitute loss of participation points at the discretion of the instructor. Any non-negotiable, mandatory attendance days will be specified in writing on the course syllabus. Participation is graded on individual contributions to class. Some of the characteristics of effective class participation are:

1. Points made are relevant to the discussion in terms of increasing everyone’s understanding, not simply a regurgitation of facts.
2. Comments take into consideration the ideas offered by others and reflect good listening.
3. Comments show evidence of a thorough reading and analysis of the class readings.
4. Willingness to interact with other class members by asking questions or challenging conclusions.

Academic honesty / plagiarism

We are committed at Biola University to ethical practice in teaching, scholarship, and service. As such, plagiarism and other forms of academic dishonesty will not be tolerated. It is imperative that you present all written, oral, and/or performed work with a clear indication of the source of that work. If it is completely your own, you are encouraged to present it as such, taking pleasure in ownership of your own created work. However, it is also imperative that you give full credit to any and all others whose work you have included in your presentation via paraphrase, direct quotation, and/or performance, citing the name(s) of the author(s)/creator(s) and the source of the work with appropriate bibliographic information. To do otherwise is to put oneself in jeopardy of being sanctioned for an act or acts of plagiarism that can carry serious consequences up to and including expulsion from the university.

Mobile phones and computers

Out of consideration for others, please turn your electronic devices to the silent mode. If they do not have a silent mode, please turn them off. These items tend to distract other students or the instructor when they ring during class. Please note that the vibratory mode often creates a class disruption. Please refrain from checking email or conducting Internet activities during class unless otherwise directed by the instructor.

Late Assignments

The term “late” refers to work that is not turned in on the day and at the time that it is called for by the instructor or posted to Blackboard prior to the start of class in which the assignment is due. Late work will not earn the full points possible (20% will be deducted from the score for each class an assignment is late). All work must be turned in by the last class to earn any points. In addition, the instructor reserves the right to deduct points from the student’s final grade if the course is not completed by the originally scheduled end date.

Grading Policy

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
</tr>
<tr>
<td>A-</td>
<td>90-92</td>
</tr>
<tr>
<td>B+</td>
<td>87-89</td>
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<tr>
<td>B</td>
<td>83-86</td>
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<tr>
<td>B-</td>
<td>80-82</td>
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<tr>
<td>C+</td>
<td>77-79</td>
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<tr>
<td>C</td>
<td>73-76</td>
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<tr>
<td>C-</td>
<td>70-72</td>
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<tr>
<td>D+</td>
<td>68-69</td>
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<tr>
<td>D</td>
<td>63-67</td>
</tr>
<tr>
<td>D-</td>
<td>60-62</td>
</tr>
</tbody>
</table>

*Student teaching requires a “B-“ or better. All education students graduating with an M.A. in Education must have a 3.0 cumulative GPA requirement.