



El Camino College

DCC Approval Date: 10/17/18

Originator: Greg Fry

1. COURSE SPECIFICATIONS

- 1.1 Division: Mathematical Sciences
- 1.2 Department: Mathematics
- 1.3 Subject: Mathematics
- 1.4 Discipline(s): Mathematics
- 1.5 Course Information
 - 1.5.1 Title and Number: Mathematics 180S
 - 1.5.2 Descriptive Title: Pre-calculus Support

1.5.3 Catalog Description:

This course is designed to support students concurrently enrolled in Pre-calculus (Math 180). As needed, students review core skills and topics necessary to meet the Pre-calculus student learning outcomes and objectives. Students explore strategies and habits used by successful independent learners. Topics reviewed in this support course may include: a review of the computational skills developed in intermediate algebra; operations on polynomial, rational, radical, exponential and logarithmic expressions; functions and transformations of their graphs; solving equations and inequalities; and solving application problems.

1.5.4 Prerequisite, Corequisite, Recommended Preparation, Enrollment Limitation (specify):

Corequisite: Math 180

Justification: This corequisite course is necessary to satisfy AB 705. Its intent is to strengthen and supplement the algebraic skills needed for success in Pre-calculus.

- 1.5.5 Grading Method: Letter Pass/No Pass Both No Grade
- 1.5.6 Degree Status: Associate Degree Credit Non-Degree Credit Non-Credit

1.6 Course Units, Hours, and Offerings

- 1.6.1 Credit Units: 2
- 1.6.2 Hours Lecture: 2 Hours Laboratory: _____ Activity Lab: _____
- 1.6.3 Maximum Semesters of Credit: 1 Maximum Credit Units: 1
- 1.6.4 Course Length: Full Term: X or Weeks: _____
- 1.6.5 Class Size: 35
- 1.6.6 Number of sections: Fall: _____ Spring: _____ Summer: _____ Winter: _____
- 1.6.7 Total enrollment per year: _____
- 1.6.8 Instructor Load: 13.33% WSCH/FTE Ratio: _____
- 1.6.9 Apportionment: Daily/Weekly Census Positive Attendance Distance Education
 Independent Study Non-Credit

1.7 Transfer and General Education

- 1.7.1 Proposed Transfer Articulation:
- 1.7.2 Proposed GE Patterns
El Camino College:

CSU GE:

IGETC:

2. PURPOSE OF COURSE

2.1 Course is designed for:

- Transfer
- Interdisciplinary
- Occupational (preparatory)
- Occupational (upgrade)
- Precollegiate Basic Skills
- Basic Skills (developmental)
- Other (explain): _____

2.2 How widespread and established is this course at post-secondary institutions?

- Course is well-established and widely offered at many post-secondary institutions.
- Course is not yet found in many (or an) other post-secondary institutions.
- Traditional as generally offered in corresponding community colleges and/or four-year institutions.
- Not Applicable – Not for Transfer.

2.3 Examples of parallel courses at both California Community Colleges and CSUs or UCs. List the institution, the title and number of the parallel course, and the number of units. For each parallel course, attach copies of the appropriate pages of that college's or university's catalog. If the course is proposed for transfer, lower division status must be evident in the CSU or UC courses.

These courses generally did not exist until mandated by AB 705. Two community colleges that are currently piloting the parallel courses are:

Cuyamaca College: Math 076, Intermediate Algebra for Math 176 (Pre-calculus: Functions and Graphs), 2 units.

Mira Costa College: Math 36, Intermediate Algebra-Learning Assistance for Pre-Calculus, 2 units.

Math 180S is a support course for Math 180; therefore, it is not for transfer to CSU or UC.

3. JUSTIFICATION FOR THE COURSE

3.1 Explain how the course relates to the mission and goals of the College:

It is the goal of El Camino Community College to meet the requirements of AB 705; this course has been created to do so.

3.2 Explain how the course strengthens and relates to existing curriculum:

This support course is a review of the core prerequisite skills needed to pass Math 180.

4. COURSE DEVELOPMENT INFORMATION

4.1 The following have been consulted in the development of the course.

- 4.1.1 Faculty: Mathematics Department
- 4.1.2 Counselor(s): Ken Key
- 4.1.3 Students:
- 4.1.4 Advisory Committee(s):
- 4.1.5 Other:

- 4.2 Is the course similar to an existing course at El Camino College?
If yes, identify the similar course(s) and explain why this proposed course should be part of the El Camino College curriculum.

No.

If the similar course exists in a different department, the proposed course must be submitted to that department for review. Record the comments below.

5. COURSE RESOURCE REQUIREMENTS

- 5.1 Library/Media Resources have been reviewed and determined to be adequate. Indicate the Library/Media Resources personnel consulted and provide the date of the consultation:

Claudia Striepe, November 13, 2018

- 5.2 Is the present faculty and staff adequate to support the offering of the course?
If no, specify proposed additions with anticipated cost and budget allocation.

Yes.

- 5.3 Are facilities for teaching the course available?
If no, what plans have been made for accommodation?

Yes.

- 5.4 Are special equipment and/or supplies necessary for teaching the course?
If yes, list, estimate cost, and provide budget allocation.

No.

- 5.5 Are other special resources necessary?
If yes, list, estimate cost, and provide budget allocation.

No.

6. METHODS FOR EVALUATING COUSE EFFECTIVENESS

- Faculty/department review
- Review of articulation agreement
- Student success/failure analysis
- Student surveys
- Review of advisory committee recommendations
- Review of industry needs and standards
- Review of entry-level job requirements
- Other (specify):

7. ACCOMODATIONS FOR STUDENTS WITH DISABILITIES AND INSTRUCTIONAL DELIVERY

In compliance with ECC Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973 - Sections 504 and 508, and the Americans with Disabilities Act, instructional delivery shall provide access, full inclusion, and effective communication for students with disabilities. Instructional delivery methods may include, but are not limited to, Braille/audiotape for print material, on-site interpreter/real-time transcription/live captioning for audio material, captioning for video material, alternative text for images, and captioning of audio information for electronic media materials (such as web and online).

**EL CAMINO COLLEGE
COURSE OUTLINE OF RECORD**

I. GENERAL COURSE INFORMATION

Course Title and Number: Mathematics 180S

Descriptive Title: Pre-calculus Support

Discipline: Mathematics

Division: Mathematical Sciences

Course Length: Full Term Other (specify): _____

Hours Lecture: Hours Laboratory: 0 Course Units: 2

Grading Method: Letter Credit/No Credit Both No Grade

Course Type: Credit, Degree Applicable Credit, Not Degree Applicable Non-Credit

Transfer CSU: Yes Effective Date _____ Pending No

Transfer UC: Yes Approval Date _____ Pending No

Conditions of Enrollment:

Corequisite: Math 180

Catalog Description:

This course is designed to support students concurrently enrolled in Pre-calculus (Math 180). As needed, students review core skills and topics necessary to meet the Pre-calculus student learning outcomes and objectives. Students explore strategies and habits used by successful independent learners. Topics reviewed in this support course may include: a review of the computational skills developed in intermediate algebra; operations on polynomial, rational, radical, exponential and logarithmic expressions; functions and transformations of their graphs; solving equations and inequalities; and solving application problems.

II. OUTCOMES AND OBJECTIVES

A. COURSE STUDENT LEARNING OUTCOMES *List 3 student learning outcomes. Provide a short title for each. We have 4 learning outcomes for all our CM1 courses.*

- 1. Understanding Concepts:** Students will explain and demonstrate basic pre-calculus concepts by solving equations, inequalities and systems involving algebraic, exponential, logarithmic, trigonometric, and absolute value expressions.
- 2. Solving Problems:** Students will use polynomial, rational, exponential, logarithmic, and trigonometric equations and functions to set up and solve application and modeling problems.
- 3. Graphs:** Students will create, interpret and analyze the graphs of polynomial, rational, exponential, logarithmic, trigonometric, parametric, polar and conic equations.
- 4. Proofs:** Students will analyze and construct proofs, including proofs by induction.

B. COURSE OBJECTIVES List the major learning objectives for course. These must be stated in behaviorally measurable terms and demonstrate critical thinking skills.

Provide a representative assessment method for each from this list. If you select “other” give an explanation.

Essay Exam	Performance Exams	Objective Exams	Oral Exam	Quizzes
Reading Reports	Written Homework	Laboratory Reports	Fieldwork	Class Performance
Term or Other Papers	Multiple Choice	Completion	Other _____	

1. Carry out numerical operations and manipulate algebraic expressions, including polynomial, rational, radical, exponential and logarithmic expressions. (Objective Exams)
2. Recognize functional relations in the form of graphs, data, or symbolic equations. (Written Homework)
3. Solve equations using algebraic and graphical methods, including polynomial, absolute value, radical, rational, exponential, and logarithmic equations. (Quizzes)
4. Graph functions using transformations. (Objective Exams)
5. Solve linear, absolute value, quadratic, and nonlinear inequalities (Quizzes)
6. Use numerical, symbolic and graphical methods to model application problems and solve them. (Written Homework)

III. OUTLINE OF SUBJECT MATTER Topics should be detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.

List hours as lecture or lab	Approx Time in Hours	Number each with a Roman numeral. I, II, III, etc.	Major Topics <i>Use outline format.</i> <i>A. List the Topic – Capitalize First Letter of All Words</i> <i>1. List Subtopics with Numerals</i>
Lecture	8	I	OPERATIONS AND MANIPULATIONS Concepts and skills as needed through just-in-time work to support: A. Operations on polynomial, rational, radical, exponential, logarithmic and absolute value expressions B. Factoring polynomial expressions C. Operations on complex numbers

			D. Rational exponents
Lecture	11	II	<p>FUNCTIONS AND GRAPHING</p> <p>Concepts and skills as needed through just-in-time work to support:</p> <p>A. Definition of function, domain and range B. Functions as rules, as sets of ordered pairs, as algebraic equations and as graphs C. Composite, one-to-one, and inverse functions D. Determining a function based on a graph or sufficient data E. Transformations of graphs of functions, including translations, reflections, and scaling F. The equations and graphs of conic sections</p>
Lecture	11	III	<p>EQUATIONS AND INEQUALITIES</p> <p>Concepts and skills as needed through just-in-time work to support:</p> <p>A. Algebraic and graphical methods for solving equations B. Solving equations by factoring C. Solving quadratic, rational, radical, exponential, logarithmic, and absolute value equations D. Finding domains by setting up and solving appropriate inequalities E. Using interval notation F. Solving linear and nonlinear inequalities G. Systems of linear equations (2x2 and 3x3 systems)</p>
Lecture	6	IV	<p>APPLICATIONS</p> <p>Concepts and skills as needed through just-in-time work to support:</p> <p>A. Modeling verbally expressed problems numerically, symbolically, and graphically B. Solving problems numerically, symbolically and graphically C. Pythagorean Theorem D. Pattern recognition strategies E. Solving problems modeled by systems of linear equations</p>
Total Lecture Hours		36	
Total Laboratory Hours		0	
Total Hours		36	

IV. PRIMARY METHODS OF EVALUATION AND SAMPLE ASSIGNMENTS

A. PRIMARY METHOD OF EVALUATION

Check the PRIMARY method of evaluation for this course.

- Substantial writing assignments
- Problem solving demonstrations (computational or non-computational)
- Skills demonstrations

B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION

Find the domain of the function $f(x) = \sqrt{x^2 - 7x - 10}$

C. COLLEGE LEVEL CRITICAL THINKING ASSIGNMENTS

1. Consider the function: $f(x) = 4 - \sqrt{x + 9}$

- (a) What transformations of $y = \sqrt{x}$ lead to the graph of $f(x)$?
- (b) What are the y-intercepts, if any?
- (c) What are the x-intercepts, if any?
- (d) What are the domain and range?
- (e) Sketch the graph

2. Find the equation of the parabola in form $y = ax^2 + bx + c$ that contains the points (1,2), (-1,6) and (2,3). You must set up a 3x3 system and solve it using any method.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS: Select from this list. Use all that apply.

A. Check all planned instructional activities that apply:

- | | |
|---|--|
| <input type="checkbox"/> Class Performance | <input checked="" type="checkbox"/> Objective Exam |
| <input type="checkbox"/> Clinical Evaluation | <input type="checkbox"/> Oral Exams |
| <input type="checkbox"/> Completion | <input checked="" type="checkbox"/> Other Exams |
| <input type="checkbox"/> Embedded Questions | <input type="checkbox"/> Performance Exams |
| <input type="checkbox"/> Essay Exams | <input type="checkbox"/> Presentation |
| <input type="checkbox"/> Fieldwork | <input checked="" type="checkbox"/> Quizzes |
| <input checked="" type="checkbox"/> Homework Problems | <input type="checkbox"/> Reading Reports |
| <input type="checkbox"/> Journal kept throughout course | <input type="checkbox"/> Term or Other Papers |
| <input type="checkbox"/> Laboratory Reports | <input type="checkbox"/> True/False |
| <input type="checkbox"/> Matching Items | <input checked="" type="checkbox"/> Written Homework |
| <input type="checkbox"/> Multiple Choice | <input type="checkbox"/> Other (specify) |

V. INSTRUCTIONAL METHODS: Select from this list. Use all that apply.

B. Check all planned instructional activities that apply:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Lecture | <input checked="" type="checkbox"/> Group Activities |
| <input type="checkbox"/> Lab | <input type="checkbox"/> Role play/simulation |
| <input checked="" type="checkbox"/> Discussion | <input type="checkbox"/> Guest Speakers |
| <input type="checkbox"/> Multimedia presentations | <input type="checkbox"/> Field trips |
| <input checked="" type="checkbox"/> Demonstration | <input type="checkbox"/> Other (specify) |

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instructional delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. WORK OUTSIDE OF CLASS: Select from this list. Use all that apply.

Two hours work outside of class are required for each hour of lecture or equivalent. Each student in this course will be required to participate in the following work outside of class time. Check all that apply.

- Study
- Answer questions
- Skill practice
- Required reading
- Problem solving activity
- Written work (such as essay/composition/report/analysis/research)
- Journal (done on a continuing basis throughout the semester)
- Observation of or participation in an activity related to course content (such as theatre event, museum, concert, debate, meeting)
 - Course is lab only - minimum required hours satisfied by scheduled lab time
 - Other (specify)

Estimated Study Hours Per Week: 1.0

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

Stewart and Connally (Functions Modeling Change, 5th ed, Connally, Hughes-Hallett, Gleason, et al, Wiley), 2014.

A. REQUIRED TEXTS (title, author, publisher, year)

B. REQUIRED SUPPLEMENTARY READINGS

C. OTHER REQUIRED MATERIALS

VIII. CONDITIONS OF ENROLLMENT

A. Requisites (Course and Non-Course Prerequisites and Corequisites)

Requisites	Category and Justification
Math 180	<p style="text-align: center;">Corequisite</p> <p style="text-align: center;">This corequisite course is necessary to satisfy AB 705. Its intent is to strengthen and supplement the algebraic skills needed for success in Pre-calculus.</p>

B. Requisite Skills

Requisite Skills
<p>Math 180 Solve equations involving polynomial, rational, exponential, logarithmic, trigonometric functions.</p> <p>Math 170 EQUATIONS A. Solving basic trigonometric equations B. Solving using algebraic techniques such as factoring and quadratic formula C. Solving using identities D. Solving equations involving multiple angles</p>

C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification
Math 180	

D. Recommended Skills

Recommended Skills

E. Enrollment Limitations

Enrollment Limitations and Category

Enrollment Limitations Impact

Course created by Greg Fry

BOARD APPROVAL DATE: (Leave Blank)

LAST BOARD APPROVAL DATE: Leave Blank)

Last Reviewed and/or Revised by: Greg Fry

Date: 10/17/2018