

*Report on the Preparation*  
*of*  
*Secondary School*  
*Mathematics Teachers*  
*in the*  
*California State University*

Prepared by

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## INTRODUCTION

The material appearing herein was compiled from the responses of faculty members in Mathematics Departments of the California State University system who are responsible for preparing Secondary School mathematics teachers. A questionnaire was used to ascertain the state of teacher preparation programs in terms of the mathematics content and methodology. Current figures on numbers of prospective teachers entering and exiting the programs were also obtained. This report is an update of the October 1998 *Report on the Preparation of Secondary School Mathematics Teachers in the California State University*.

The purpose of this report is to keep all those who prepare secondary school mathematics teachers better informed. We should know what courses are required at other campuses and those responsible for the different phases of the mathematics teacher preparation program.

I wish to thank the professors who responded to my queries for information. The names of mathematics department faculty responsible for the preparation of secondary school mathematics teachers appear on pages 3-7. This document has been distributed to all of these faculty members and their department chairs. The cost of publication was paid for by a grant from the Office of Grants and Contracts and the Department of Mathematics of California State University, Fullerton.

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## LIST OF CSU FACULTY WHO MONITOR THE SECONDARY SCHOOL MATHEMATICS CREDENTIAL PROGRAM

<u>University</u>	<u>Math Dept. Chair</u>	<u>Sec Math Teacher Training Faculty (*Committee Chair)</u>
1. California State University, Bakersfield 9001 Stockdale Highway Bakersfield, CA 93311-1099	Laird Taylor (661) 664-3197 (661) 664-2039(fax) <a href="mailto:ltaylor@subak.edu">ltaylor@subak.edu</a>	Jorgen Berglund Joe Fiedler Mike Lutz  <i>(no official committee nor chair)</i>
2. California State University, Chico First and Normal Streets Chico, CA 95929-0150	Margaret Owens (530) 898-6111 (530) 898-4363(fax) <a href="mailto:mathdept@suchico.edu">mathdept@suchico.edu</a>	Eliza Berry Rapti de Silva William Fisher Rick Ford LaDawn Haws Thomas Mattman Margaret Owens Neil Portney* Sharon Ross Robin Soloway
3. California State University, Dominguez Hills 1000 East Victoria Street Carson, CA 90747-0005	George Jennings (310) 243-3378 (310) 516-3627(fax) <a href="mailto:gjennings@csudh.edu">gjennings@csudh.edu</a>	Hal Anderson Fred Brulois Gary Hart Eunice Krinsky* John Wilkins Sheila Woods
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**Sec Math Teacher  
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(\*Committee Chair)**

<b>University</b>	<b>Math Dept. Chair</b>	<b>(*Committee Chair)</b>
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12. California State University, Sacramento 6000 J Street Sacramento, CA 95819	Wallace Etterbeek (916) 278-6534 (916) 278-5586(fax) <a href="mailto:etterbeekw@csus.edu">etterbeekw@csus.edu</a>	Edward Bradley Roberta Gehrman* Scott Farrand John Ingram Elaine Kasimatis** Roger Leezer Brian Lim*** Judith Ng Gary Shannon Ed Shea Lisa Taylor Wallace Etterbeek
<p>(*Coordinator of the Mathematics Blended Program, **Convener of the Credential Committee, ***from Education Department, teaches Math Methods course)</p>		
13. California State University, San Bernardino 5500 University Parkway San Bernardino, CA 92407	Peter D. Williams (909) 880-5361 (909) 880-7119(fax) <a href="mailto:williams@math.csusb.edu">williams@math.csusb.edu</a>	Joe Chavez Terry Hallett Zahid Hasan John Sarli Robert Stein*

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17. California Polytechnic State University, San Luis Obispo San Luis Obispo, CA 93407	Kent Morrison (805) 756-2206 (805) 756-6537(fax) <a href="mailto:kmorriso@calpoly.edu">kmorriso@calpoly.edu</a>	Alan Holz Elsa Medina Bernard Strickmeier* Robin Ward
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<b>University</b>	<b>Math Dept. Chair</b>	<b>Sec Math Teacher Training Faculty (*Committee Chair)</b>
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## 1. What course content is required for your prospective teachers?

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### California State University, Bakersfield (Quarter System)

#### *Mathematics Courses Required for Single Subject Teaching Credential*

The proposed subject matter program in mathematics consists of eighteen courses for a total of 79 units.

First year Calculus	Math 211, 212
Second year Calculus	Math 213, 214
Laboratory Experience	Math 222, 223
Sets and Logic	Math 300
Linear Algebra	Math 330
Algebraic Structures	Math 331
Probability	Math 340
Real Analysis I	Math 363
Statistics	Math 341
Modern Geometry	Math 420
Modern Math for Teachers	Math 425
Number Theory	Math 430
History of Mathematics	Math 450
Senior Seminar for Teachers	Math 491
Early Field Experience in the Secondary School	EDSE 241

The required mathematics courses listed above provide both breadth and depth in important areas in mathematics. In addition, one computer science cognate course, Pascal (CS 212), and two science cognate courses are required for the major.

### California State University, Chico (Semester System)

#### *Mathematics Courses Required for Single Subject Teaching Credential*

<b>Course Number</b>	<b>Course Title</b>	<b>UNITS</b>
Math 007A	Analytical Geometry & Calculus	4
Math 007B	Analytical Geometry & Calculus	4
Math 007C	Analytical Geometry & Calculus	4
Math 100	Methods of Proof	3
Math 102	History of Math	3
Math 103	Conceptual and Practical Statistics	3
Math 114A	Math Topics for Credential	3
Math 135	Elementary Linear Algebra	3
Math 201*	College Geometry	3
Math 228A*	Advanced Calculus	3
Math 237*	Modern Algebra 3	3
Math 250*	Introduction to Number Theory	3
Math 266*	Combinatorial Mathematics & Graph Theory	3
<b>TOTAL</b>		<b>42</b>

\* Math 100 must be taken prior to the 200 level math courses listed here.

<u>Additional Courses:</u>	<u>Units</u>
Computer Requirement, ONE of the following:	
CSCI 15A, 50, 54 or 65;	3
OR	
Math 65 or 95	3
<b>Elective:</b>	
Math 7D or any additional upper division course	3 - 4
(except Math 112, 113, 151, 152, 153, 154, 155, 215 or 315)	
<b>TOTAL</b>	<b>48—49</b>

**California State University, Dominguez Hills (Semester System)**

*Mathematics Courses Required for Mathematics Education Option in the Mathematics Major (66 units)*

Single field major—no minor required. This option will satisfy the subject matter preparation necessary for a secondary teaching credential in mathematics. All courses used to satisfy this option must be passed with a grade of “C” or better.

Students not seeking a degree in mathematics, but wishing to satisfy the requirements for the teaching credential in mathematics must take at least nine (9) units of upper division mathematics at CSUDH, including MAT 490.

<b><i>Common Core Requirements</i></b>			<b><i>34 units</i></b>
<b>Lower Division Required Courses</b>			<b>(25 units)</b>
MAT	191	Calculus I	4
MAT	193	Calculus II	4
MAT	211	Calculus III	4
MAT	271	Foundations of Higher Mathematics	3
PHY	130	General Physics I	5
PHY	132	General Physics II	5
<b>Upper Division Required Courses</b>			<b>(9 units)</b>
MAT	331	Linear Algebra	3
MAT	333	Abstract Algebra	3
MAT	411	Mathematical Modeling	3
<b><i>Courses for the Mathematics Education Option</i></b>			<b><i>32 units</i></b>
<b>Lower Division Required Courses</b>			<b>(14 units)</b>
CSC	101	Computer Applications for Scientists	2
MAT	141	Computers for Mathematics Teaching	3
MAT	143	Problem Solving in Mathematics	3
MAT	281	Discrete Mathematics	3
<b>Upper Division Required Courses</b>			<b>(18 units)</b>
MAT	321	Probability and Statistics	3
MAT	347	Modern Geometry	3
MAT	443	History of Mathematics	3
MAT	447	Number Theory	3
MAT	490	Seminar in Mathematics Education	3
TED	305	Introduction to Urban/ Multicultural Classroom	1
TED	415	Multicultural Perspectives for Teachers	2

**California State University, Fresno (Semester System)**

*Mathematics Courses Required for Single Subject Teaching Credential*

COURSES		UNITS
Math 75	Mathematical Analysis I	4
Math 76	Mathematical Analysis II	4
Math 77	Mathematical Analysis III	4
Math 101	Statistical Methods	4
Math 114	Discrete Structures	3
Math 116	Theory of Numbers	4
Math 143	History of Mathematics	4
Math 145	Problem Solving	3
Math 151	Principles of Algebra	4
Math 152	Linear Algebra	4
Math 161	Principles of Geometry	3
Math 171	Intermediate Mathematical Analysis I	4
Math 128	Applied Complex Analysis or	
Math 165	Differential Geometry or	
Math 172	Intermediate Mathematical Analysis II	3—4

**BREADTH REQUIREMENT IN SUBJECT MATTER PREPARATION**

CSCI 40	INTRO TO PROGRAMMING & PROBLEM SOLVING	4
PHYSICS 4A	ELEMENTARY PHYSICS	3
<b>TOTAL</b>		<b>55—56</b>

**CREDENTIAL PROGRAM ADMISSION EDUCATION COURSE REQUIREMENT**

EHD	50	Introduction to Teaching	2
<b>Professional Education Course Requirements</b>			
ERF	151	Social Foundations of Education	3
ERF	152	Psychological Foundations of Education	3
CTET	159	Curriculum and Instruction	3
CTET	161	Methods and Materials in Secondary Teaching	3
LEE	156S	Content Area Reading in the Secondary Schools	3
EHD	155A	Student Teaching in Secondary School	5
EHD	155B	Student Teaching in Secondary School	10

**Additional Course Requirements for the Clear Credential**

H S	121	Secondary School Health Science Education	2
SPED	160	Mainstreaming Exceptional Students	3
CTET	101	Educational Applications of Microcomputers	?

**California State University, Fullerton** (Semester System)

*Mathematics Courses Required for Single Subject Teaching Credential*

<b><u>Programming Requirement (3 units)</u></b>		
One of the following:		
CPSCI 121	Programming Concepts	3
ECCN 205	Digital Computation	
Math 320	Introduction to Mathematical Computation	
<b><u>Core Requirements (27 units):</u></b>		
Math 150A, B	Analytic Geometry & Calculus	4, 4
Math 250A	Intermediate Calculus	4
Math 250B	Intro to Linear Algebra & Differential Equations	4
Math 280	Strategies of Proof	2
Math 307	Linear Algebra	3
Math 335	Mathematical Probability	3
Math 350A	Advanced Calculus	3
<b><u>Teaching Mathematics Concentration (18 units)</u></b>		
Math 302	Modern Algebra	3
Math 370	Mathematical Model Building	
Or		3
Math 375	Discrete Dynamical Systems and Chaos	
Math 401	Algebra & Probability for Secondary Teachers	3
Math 402	Logic & Geometry for Secondary Teachers	3
<b><u>Two courses from the following two groups:</u></b>		
Math 414	Topology	
Or		3
Math 417	Foundations of Geometry	
Math 435	Mathematical Statistics	
Or		3
Math 438	Introduction to Stochastic Processes	
Or		
Math 470	Advanced Mathematics Model Building	
<b><u>Writing Requirement (3 Units)</u></b>		
Math 380	History of Mathematics	3

**California State University, Hayward (Quarter System)**

*Mathematics Courses Required for Single Subject Teaching Credential*

COURSE		UNITS
Math 1300	Trigonometry & Analytic Geometry	4
Math 1304	Calculus I	4
Math 1305	Calculus II	4
Math 2101	Elements of Linear Algebra	4
Math 2150	Discrete Structures	4

Math 2304	Calculus III	4
Math 3121	Abstract Algebra I	4
Math 3215	Geometry I	4
Math 3600	Number Theory	4
Math 4040	History of Mathematics	4
Math 4901	Senior Seminar	2
Stat 2010	Elements of Statistics for Business & Economics	5
Stat 3401	Introduction to Probability Theory	4
<b>TOTAL</b>		<b>51</b>

<b>Coursework Providing Breadth and Perspective</b>		
a) Additional advanced courses that require calculus as a prerequisite		
Math 3300	Analysis I	4
Math 3331	Differential Equations	4
b) One course in computer science course		
CS 1160	Introduction to Computer Science and Programming Methods	4
c) Field experiences related to mathematics: One course chosen from the following, or other field experience approved by the Mathematics Subject Matter Preparation Adviser:		
Math 3898	Cooperative Education (requires a minimum of 100 hours of Co-op work)	2
Math 4900	Independent Study (in tutoring) (requires a minimum of 60 hours of tutoring in the Departmental Math Lab)	2

*Hayward continued*

d) Additional courses to bring the total Breadth and Perspective units to 22, chosen from the following list or from other related courses approved by the Mathematics Subject Matter Preparation Adviser:		
Chem 1101	General Chemistry	5
Chem 1102	General Chemistry	5
Chem 1103	General Chemistry	5
CS 1020	Introduction to Computers	4
CS 2360	Programming Methodology and Introduction to Software Engineering	4
CS 2430	Computer Organization and Assembly Language Programming	4
Econ 2301	Principles of Microeconomics	4

Econ 2302	Principles of Macroeconomics	4
Math 3100	Linear Algebra	4
Math 3122	Abstract Algebra II	4
Math 3301	Analysis II	4
Math 4215	Topics in Geometry	4
Mgmt. 3100	Intro to Quantitative Methods in Business	5
Phil 1001	Introduction to Logic	4
Phil 3002	Modern Logic	4
Phys 1001	General Physics	5
Phys 1002	General Physics	5
Phys 1003	General Physics	5
Stat 3502	Statistical Inference I	4
Total units of courses providing breadth and perspective		22
<b>TOTAL</b>		<b>73</b>

**Humboldt State University** (Semester System)

*Mathematics Courses Required for Single Subject Teaching Credential*

Course		Units
Math 109	Calculus I	4
Math 110	Calculus II	4
Math 210	Calculus III	4
Math 240	Introduction to Mathematical Thought	3
Math 241	Elements of Linear Algebra	2
Math 301*	Mathematics and Culture: A Historical Approach (meets Diversity and Common Ground requirement)	3
Or Math 401*		3
Stat 323*	Probability and Mathematical Statistics	4
Math 340*	Number Theory	3
Math 343*	Introduction to Algebraic Structures	4
Math 344*	Linear Algebra	3
Math 317*	Geometry	3
Math 407*	Senior Seminar: School Mathematics from an Advanced View-Point	3
Or, Course in computer programming (E.g.: Basic, C++, Fortran, Java, Pascal)		

Additional approved courses must be taken to bring the total number of upper division units to a minimum of 26. Recommended electives include: Math 415\* (Introduction to Real Analysis), Math 474\* (Graph Theory), Math 361\* (Modeling).

An advisor-approved coherent program of not less than 8 units in a field of study to which mathematics is applicable is also required. Physics 109 and 110 are recommended for this purpose

An advisor-approved coherent program	8
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The following courses are not required but are strongly recommended:

Math 481*	Workshop in Tutoring Math	1
Philosophy 100	Logic (Meets Area A General Education)	3
Art 105B	Beginning Representational Drawing (Meets Area C General Education)	3
Journalism 232	Technical Writing	3

\*Courses so marked are upper division courses.

**California State University, Long Beach** (Semester System)

*Mathematics Courses Required for Single Subject Teaching Credential*

<b>Lower Division (21 units)</b>		
Math 122	Calculus I	4
Math 123	Calculus II	4
Math 224	Calculus III	4
Math 233	Fundamental Concepts for Advanced Math	3
Math 247	Introduction to Linear Algebra	3
<b>One of the following: (3 units)</b>		
CECS 174	Programming & Problem Solving I	3
CECS 242	Computer Methods I	3
Math 278*	Computer Applications in Math for Teachers	3
<b>Upper Division (30 units)</b>		
Math 310	History of Mathematics	3
Math 341	Number Theory	3
Math 355	College Geometry	3
Math 361A*	Introduction to Mathematics Analysis I	3
Or		
Math 364A	Ordinary Differential Equations	3
Math 380	Probability and Statistics	3
Math 381	Mathematics Statistics	3
Math 410	History of Modern Mathematics	3
Math 411	Topics in Secondary Math	3
Math 444	Introduction to Higher Algebra	3
Upper division mathematics elective		3

\* denotes preferred courses

**California State University, Los Angeles (Quarter System)**

Students seeking a Single Subject Credential in Mathematics for secondary teaching from the State of California may complete the following program of course work (or its equivalent taken at another institution). Students should also consult advisors in the School of Education regarding required work in education, examinations, practice teaching, credentialing procedures, etc.

<b>Required Courses in Mathematics, Computer Science, and Physics</b>		<b>Units</b>
MATH 102	College Algebra	4
MATH 103	Algebra & Trigonometry	4
MATH 206-209	Calculus I - IV	4-4-4-4
MATH 255	Introduction to Matrix Theory	4
MATH 320	History of Mathematics	4
MATH 325	Mathematical Notation & Proof	4
MATH 248	Discrete Mathematics	4
MATH 398	Observation and Tutoring	1-1-1
MATH 430	Modern Geometry	4
MATH 446	Number Theory	4
MATH 455	Modern Algebra I	4
MATH 465	Advanced Calculus I	4
MATH 474	Theory of Probability	4
MATH 490	Senior Seminar	4
CS 290 CS 201	Intro to FORTRAN Programming Or Intro to Programming	2 4
PHYSICS 201, 202	General Physics	4, 4

Electives: Choose at least 12 units from the following related areas:

- BIOLOGY                    302, 315, 408
- COMPUTER INFORMATION SYSTEMS    228, 283, 294
- CHEMISTRY                101, 122, 123, 401, 402, 403, 414
- COMPUTER SCIENCE    240, 340 *Either of 201 or 290 not selected above*
- ECONOMICS                209, 309, 310, 391, 403, 409, 410, 413, 414
- ENGINEERING             201, 202, 204, 209, 306, 326A, 344, 345
- MATHEMATICS            215, 420, 456, 457, 466, 470, 472, 475
- PHILOSOPHY                250, 404, 405, 406
- PHYSICS                    203-206, 410AB, 427, 428, 432, 488

(Mathematics 466 is strongly recommended for those who may be teaching advanced placement calculus classes.)

**California State University, Northridge (Semester System)**

**ACADEMIC PROGRAM MATHEMATICS**

<b>COURSE TITLE</b>		<b>UNITS</b>
<u>Lower Division</u>		
Math 150A	Mathematical Analysis I	5
Math 150AL	Calculus Laboratory I	1
Math 150B	Mathematical Analysis II	5
Math 150BL	Calculus Laboratory II	1
Math 250	Mathematical Analysis III	3
Math 262	Introduction to Linear Algebra	3
Phys 220A & AL	Mechanics & Mechanics Lab	4
Phil 230	Symbolic Logic I	4
Comp 110/106L	Computing in Engineering and Sciences	3
Or		
Comp 110/110L	Introduction to Algorithms & Programming	
<b>Lower Division Units</b>		<b>29</b>
<u>Upper Division</u>		
Math 320	Foundations of Higher Math	3
Math 364	Elementary Modern Algebra	3
Math 373	Modern Geometry	3
Math 391	Field Experience in the Public Schools	2
Math 411	Foundations of Geometry	3
Math 412	Foundations of Algebra	3
Math 441	Introduction to Statistical Inference	3
Math 490	Seminar in History of Mathematics	3
Electives	Choices from Mathematics, Physics, Health Science, Management Science	3-4
<b>Upper Division Units</b>		<b>26–27</b>
<b>Total Units</b>		<b>55–56</b>

The **BA Option II: Teaching** major in mathematics also includes Physics 220B & BL (Electricity and Magnetism) and SEd 525MA (Methods in Teaching Mathematics).

**California State Polytechnic University, Pomona** (Quarter System)

**MATHEMATICS SUBJECT MATTER  
PREPARATION PROGRAM  
RECOMMENDED PROGRAM**

Mat 114	Analytic Geometry and Calculus I
Mat 115	Analytic Geometry and Calculus II
Mat 116	Analytic Geometry and Calculus II
Mat 201	Introduction to Numerical Methods
Mat 208	Introduction to Linear Algebra
Mat 214	Calculus of Several Variables

Mat 215	Calculus of Several Variables
Mat 306	History of Math
Mat 310	Introduction to Logic and Set Theory
Mat 314	Intermediate Analysis I
Mat 325	Introduction to Number Theory
Mat 330	Modern Euclidean Geometry
Mat 415 Or Mat 416	Foundations of Geometry Projective Geometry
Mat 417	Modern Algebra I
Mat 418	Modern Algebra II
Mat 495	Topics & Issues in Contemporary Secondary School Math
Mat 496	Topics & Issues in Contemporary Secondary School Math
Mat 497	Topics & Issues in Contemporary Secondary School Math
STA 330	Applied Probability Theory
STA 331	Applied Statistics
CS 128	C++

**California State University, Sacramento** (Semester System)

*Mathematics Courses Required for Single Subject Teaching Credential*

<b>Course</b>		<b>Units</b>
Math 30	Calculus I	4
Math 31	Calculus II	4
Math 32	Calculus III	4
Math 35	Introduction to Linear Algebra	3
Math 45	Differential Equations	4
Math 102	Number Theory	3
Math 108	Intro to Formal Mathematics	3
Math 110A	Modern Algebra	3
Math 110B	Modern Algebra	3
Math 121	Euclidean Geometry	3
Math 130A	Advanced Calculus	3

Math 130B	Advanced Calculus	3
Math 190	History of Mathematics	3
Math 193	Capstone Course	3
<b>TOTAL</b>		<b>46</b>
<u>Additional Courses:</u>		
CSci 10, 22, or 25		2—3
Stat 1	Introduction to Statistics	3
	<b>Total</b>	<b>5—6</b>

*The Mathematics Blended Program (for achieving a California Credential in 5 years) has the following additional courses:*

Math 198	Tutoring Seminar Or
EDTE 100	Observation and Participation in Schools
EDBM 105	Multicultural Education
EDTE 106	Educational Psychology
EDTE 384	Reading
EDTE 380	Secondary Teaching (A Common Field Experience for Math 193, EDTE 384, EDTE 380)
EDTE 386	Math Methods
Student Teaching (2 Semesters)	

**California State University, San Bernardino (Quarter System)**

*Mathematics Courses Required for Single Subject Teaching*

<b>Course</b>		<b>Units</b>
Math 211	Basic Concepts in Calculus	4
Math 212	Calculus II	4
Math 213	Calculus III	4
Math 241	Problem Solving in Calculus	2
Math 251	Multivariable Calculus I	4
Math 252	Multivariable Calculus II	4
Math 331	Linear Algebra	4
Math 345	Number Theory and Proof	4
Math 355	Analysis and Proof	4
Math 372	Combinatorics	4
Math 465	Probability Theory	4
Math 545	Abstract Algebra I	4
Math 553	Analysis I	4

<b>Total</b>	<b>50</b>
Math Electives – 5 additional courses	20
(*Math 480      Topics in History of Mathematics)	4)
(*Math 529      Advanced Geometry)	4)
Additional course in computing	4
<b>TOTAL</b>	<b>24</b>

\*These are to be taken as Math electives in order to satisfy the requirements for the California Single Subject Credential in Math

### San Diego State University (Semester System)

#### *Mathematics Courses Required for Single Subject Teaching Credential*

<b>Courses</b>	<b>Units</b>
Math 150      Single Variable Calculus	5
Math 151      Calculus & Analytical Geometry	4
Math 252      Multivariate Calculus	4
Math 245      Discrete Mathematics	3
Math 254      Introduction to Linear Algebra	3
Math 302      Basic Mathematical Concepts	3
Math 357      Probability and Statistics	3
Math 414      Mathematics Curriculum and Instruction	3
Math 510      Intro to the Foundations of Geometry	3
Or	
Math 511      Projective Geometry	
Or	
Math 512      Non-Euclidean Geometry	
Math 521A      Abstract Algebra	3
Math 534A      Advanced Calculus I	3

CS 107	Introduction to Computer Programming	3
Or		
CS 205	Introduction to Computational Analysis	
Two additional upper division electives in math		6
<b>Total</b>		<b>46</b>

**San Francisco State University** (Semester System)

*SUBJECT MATTER PREPARATION PROGRAM IN  
MATHEMATICS*

A minimum grade point average of 2.75 is required in the following courses (or their equivalents).

<b>CORE</b>		<b>UNITS</b>
Math 226-228	Calculus I-III	4-4-4
Math 300	History of Mathematics	3
Math 310	Elementary Number Theory	3
Math 335	Modern Algebra	3
Math 325	Linear Algebra	3
Math 350	Geometry	3
ONE of the following:		
Math 324	Probability and Statistics with Computing	3
Math 441	Mathematical Statistics*	3
<b>Total</b>		<b>33</b>

<b>BREADTH and PERSPECTIVE</b>		
Math 301	Exploration and Proof	3
Math 376	Ordinary Differential Equations I	3
Math 460	Mathematical Modeling	3
Math 490	Mathematics Seminar	3
Math 699	Special Study in Mathematics**	1

ONE of the following:		
Math 309	Computation in Mathematics	3
CSc 201*	Introduction to Computer Programming For Non-majors	3
<b>Total</b>		<b>16</b>

\* Math 340 Introduction to Probability is a prerequisite.

\*\* Early field experience in mathematics; may be waived with approval of the Mathematics Department's Credential Advisor.

### San Jose State University (Semester System)

#### *Mathematics Courses Required for Single Subject Teaching Credential*

Course		Units
Math 42	Discrete Math	3
Math 30	Calculus I	3
Math 31	Calculus II	3
Math 32	Calculus III	3
Or		
Math 131A	Real Analysis	(3)
Or		
Math 133A	Differential Equations	(3)
Math 104	History of Mathematics	3
Math 115	Modern Geometry and Transformations	3
Math 126	Theory of Numbers	3
Or		
Math 201B	Mathematics for Secondary Teachers	(3)
Math 128A	Abstract Algebra I	3
Math 129A	Linear Algebra I	3
Math 201A	Math for Secondary Teachers	3
Math 161	Applied Statistics	3
Or		
Math 164	Mathematical Statistics	(3)
Math 163	Probability Theory	3
<b>Core Total</b>		<b>36</b>

<b>Three from the following:</b>	<b>9</b>
Physics 60, 61, 62,	2-4-4
Math 196N (Integrated Math & Science),	3
Math 143M (Numerical Analysis),	3
Math 177 (Linear and Nonlinear Programming),	3
Math 178 (Modeling)	3

<b>One of the following:</b>	<b>3</b> ___	
Math 128B Abstract Algebra II		3
Math 129B Linear Algebra II		3
Math 131B Real Analysis II		3
Math 175 Topology		3

**California State Polytechnic University, San Luis Obispo** (Quarter System)

*Mathematics Courses Required for Single Subject Teaching Credential*

<b>A. The Core</b>		<b>Units</b>
Math 141, 142, 143, 241	Calculus I, II, III, IV	4, 4, 4, 4
Math 206	Linear Algebra	4
Math 242	Differential Equations	4
Math 335	Graph Theory	4
Or		
Math 336	Combinatorial Mathematics	
Math 341	Number Theory	4
Math 419	History of Mathematics	4
Math 442	Euclidean Geometry	4
Math 443	Modern Geometries	4
Math 481	Abstract Algebra I	4
Stat 321, 322	Statistical Analysis	4, 4
<b><i>Core Total</i></b>		<b><i>56</i></b>
<b>B. BREADTH AND PERSPECTIVE</b>		
Math 248	Methods of Proof in Mathematics	4
Math 300	Technology in Mathematics Education	3
Math 424	Organizing and Teaching Mathematics	4
Math 459	Undergraduate Seminar	4
Math 461, 462	Senior Project	2,2
CSC 101	Fundamentals of Computer Science I	4
<b><i>Breadth and Perspective Total</i></b>		<b><i>23</i></b>
<b>TOTAL UNITS REQUIRED</b>		<b>79</b>

**California State University, San Marcos** (Semester System)

Students interested in teaching mathematics at the secondary level may wish to complete the Single Subject Preparation Program (SSPP) in mathematics. A prospective teacher qualifies for the Single Subject Teaching Credential in mathematics by completing the SSPP and earning a Bachelor's degree

<b>COURSE NUMBER</b>	<b>Course Title</b>	<b>Units</b>
MATH 160	Calculus with Applications, I	5
MATH 162	Calculus with Applications, II	4
MATH 260	Calculus with Applications, III	4
MATH 330	Introduction to the History of Mathematics	3
MATH 350	Foundations of Theoretical Mathematics	3
MATH 360	Foundations of Analysis	3
MATH 374	Linear Algebra	3
MATH 410	Modern Geometry	3
MATH 440	Intro to Mathematical Probability & Statistics	4
MATH 470	Introduction to Abstract Algebra	3
<b>Choose one of the following courses:</b>		
MATH 262	Introduction to Differential Equations	3
MATH 362	Differential Equations	
<b>Choose one of the following courses:</b>		
MATH 372	Introduction to Number Theory	3
MATH 522	Number Theory	
<b>Choose one of the following courses:</b>		
MATH/CS 464	Numerical Analysis and Computing	3
MATH 480	Introduction to Optimization	
<b>Choose one of the following courses:</b>		
MATH 472	Introduction to Graph Theory	3
MATH 474	Introduction to Combinatorics	
Any 400 or 500 level mathematics course approved for the Mathematical science majors, and not already used to satisfy a requirement above.		
EDUC 350	Foundations of Teaching as a Profession	3
<b>TOTAL UNITS</b>		<b>53</b>

**Sonoma State University (Semester System)**

<b>Mathematics B.A. -Secondary Teaching Option</b>		<b>Units</b>
Math 161	Calculus I (3 units in G.E., I unit in major)	1
Math 180	Mathematical Computing	2
Math 211	Calculus II	4
Math 220	Higher Mathematics: An Introduction	3
Math 241	Differential Equations and Linear Algebra	4
Math 250	Probability and Statistics	3
Math 261	Calculus III	4
Math 306	Number Theory	3
Math 308	College Geometry	3
Math 310	History of Mathematics	3
Math 316	Combinatorics and Graph Theory	3
Math 320	Modern Algebra I	4
Math 340	Real Analysis I	4
Math 345	Probability Theory	3
Or		
Math 470	Mathematical Models	3
Math 395	Community Involvement Program	2
Phys 114	Intro to Physics (3 units in G.E., 1 in major)	1
<b>TOTAL</b>		<b>47 (53 counting GE)</b>

**California State University, Stanislaus** (Semester System)  
*Mathematics Courses Required for Single Subject Teaching Credential*

<b>The Core (33 units)</b>		
Math 1410	Calculus I	4
Math 1420	Calculus II	4
Math 1620	Probability and Statistics	4
Math 2410	Multivariate Calculus	4
Math 2460	Introduction to Differential Equations	2
Math 2530	Linear Algebra	4
Math 3060	Modern Geometry	3
Math 3110	History of Mathematics	3
Math 3420	Set Theory and Mathematical Logic	2
Math 3600	Theory of Numbers	3
Math 4530	Abstract Algebra	4
<b>Breadth and Perspective (23 units)</b>		
CS 1500	Computer Programming I	3
Math 1412	Calculus I Laboratory	1
Math 1422	Calculus II Laboratory	1
Math 4020	Mathematics for Secondary Teachers	3*
Math 4022	Mathematics for Secondary Teachers Laboratory	1*
Math 4600	Complex Variables	3
Math 4630	Probability Theory	3
Math 4960	Senior Seminar in Mathematics	3
<b>One elective selected from the following:</b>		
Math 3230	Differential Equations	3
Math 4330	Numerical Analysis	3
Math 4430	Operations Research	3
Math 4640	Statistical Inference	3
<b>Additional Coursework to Earn BA in Mathematics</b>		
Math 4130	Real Analysis I	3

\*Satisfactory completion of Math 4020 and Math 4022 satisfied the early field experience requirement for entrance into the Single Subject Credential Program at CSU, Stanislaus. Consult the university catalog for other requirements of this program.

**California State University, Monterey Bay** (Semester System)

Mathematics Courses Required for Single Subject Teaching Credential Information unavailable at this time.

2. Is the Methods Course for secondary teachers in the Math Department or Education Department and who teaches it, Math or Education Faculty?

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University	Methods Course is listed under:			Course taught by:	
	Mathematics Department	Education Department	Both (cross-listed)	Math Faculty	Education Faculty
CSU, Bakersfield			<b>X</b>	<b>X</b>	
CSU, Chico		<b>X</b>			<b>X</b>
CSU, Dominguez Hills		<b>X</b>			<b>X</b>
CSU, Fresno		<b>X</b>		<b>X</b>	
CSU, Fullerton	<b>X</b>			<b>X</b>	
CSU, Hayward		<b>X</b>			<b>X</b>
Humboldt State		<b>X</b>		<b>X</b>	
CSU, Long Beach	<b>X</b>			<b>X</b>	
CSU, Los Angeles		<b>X</b>			<b>X</b>
CSU, Northridge		<b>X</b>			<b>X</b>
Cal Poly Pomona		<b>X</b>		<b>X</b>	
CSU, Sacramento		<b>X</b>			<b>X</b>
CSU, San Bernardino		<b>X</b>			<b>X</b>
San Diego State		<b>X</b>			<b>X</b>
San Francisco State		<b>X</b>			<b>X</b>
San Jose State	<b>X</b>			<b>X</b>	
Cal Poly San Luis Obispo	<b>X</b>			<b>X</b>	
CSU, San Marcos		<b>X</b>			<b>X</b>
Sonoma State		<b>X</b>		<b>X</b>	<b>X</b>
CSU, Stanislaus	<b>X</b>			<b>X</b>	

**3. Who places the student teachers, faculty in the Math Department or faculty in the School of Education?**

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<b>University</b>	<b>Education Faculty</b>	<b>Mathematics Faculty</b>
CSU, Bakersfield	X	
CSU, Chico	X	
CSU, Dominguez Hills	X	
CSU, Fresno	<b>INITIAL PLACEMENT</b>	Final placement
CSU, Fullerton		X
CSU, Hayward	X	
Humboldt State	X*	
CSU, Long Beach		X
CSU, Los Angeles	X	
CSU, Northridge	X	
Cal Poly Pomona		X
CSU, Sacramento	X**	
CSU, San Bernardino	X	
San Diego State	X	
San Francisco State	X	
San Jose State		X
Cal Poly San Luis Obispo		X
CSU, San Marcos	X	
Sonoma State	X*	
CSU, Stanislaus	X	

*\*Based on recommendations/assistance from the Math Department*

*\*\*Fall 2002 semester, CSU Sacramento expects the Mathematics Blended Program to place the student teachers.*

**4. Who supervises the student teachers in secondary school mathematics, Math faculty or Education faculty?**

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University	Education Faculty	Mathematics Faculty
CSU, Bakersfield	X	
CSU, Chico	X	
CSU, Dominguez Hills	X	
CSU, Fresno	<b>INITIAL SUPERVISIO N</b>	Final supervision
CSU, Fullerton		X
CSU, Hayward	X	
Humboldt State		X
CSU, Long Beach		X
CSU, Los Angeles	X	
CSU, Northridge	X	
Cal Poly Pomona		X
CSU, Sacramento	<i>Unclear; next Fall semester supervision will be done through the Mathematics Blended Program</i>	
CSU, San Bernardino	X	
San Diego State	X	
San Francisco State	X	
San Jose State		X
Cal Poly San Luis Obispo		X
CSU, San Marcos	X	
Sonoma State	<b>May be either</b>	
CSU, Stanislaus	X	

**5. How many student teachers did you have in mathematics during the academic years of 1998-99, 99-00, 00-01, and many do you anticipate during 2001-02?**

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University	1998-1999	1999-2000	2000-2001	2001-2002
CSU, Bakersfield	7	18	19	20
CSU, Chico	14	10	13	12

CSU, Dominguez Hills	~50	~50	~50	~50
CSU, Fresno*	11	10	12	14
CSU, Fullerton	18	17	12	18
CSU, Hayward	22	29	18	20
CSU, Humboldt	7	5	5	4
CSU, Long Beach	10	10	16	12
CSU, Los Angeles	~50	~50	~50	~50
CSU, Northridge**	16	17	18	19
Cal Poly, Pomona	5	3	6	6
CSU, Sacramento	15	5	17	5
CSU, San Bernardino	2	11	2	14-17
San Diego State	26	32	18	24
San Francisco State	10	11	11	10
San Jose State	11	20	12	12
Cal Poly, San Luis Obispo	1	9	6	6
CSU, San Marcos***	4	2	6	6
Sonoma State	8	8	10	12
CSU, Stanislaus	13	16	9	16
CSU, Monterey Bay	No Math Major			
<b><i>TOTAL</i></b>	<i>300</i>	<i>333</i>	<i>293</i>	<i>330-333</i>

\*(Students in internship take 2 semesters formal student teaching. They are double counted.)

\*\* (There are 3-7 additional students each summer doing student teaching)

\*\*\* (Note that these are numbers of students in the Credential program in the College of Education, not Mathematics majors completing the Single Subject Preparation Program.)

See the next two pages for the numbers of student teachers beginning in 1984.

**6. Any comments about the present system? Anything you would like to see changed?**

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CSU, Chico

There is discussion in our department about trying to create a “blended” teacher preparation program in which we would cooperate with faculty in the College of Communication and Education.

CSU, Dominguez Hills

I would like to see greater cooperation between Mathematics and Education in these areas. We don't talk to each other very much and relations between our Math Department math-ed people and the School of Education people are less collegial than they should be.

CSU, Fresno

We may change to year-round operation for summer 2002.

CSU, Long Beach

We think that students should teach in public schools only.

Cal Poly Pomona

Pre-service secondary mathematics teachers have no early field experience in their academics preparation. Thus, many students do not have contact with public school student until their senior year or graduate school.

CSU, Sacramento

We are developing a Mathematics Blended Program that we hope will attract students to our program.

CSU, Sonoma

We have a CCTC-approved Integrated Program of Teacher Preparation in Mathematics. From this, we hope that our current handful of students will grow into a substantial program.

**7. Do you accept the PRAXIS/SST in lieu of a Preparation Program? If you accept the PRAXIS/SST, do you have any minimal course requirements in Mathematics in addition to the passing score?**

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**CSU, Chico:** Yes, the College of Communication and Education accepts the PRAXIS/SST in lieu of a preparation program.

**CSU, Dominguez Hills:** Yes, we accept the PRAXIS/SST in lieu of a preparation program. No, we do not have any minimal course requirements in Math. But this has little practical effect because few of our math teacher prep students attempt the PRAXIS without taking courses. They'd never pass without taking at least a few courses to prepare. They try for a full subject matter competency certification, or they take some of the courses (calculus, linear algebra, abstract algebra) and then try to pass the PRAXIS.

**CSU, Fresno:** We do accept the PRAXIS/SST in lieu of the Preparation Program. We do not have minimal course requirements in addition to passing the score.

**CSU, Hayward:** We do accept the PRAXIS/SST in lieu of the Preparation Program. We do not have minimal course requirements in Mathematics in addition to the passing score.

**Humboldt State University:** see application checklist

**CSU, Long Beach:** Yes we accept the PRAXIS/SST in lieu of a Preparation Program. In addition to the passing score, students must take History of Math (Math 410) and a capstone course (Math 411).

**CSU, Los Angeles:** We do accept the PRAXIS/SST in lieu of a Preparation Program. We do not have minimal course requirements in addition to passing the score.

**California State Polytechnic University, Pomona:** We will accept the PRAXIS/SST in lieu of our Subject Matter Program. The Mathematics Education Committee in the Department of Mathematics is discussing the issue of minimal course requirements in addition to a passing score on the PRAXIS/SST. No decision has been reached.

**CSU, Sacramento:** The Math Department has accepted the PRAXIS because it is a mandate from the Chancellor's Office. However, we are developing a program that we hope will appeal to those who want to become secondary mathematics teachers.

**CSU, Bernardino:** Yes, we accept the PRAXIS/SST in lieu of a Preparation Program. We do not have any minimal course requirements in addition to the passing score.

**San Diego State University:** Yes, we accept the PRAXIS/SST in lieu of the Preparation Program. We do not have minimal requirements in Mathematics in addition to the passing score.

**San Francisco State University:** The PRAXIS/SST is accepted in lieu of a Preparation Program, with no additional requirements to the passing score.

**San Jose State University:** Yes we accept the PRAXIS/SST in lieu of a Preparation Program. In addition to the passing score, we require a minor in mathematics. This entails 18 units including 9 upper division units. Students must take Math 201A (Math for Secondary Teachers).

**California Polytechnic State University, San Luis Obispo:** Yes, we accept the PRAXIS/SST in lieu of a Preparation Program. According to the Chancellor's Executive Order No. 758, a CSU campus must accept the PRAXIS/SST and may not require additional math courses.

**CSU, San Marcos:** Yes we accept the PRAXIS/SST in lieu of a Preparation Program. We do not have any minimal requirements in addition to the passing score.

**Sonoma State University:** Yes we accept the PRAXIS/SST in lieu of a Preparation Program. We do not have any minimal requirements in addition to the passing score.

**CSU, Stanislaus:** Yes we accept the PRAXIS/SST in lieu of a Preparation Program. We do not have any minimal requirements in addition to the passing score. (As I understand the state requirements, we cannot impose minimal course requirements when certifying mathematics competency.)

**8. How is Executive Order No. 758 being implemented on your campus? How is the faculty in the Mathematics Department advising students? Is the Math faculty in support of Executive Order No. 758 or would they be interested in at least having students take courses equivalent to a minor in mathematics?**

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**CSU, Chico:** We offer students two options: complete our subject matter competency program in mathematics (i.e., get a bachelor's in math) or have a bachelor's in something and pass the SSAT and PRAXIS exams.

The present exam requirement is sufficiently difficult that almost no one passes, not even recent graduates in mathematics from other states. The exam requirement is far more difficult to accomplish than a minor in math. As long as the exam remains this difficult, we are not opposed to EO 758.

Another somewhat related comment: we get inquiries about teaching mathematics from a significant number of students who have degrees in something like engineering in which there is no credential. These students often have taken a great many mathematics courses, but not enough to pass the SST and PRAXIS exams. Moreover, they cannot get even a supplementary authorization to teach math (because they are not "credentiable"). It's a shame to waste all of this mathematical talent.

**CSU, Fresno:** We feel that Executive order 758 is implemented and enforced in our campus. At CSU Fresno, we have a CCTC and NCATE -accredited subject matter program. Students completing our program or an equivalent one are accepted to the credential program if they also meet the GPA requirement.

If they have not completed our program or an equivalent, or if their GPA is lower than required, they are advised by both the math department and the School of Education to pass the CCTC-approved subject matter examination (SSAT and Praxis 63, 64).

We are in support of Executive order 758. There are several prospective teachers, many from foreign countries, who may lack the required courses, but their overall preparation in math is very strong. They should have a chance of demonstrating their subject matter competence, and should not be held back from teaching just for the sake of getting a paper about their minor or more. It is a particularly important issue because of the shortage of well-prepared teachers. We found in our practice that the required tests are fair, and are at the right level of difficulty. Students normally cannot pass the exams unless they are close to the completion of a math major, or have strong preparation that would grant at least a math minor. Unfortunately, we also see a large percentage of teachers in high school math classes who would not qualify in any of the two ways mentioned above, still, they have been teaching for more than a decade already. Last year there was increased interest toward workshops preparing pre-interns (teachers hired on emergency credentials) and in-service teachers for passing the exams in our service area. We plan to continue offering such workshops in collaboration with the school districts.

**CSU, Fullerton:** Traditionally, the single subject credential applicant in mathematics has been referred to the mathematics department for verification of subject matter competency and for

the decision to admit or not admit into the credential program. Subject matter competency was based on the approved program with substitutions as appropriate for non-CSUF students. Even with a completed program, additional coursework would be prescribed if the grades were too low. The PRAXIS/SSAT was not a factor one-way or the other.

Since EO 758, we have been struggling with compliance. We are aware of too many who have passed with very little formal mathematical training. The test has a lot of good questions, but it is possible to achieve a passing score without confronting many of them. Our current position is simple: since we can add requirements to someone who has completed the program (e.g. low grades), we feel we can add requirements to one who has passed the exams (e.g. weak math background). We will continue to expect our candidates to have basically completed our program. We do not take seriously the state's claim that the program and the exams are equivalent! We are also aware that the decision to implement EO 758 was made without consultation with academic departments.

We are aware of the shortage of math teachers, but there are other ways that should be explored other than lowering the bar simply to increase the number of credentialed teachers.

**CSU, Hayward:** CSU Hayward accepts either the completion of a subject matter program or a passing score on the SSAT/PRAXIS.

Students are advised by faculty in the Math and Computer Science Departments. (Well, I suppose students also get some advice from the School of Education, but Education tends to refer them to the department chair for advice about subject matter competence, etc.)

The Math faculty supports Executive Order #758. In practice, I don't see very many students who are able to pass the exams without having had quite a few math courses. Of course, I assume there are those who don't come to see me.

**Humboldt State University:** EO 758 has not yet been implemented on our campus in mathematics. (Since its issuance we have not had applicants from outside our own subject matter program.) The following process is still in place: All mathematics applications to our credential program in mathematics are sent to the mathematics department education committee for 1) verification of subject matter competence and 2) assessment of potential success in the student teaching phase of the program. I anticipate that our verification method for subject matter competence will eventually be modified to reflect EO 758.

In general, our faculty favor the part of EO 758 related to completion of a CCTC-accredited subject matter program at a CSU campus. Our faculty is not in favor of the part of EO 758 that says that we have to accept a test score in lieu of an undergraduate math degree. In the past, those with test scores have still had to take courses that we consider foundational for teaching mathematics, including number theory, history, modern algebra, geometry, and our capstone course - school math from an advanced perspective.

**CSU, Northridge:** Executive Order No. 758 is being implemented on our campus. If a student passes the two exams, he or she does not need to see an advisor in the Department of

Mathematics. The Credential Preparation Office checks off the requirement for subject matter competence. Otherwise, the student sees an advisor in the Department of Mathematics. The policies followed by those advisors may be found at <http://www.csun.edu/math/CREd.html>

The Mathematics Department has been informed of the executive order, but response has been low key. Those of us involved in secondary teacher preparation would prefer to see a requirement where the student must also take about three upper division mathematics classes, chosen from among those courses required of our bachelor candidates. If the Mathematics Department were asked to vote, most likely all would want at least a minor in mathematics as well as the exams. While we have little quarrel with the exams themselves, which require a thorough knowledge of high school mathematics, they certainly are not anywhere close to being the equivalent of a bachelor's degree in mathematics.

**CSU, San Bernardino:** We used to have subject matter competency exams that consisted of multiple choice exams in 7 areas along with an oral examination in which students were asked to present some high school topic.

These have now been abolished. However, for single subject, we still receive requests from Education asking for waiver approval. We still require some students to complete courses in order to receive a waiver. The department still does some advising but it is lower key now and more informal.

**San Diego State University:** In the old days (prior to 758?) all mathematics applicants for the SDSU single-subject credential program were routed to an advisor in the mathematics department. At that time we did not recognize the test route, but looked for coursework like that in our CTC-approved program.

A few years ago, perhaps at the time the Chancellor demanded a 25% increase in teacher production (and at the time of 758?), the School of Teacher Education decided to admit any student who had completed a CTC-approved program from a CSU or UC school, or who had performed satisfactorily on the three tests (SSAT and the two PRAXIS tests). This decision was reached without consultation with the mathematics department, although Teacher Education said they had consulted "higher-ups" as to what "consultation with the appropriate faculty/group on campus" meant. (We in the department would have naturally interpreted the "appropriate" faculty/group as us.)

That is the current status, so far as we know the requirement is to either do the coursework in a CTC-approved program, or pass the three tests. We advise our own students, naturally, and CA-schooled students who have non-CTC program backgrounds, as well as candidates from out of state. Presumably the School of Teacher Education evaluates the others. We have not surveyed the department, of course, but we're positive that the "require-at-least-a-minor" in addition to the three tests would dominate any polling that gave a test-based option. We would probably not argue with other CTC-approved programs since all are responding to the same guidelines.

Although we were upset initially, the primary advisor has been less concerned in recent years than he was initially. Other CTC-approved programs are comparable to ours, and in the case of programs leading to a B.S., actually exceed ours. So there was no problem with CTC-approved programs. Furthermore, the 3-test route has not proved to be trivial, especially the two PRAXIS tests, so people with minimal mathematics background do not seem to be passing. Of course, what "passing" is, is the crucial decision and may be decided by CTC on a supply-demand grounds rather than some satisfactory degree of performance. One of our faculty once saw a report decrying what was "passing" on one of the PRAXIS mathematics tests, but his memory is that it was neither of the ones required in California.

**San Jose State University:** First let us state that there is a shortage of competent mathematics teachers. We are doing what we can to encourage well-trained new teachers to meet the demand. Also, we are working to see that those who are coming through our program meet the mathematics background standard set out in our State contract with the CTC commission. In this contract, subject matter approval in mathematics requires two calculus course, courses in discrete math, modern geometry, abstract algebra, linear algebra, statistics, probability, analysis, number theory, a second semester course in either algebra, geometry or analysis, three applied courses and a capstone problem solving course.

The alternative to this is to successfully complete the PRAXIS/SSAT examinations. In the case of the exam route, we ask that students at least have the equivalent of a minor in math. This would include two courses in calculus, two upper division math courses and one of our two capstone courses. Although this second option requires less than 20 units in math, that is less than even a supplementary authorization, we do feel it is an absolute minimum to participate in the courses designed to investigate the teaching of mathematics.

In light of past experiences, the math education group feels strongly that at least the equivalent of a minor is needed. We have had several good test takers who have taken the exams and passed based upon no more than a calculus course, sometimes the course was even taken in high school. This is not an adequate background for concepts needed to teach mathematics and as I said above, it does not even meet the requirements for the supplementary authorization.

Also, without the capstone course, the one to three courses they may have had were probably taught in the traditional lecture mode. As a result, we are not only lowering the mathematical content standards to below a functional level, the view of teaching mathematics is also dysfunctional. To modify either the mathematical background or the view of teaching in only 15 weeks of a methods course is impossible. In addition, to include such a group in the methods course reduces the impact of the course for everyone who is interested in teaching.

I guess this response may seem strong but we are constantly faced with people who have had one or two courses in calculus and who can pass the exam but who certainly do not have the equivalent of a minor or major. This is unfair to anyone they end up teaching.

**California Polytechnic University, San Luis Obispo:** We are reluctantly complying with the executive order. Students are being advised that if they have passed the PRAXIS and SSAT, or have completed a CSU waiver program, they have demonstrated subject matter competency.

The math department does not support the executive order. We strongly support the position that a candidate should take course work at least equivalent to a minor in mathematics.

**Sonoma State University:** In the past the exam (I've forgotten the name of it) used to be quite easy to pass in the sense that students were required to know a lot less than they would need to pass the course work ( I think they used to call it the waiver, because they waived the requirement of passing the easy exam). If that is still the case (the PRAXIS and SSAT are easy) then I would favor requiring the minor in math.

For the Single Subject I favor at least a minor in addition to the PRAXIS. I personally would agree that in the quasi ideal world [ideal would be a major] that a minor would be required along with the tests. I'm not sure how practical this is. We do suggest certain courses as preparation for the tests, but do not mandate them.