

**SOUTHERN WESLEYAN UNIVERSITY**  
**SYLLABUS**

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Year 2013      Fall       Spring \_\_\_\_\_      May Term \_\_\_\_\_      Summer School \_\_\_\_\_

COURSE NUMBER/NAME EDUC 4223 Methods of Teaching Mathematics in Secondary/Middle School

INSTRUCTOR Shotsberger

The following checklist indicates the information required for each SWU syllabus (see *Faculty Handbook C-130*.)

- Instructor's name, office number (or telephone number), and office hours
- Course name and number (Including meeting room and time is helpful.)
- Objectives stated in terms of student learning OUTCOMES
- Texts and other required material (author, title, publisher, year)
- Grading procedures
- Policies governing late work
- Policies on attendance and tardiness
- Assignments for semester, including reading, test dates (where possible)
- Outline of the course/topics to be covered
- One or more learning objectives relating to approaching issues from a Christian perspective
- One or more activities with a research component
- One or more activities giving the opportunity for the student to work with others

Also helpful:

\_\_\_\_\_ Prerequisites

\_\_\_\_\_ Reading list or bibliography

Signature Paul Shotsberger  
Instructor

8/15/13  
Date

\_\_\_\_\_  
Dean

\_\_\_\_\_  
Date

## **EDUC 4223 Methods of Teaching Mathematics in Secondary/Middle School**

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3 Credit Hours  
TR 9:25  
Fall 2013

### **Course Description:**

Methods, techniques, and procedures of presentation of mathematics in the classroom. Special attention to the laboratory approach, games, the discovery-inquiry approach, number theory and systems, and individualized approach.

### **Rationale:**

This course is designed to familiarize the secondary mathematics education major with the purposes, curriculum, technology and activities of the secondary mathematics classroom, with an emphasis on preparation and presentation of mathematics lessons.

### **Prerequisites:**

Admission to Lock I and a minimum C overall.

**Relationship to Conceptual Framework:** The theme of the School of Education is integrated with this course by familiarizing students with how dispositions towards scholarship and a Christian ethic of care are related to self, learners, colleagues, and the community in the context of the mathematics high school classroom.

**INTASC Standards, NCTM Standards, and ADEPT Performance Standards** are referenced for each objective and activity.

**Response to Dispositions:** Courses in the School of Education seek to integrate the following dispositions:

- **The teacher candidate demonstrates an ethic of care towards self** by exhibiting a biblical approach to life that is demonstrated by a passion for learning.
- **The teacher candidate demonstrates an ethic of care towards learners** by displaying an enthusiasm about teaching as demonstrated by compassionate and respectful interactions with learners.
- **The teacher candidate demonstrates an ethic of care towards colleagues** by engaging in collaborative work practices as demonstrated by compassionate and respectful interactions with colleagues.
- **The teacher candidate demonstrates an ethic of care towards the community** by recognizing the community as an integral part of the learning process as demonstrated by valuing its pluralist nature.

**This course emphasizes all four of these dispositions.**

### **Accommodations Statement**

If you have a disability that interferes with your learning, test taking, or completion of assignments outlined in the syllabus, please contact Martha Mishoe, Assistant Director of the Center for Transformational Learning. She will help you secure the right documentation, know what

accommodations are appropriate, and authorize professors to accommodate your disability. She will disclose the information you request only to those whom you identify. Neither she nor your professors can authorize or provide accommodations unless you specifically request accommodations each semester. Documentation must meet the guidelines of the Americans with Disabilities Act. We want you to have equal opportunity to learn and a fair assessment of that learning. Your abilities, skills, and efforts should determine your success, not your disability.

### **Counseling Services**

Free services are available in the counseling center for help related to any issues or problems you experience this semester. Contact the secretary, Debbie Eller, at 864-644-5131, or by e-mail [deller@swu.edu](mailto:deller@swu.edu) to schedule an appointment with Monica Perez, Director of Counseling Services. The counseling center is on 3rd floor of the Campus Life Center near the elevator. Your contact with a counselor is confidential.

**Technology Integration** Teacher candidates will be required to use word processors for all assignments. They will learn how to evaluate and use technology such as a SMART Board graphing calculator for instruction. They will access information from the Internet. They will use presentation software for their model lessons.

**Culturally Responsive Teaching:** Teacher candidates will learn how to address issues related to different learning styles, varying abilities, and cultural backgrounds in their own classrooms by discussing text material, doing research in professional journals, evaluating instructional materials, and discussing teaching techniques.

### **Required Textbooks and Materials:**

*Teaching Secondary Mathematics* (Fourth Edition), Routledge 2013  
Student e-membership in the National Council of Teachers of Mathematics

### **Enduring Understandings**

Students will learn that:

1. High school and middle school mathematics classrooms are complex systems which require teachers who are adaptive and flexible in their approach to mathematics education.
2. Mathematics teacher selection and implementation of effective strategies and technologies plays a crucial role in promoting student learning in the classroom.
3. Assessment plays a fundamental role in mathematics instruction and learning, and effective student assessment can enhance teacher decision making.
4. Effective mathematics teaching does not just happen; it is produced by thoughtfully planning each phase of the intended learning process.

**General Course Objectives** : Upon completion of this course, teacher candidates will be able to

OBJECTIVES	ADEPT PD #	INTASC PRINCIPLES	NCTM SPA Standards
1. examine and discuss the role of the mathematics teacher.	1-10	1, 9, 10, 11	2, 3, 4
2. examine and discuss the needs and development of secondary students.	2,3	2,3	3, 4
3. identify appropriate teaching "strategies" to direct learning and activities for developing understanding of mathematical concepts and generalizations, for developing skill in the use of algorithms, for developing	5, 6		3, 4

problem-solving capabilities, for providing for diagnosis and remediation of learning difficulties, for developing techniques for mathematical proof, and for developing mathematics skills used in applied academic courses in the school-to-work model			
4. develop and maintain a beneficial classroom atmosphere including how to accommodate for special education students in the regular classroom, accommodate for a variety of learning styles, and facilitate the integration of instruction between academic and applied components.	8, 9		4
5. plan and evaluate instruction, including providing for and evaluating instruction of students with various types of handicapping conditions and learning styles in courses which include significant applied mathematics techniques	7		3
6. write a daily lesson plan that includes: a. objectives b. procedures that use four areas of communication c. at least two activities to accommodate learning styles and two ability levels d. a list of materials e. evaluation	6, 7, 8		1, 2, 3, 4, 6
7. develop and teach a short lesson for each of five mathematics subjects	5, 6, 7		1, 2, 3, 4, 6
8. discuss trends and issues related to the teaching and learning of mathematics that concerns mathematics education and the public in general (e.g., mainstreaming, gatekeeper courses, low SAT scores, shortage of certified mathematics teachers, Tech Prep)			4, 6
9. discuss the place of technology used in teaching secondary mathematics including scientific and graphics calculators, computer hardware and software, etc.	2, 5		4
10. examine various methods of evaluating the performance of secondary students and select the most appropriate method for a given situation, including both formal and informal evaluation techniques for pretests, final grades, daily work, and participation.	1,2,3,7	8	3, 5
11. discuss methods for dealing with discipline, self-concept, and/or motivation problems in the classroom.	4,7,8,9	2,3,5,6,9	3, 4
12. compile an organized set of materials and ideas that can be used in the secondary mathematics class.	1-10	4	3, 4, 6
13. use computers for word processing, grading, and teacher-made materials.	5	4	4
14. discuss various ways of integrating listening and thinking skills into the curriculum.	4,5,7,8	2,3,4	4

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**Instructional Methods** will include modeling effective teaching methods by the instructor, class discussion, hands-on practice with technology, construction and presentation of mini-lessons, and the opportunity to substitute teach in an introductory math class. Lesson plans will be submitted in and evaluated using the SWU format. Appropriate scoring rubrics will be provided and used for evaluation of required projects.

**Class Attendance Policy**

Please refer to the class attendance policy described on page 19 in the current edition of the University catalog. You are responsible to know the information on these pages.

**Academic Integrity**

Please refer to pages 17 in the current edition of the University catalog. You are responsible to know the information on these pages.

**Use of Electronic Devices During Class**

Because the educational process is one of engagement between learners, instructor, and subject matter, cell phones and other electronic messaging devices are a distraction and intrusion in the learning community at SWU. Therefore, no electronic devices should be used by students during classes except computers for note-taking. I will endeavor to have my mobile phone on silent by the start of every class; please do the same.

**Coursework Submission Dates**

The teacher candidate is expected to submit all assignments on the assigned date (see schedule that follows). If, for any reason, the teacher candidate cannot meet the deadline for the assignment, (s)he should communicate with the instructor to negotiate a submission date that will facilitate the completion of the assignment. In order for the instructor to do his job and assign a valid grade that indicates the student's level of mastery of the course content, all teacher candidates will be given an equal opportunity to succeed. Therefore, it is the teacher candidate's responsibility to complete and submit all assigned work. If an assignment is not submitted on time and no prior arrangement was made for turning the work in late, 10% of the grade for the assignment will be deducted for each class meeting the assignment is turned in after the due date.

**Computation of Final Grade:**

The final semester grade for the class will be computed on a total value of 1000 points as follows:

<b>Assignment</b>	<b>Point Value</b>
Mini-lessons (5)	<b>500 (100 each)</b>
Illuminations activity summaries (4)	<b>200 (50 each)</b>
Semester exams (2)	<b>200 (100 each)</b>
Resource file	<b>100</b>
<b>TOTAL</b>	<b>1000</b>

**Mini-lessons**

Five mini-lessons are to be prepared following the guidelines contained in *Clinical Assessment of the Teacher Candidate, Part B Mathematics* (items #1-6). Each lesson will be taught to the class and the performance will be evaluated using ADEPT criteria. One of the lessons will be recorded for review and reflection by the candidate. Lesson plans should reflect the SWU lesson plan format, and contain material sufficient for an entire class period of 50 minutes, as well as appropriate teaching strategies, technologies, and accommodations for a high school

mathematics class. Each candidate will prepare and teach one lesson from each of the following subjects: Algebra I, Geometry, Algebra II, Pre-calculus, and Tech Math. Each lesson plan will be uploaded to **Chalk and Wire** and submitted to the instructor.

### **Illuminations Summaries**

A total of four one-page word-processed summaries of Illuminations activities (<http://illuminations.nctm.org>) is to be submitted according to the schedule below. These assignments are intended to familiarize the student with resources available from NCTM on its Illuminations Web site.

The format for each summary is:

#### **Personal Information Format**

In the upper left-hand corner of the page include:

Your Name  
EDUC 4223  
Illuminations Summary # \_\_\_\_\_

#### **Summary Format**

The main body of the summary should be *double-spaced* and include two sections with these headings:

**Review** (a detailed description of the main aspects of the lesson plan)

**Application** (How might the information discussed in this lesson plan be of assistance in the planning, implementation, and assessment of any part of your future teaching responsibilities? Does it in any way enhance your development of a disposition of an ethic of care?)

### **Exams**

There will be two semester exams, covering in-class and textbook material covered in the course.

### **Resource File**

You will be required to maintain a file of start-up and other activities worked on in class.

### **Final Grade Point Assignment**

<b>Percentage Range</b>	<b>Letter Grade Equivalent</b>
100-96	A
95-93	A-
92-90	B+
89-87	B
86-84	B-
83-81	C+
80-78	C
77-75	C-
74-73	D+
72-70	D
Less than 70	F

## Class Schedule

<b>Date</b>	<b>Topic</b>	<b>Assignment Due</b>
August 20	Syllabus Overview/Discussion	
August 22	Introduction	Chapter 1
August 27	Learning Theory	Chapter 2 Reform article <b>Illuminations Summary #1</b>
August 29	Curriculum	Chapter 2
September 3	Assessment	Chapter 2 <b>Mini-lesson #1 ready</b>
September 5	Planning	Chapter 3
September 10	Planning	Chapter 3 <b>Illuminations Summary #2</b>
September 12	Skills	Chapter 4
September 17	Skills	Chapter 4
September 19	Technology	Chapter 5 <b>Mini-lesson #2 ready</b>
September 24	Technology (ETV presentation)	Chapter 5
September 26	<b>Exam 1</b>	Review for exam (chap.1-5)
October 1	Problem Solving	Chapter 6 <b>Illuminations Summary #3</b>
October 3	Problem Solving	Chapter 6
<b>October 8</b>	<b>Fall Break</b>	
<b>October 10</b>	<b>Fall Break</b>	
October 15	Discovery	Chapter 7
October 17	Discovery	Chapter 7
October 22	Proof	Chapter 8 <b>Mini-lesson #3 ready</b>
October 24	Proof	Chapter 8
October 29	General Math	Chapter 9 <b>Illuminations Summary #4</b>
October 31	Algebra 1	Chapter 10
November 5	Geometry	Chapter 11
November 7	Adv. Alg. & Trigonometry	Chapter 12 <b>Mini-lesson #4 ready</b>
November 12	Pre-Calculus	Chapter 13
November 14	Calculus	Chapter 14
November 19	Probability & Statistics	Chapter 15
November 21	<b>Exam 2</b>	Review for exam (chap.6-15)
November 26	Professional Growth	<b>Mini-lesson #5 ready</b>
<b>November 28</b>	<b>Thanksgiving</b>	
December 3	Class. Mgmt. & Organization	
December 5	Equity	

PD 1: Long-Range Planning	PD 6: Providing Content for Learners
PD 2: Short-Range Planning	PD 7: Monitoring and Enhancing Learning
PD 3: Short-Range Assessment	PD 8: Maintaining an Environment that Promotes Learning
PD 4: Establishing and Maintaining High Expectations	PD 9: Managing the Classroom
PD 5: Using Instruct. Strategies to Facilitate Learning	PD 10: Professional Growth

### NCTM SPA Standards

1	Content Knowledge
2	Mathematical Practices
3	Content Pedagogy
4	Mathematical Learning Environment
5	Impact on Student Learning
6	Professional Knowledge and Skills

### School of Education Teacher Candidate Principles Interstate New Teacher Assessment and Support Consortium (INTASC) Principles

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Principle #1: The teacher understands the central concepts, tools of inquiry, and the structures of the discipline(s) he or she teaches and can create learning experiences that make these aspects of subject matter meaningful for students.

Principle #2: The teacher understands how children learn and develop, and can provide learning opportunities that support their intellectual, social, and personal development.

Principle #3: The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners.

Principle #4: The teacher understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills.

Principle #5: The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning and self-motivation.

Principle #6: The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration and supportive interaction in the classroom.

Principle #7: The teacher plans instruction based upon knowledge of subject matter, the community, and curriculum goals.

Principle #8: The teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the learner.

Principle #9: The teacher 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.



Principle #10: The teacher fosters relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well-being.

Principle #11: The teacher demonstrates dispositions that promote scholarship within a Christian ethic of care. (Southern Wesleyan University).

# Southern Wesleyan University School of Education Dispositions

## 5a&b. Assessment Tool and Scoring Guide:



Cooperating Teacher □ University Supervisor □

### SELF

#### 1. The candidate exhibits a biblical approach to life that is demonstrated by a passion for learning.

- engages in research and professional development
- reflects on own practices
- holds high expectations for self
- demonstrates initiative
- demonstrates a professional work ethic
- demonstrates a biblical view of life
- engages in habits of moral and ethical integrity
- demonstrates a healthy self-perception
- engages in a balanced, healthy lifestyle

### LEARNERS

#### 2. The candidate is enthusiastic about teaching as demonstrated by compassionate and respectful interactions with learners.

- demonstrates an integration of theory with practice
- demonstrates sensitivity to diverse learning styles and abilities
- promotes critical thinking
- encourages application of learning beyond the classroom
- encourages high achievement in all learners
- motivates learners
- promotes learning for its intrinsic value
- demonstrates a nurturing and caring attitude
- demonstrates equity in interactions
- exemplifies sensitivity to learners' nonacademic needs
- encourages individual responsibility
- acts on the belief that all students can learn

### COLLEAGUES

#### 3. The candidate engages in collaborative work practices as demonstrated by compassionate and respectful interactions with colleagues.

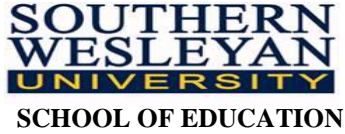
- promotes collaborative learning
- responds constructively to feedback
- works cooperatively and professionally with others
- speaks positively about colleagues
- displays sensitivity to the needs of colleagues
- fosters professional relationships

### COMMUNITY

#### 4. The candidate recognizes the community as an integral part of the learning process as demonstrated by valuing its pluralist nature.

- views community as a context for teaching
- promotes community involvement in educational practices
- promotes communication with the community
- respects diversity within the community
- engages as a member of the community
- responds nonjudgmentally to members of the community

**5a&b. Assessment Tool and Scoring Guide:**



Cooperating Teacher  University Supervisor

**CLINICAL ASSESSMENT of the  
TEACHER CANDIDATE**

“Educators who demonstrate scholarship within a Christian ethic of care”

**PART B MATHEMATICS**

Teacher Candidate \_\_\_\_\_ ID # \_\_\_\_\_ Total Field Hours \_\_\_\_\_

Assessor \_\_\_\_\_ School \_\_\_\_\_ Instructional Level/Subject \_\_\_\_\_

**Instructions: The following assessment items are based on topics that describe what a beginning teacher should know and be able to do in order to effectively help all students achieve the P-12 student standards. Your assistance is being requested to provide evidence that the respective Teacher Candidate is meeting each of these principles at this stage in this field experience. Please indicate the Teacher Candidate’s rating in relation to each of the principles using the scale below. Provide additional comments to support your rating. You do not have to respond to any item you feel you cannot accurately evaluate.**

Criterion	Below Basic-Unacceptable 1	Basic-Acceptable 2	Proficient-Acceptable 3	Advanced-Target 4	Score
1. Analyzing Mathematical Thinking (NCTM 5c)	The candidate does not collect, organize, analyze, and reflect on diagnostic, formative, and summative assessment evidence and determines the extent to which students’ mathematical proficiencies have increased as a result of their instruction.	The candidate analyzes, but does not consistently evaluate the mathematical thinking and strategies of others.	The candidate analyzes and consistently evaluates the mathematical thinking and strategies of others but does not determine the extent to which students’ mathematical proficiencies have increased as a result of their instruction.	The candidate collects, organizes, analyzes, and reflects on diagnostic, formative, and summative assessment evidence and determines the extent to which students’ mathematical proficiencies have increased as a result of their instruction.	
2. Selecting and Using Appropriate Mathematical Tools and Activities (NCTM 4c, 4d, 4e)	The candidate does not select, use, and determine suitability of appropriate instructional tools and activities to actively engage a diversity of students, while maintaining high expectations for all students.	The candidate selects, uses, and determines suitability of appropriate instructional tools and activities for average classroom students.	The candidate does select, use, and determine suitability of appropriate instructional tools and activities for most students, but either does not include students with special needs or does not maintain high expectations for all students	The candidate applies mathematical content and pedagogical knowledge to select and use appropriate instructional tools and activities to actively engage a diversity of students, while maintaining high expectations for all students.	

<p>3. Applying Knowledge of Mathematics Curriculum Standards (NCTM 3a, 3b, 3d, 3e)</p>	<p>The candidate does not apply knowledge of curriculum standards and mathematics research for secondary mathematics within and across mathematical domains</p>	<p>The candidate applies knowledge of curriculum standards and mathematics research for secondary mathematics within and across mathematical domains.</p>	<p>The candidate applies knowledge of curriculum standards and mathematics research for secondary mathematics within and across mathematical domains but either does not provide students opportunities to communicate about mathematics or does not make connections.</p>	<p>The candidate applies knowledge of curriculum standards and mathematics research for secondary mathematics within and across mathematical domains in order to provide students with opportunities to communicate about mathematics and make connections among mathematics, other content areas, everyday life, and the workplace.</p>	
<p>4. Planning and Creating Mathematical Learning Opportunities (NCTM 4a, 4b)</p>	<p>The candidate does not plan and create developmentally appropriate, sequential and challenging learning opportunities grounded in mathematics education research in which students are actively engaged in building new knowledge from prior knowledge and experiences and demonstrate positive disposition toward mathematical processes and learning.</p>	<p>The candidate plans and creates developmentally appropriate, sequential and challenging learning opportunities grounded in mathematics education research.</p>	<p>The candidate plans and creates developmentally appropriate, sequential and challenging learning opportunities grounded in mathematics education research but either does not actively engage students in building new knowledge from prior knowledge and experiences or does not demonstrate positive disposition toward mathematical processes and learning.</p>	<p>The candidate plans and creates developmentally appropriate, sequential and challenging learning opportunities grounded in mathematics education research in which students are actively engaged in building new knowledge from prior knowledge and experiences and demonstrate positive disposition toward mathematical processes and learning.</p>	
<p>5. Planning for Differentiated Mathematics Instruction (NCTM 3c)</p>	<p>The candidate does not plan lessons and units that incorporate a variety of strategies, differentiated instruction for diverse populations, and mathematics-specific and instructional technologies for building all students' conceptual understanding</p>	<p>The candidate plans lessons and units that incorporate a variety of strategies, differentiated instruction for diverse populations, and mathematics-specific and instructional technologies.</p>	<p>The candidate plans lessons and units that incorporate a variety of strategies, differentiated instruction for diverse populations, and mathematics-specific and instructional technologies but either does not build all students' conceptual understanding or does not</p>	<p>The candidate plans lessons and units that incorporate a variety of strategies, differentiated instruction for diverse populations, and mathematics-specific and instructional technologies for building all students' conceptual understanding and procedural proficiency.</p>	

	and procedural proficiency.		build procedural proficiency.		
6. Impacting Student Mathematical Learning (NCTM 5a, 5b)	The candidate does not ensure that secondary students demonstrate any of the following: conceptual understanding; procedural fluency; the ability to formulate, represent, and solve problems; logical reasoning and continuous reflection on that reasoning; productive disposition toward mathematics; and the application of mathematics in a variety of contexts within major mathematical domains, including the use of mathematics-specific technology.	The candidate ensures that secondary students demonstrate some of the following: conceptual understanding; procedural fluency; the ability to formulate, represent, and solve problems; logical reasoning and continuous reflection on that reasoning; productive disposition toward mathematics; and the application of mathematics in a variety of contexts within major mathematical domains, including the use of mathematics-specific technology.	The candidate ensures that secondary students demonstrate most of the following: conceptual understanding; procedural fluency; the ability to formulate, represent, and solve problems; logical reasoning and continuous reflection on that reasoning; productive disposition toward mathematics; and the application of mathematics in a variety of contexts within major mathematical domains, including the use of mathematics-specific technology.	The candidate ensures that secondary students demonstrate conceptual understanding; procedural fluency; the ability to formulate, represent, and solve problems; logical reasoning and continuous reflection on that reasoning; productive disposition toward mathematics; and the application of mathematics in a variety of contexts within major mathematical domains, including the use of mathematics-specific technology.	
7. Monitor Student Progress (NCTM 3f, 3g)	The candidate does not monitor students' progress, make instructional decisions, or measure students' mathematical understanding and ability through planning, selecting, implementing and interpreting formative and summative assessments.	The candidate minimally monitors students' progress, makes instructional decisions, and measures students' mathematical understanding and ability through planning, selecting, implementing and interpreting formative and summative assessments.	There is evidence that the candidate monitors students' progress, makes instructional decisions, and measures students' mathematical understanding and ability through planning, selecting, implementing and interpreting formative and summative assessments.	The candidate clearly monitors students' progress, makes instructional decisions, and measures students' mathematical understanding and ability through planning, selecting, implementing and interpreting formative and summative assessments.	

