

Transitioning to Co-requisite Mathematics/QR

Plans and Progress

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Outline

- Prefatory Information
- Timeline
- Co-req Design
 - Content
 - Pedagogy
 - Professional Development
- Evaluation of Success
- Pre-calc Challenge
- Supporting Student Success



Cal State, Monterey Bay

- Established 1994
- Seaside, CA
- Over 7000 students
- Approximately 33% from Monterey, San Benito, and Santa Cruz Counties



Mathematics and Statistics Department

My Department is AMAZING!



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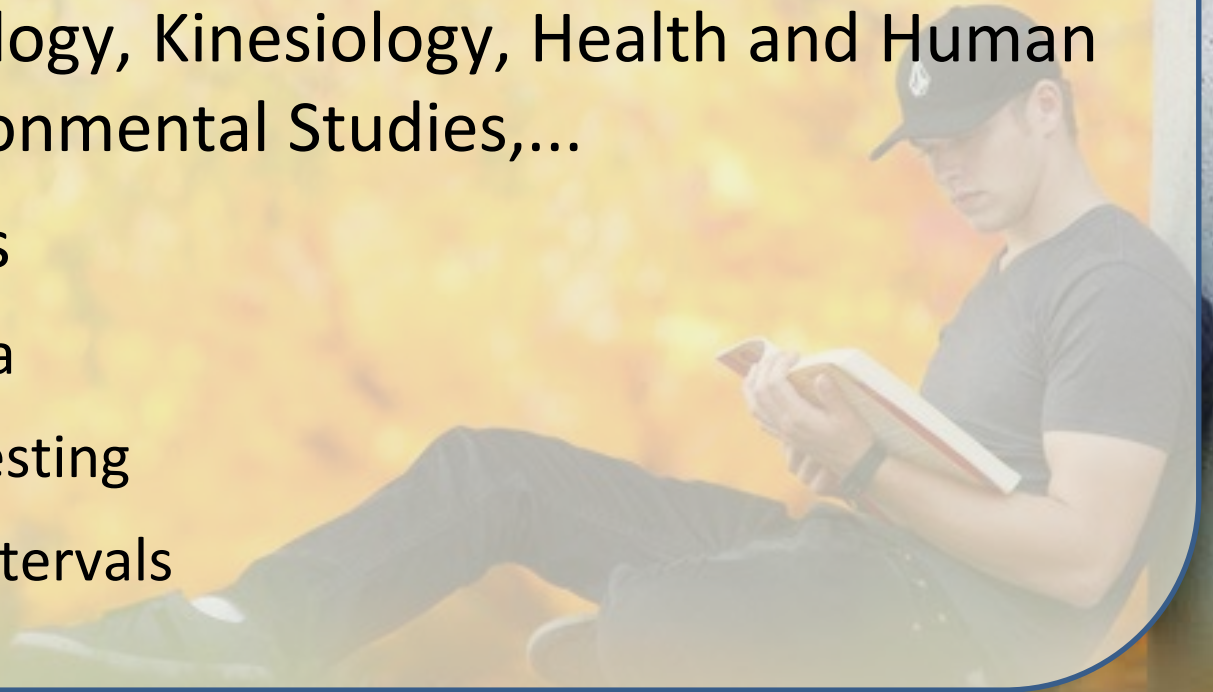
Mathematics and Statistics Department

- 9 Tenured/Tenure-Track Faculty (+1 FERP)
- 12 Full and Part-time Lecturers
- No Graduate Programs/Students
- No College Algebra Course
- Four GE Subarea B4 Math Courses

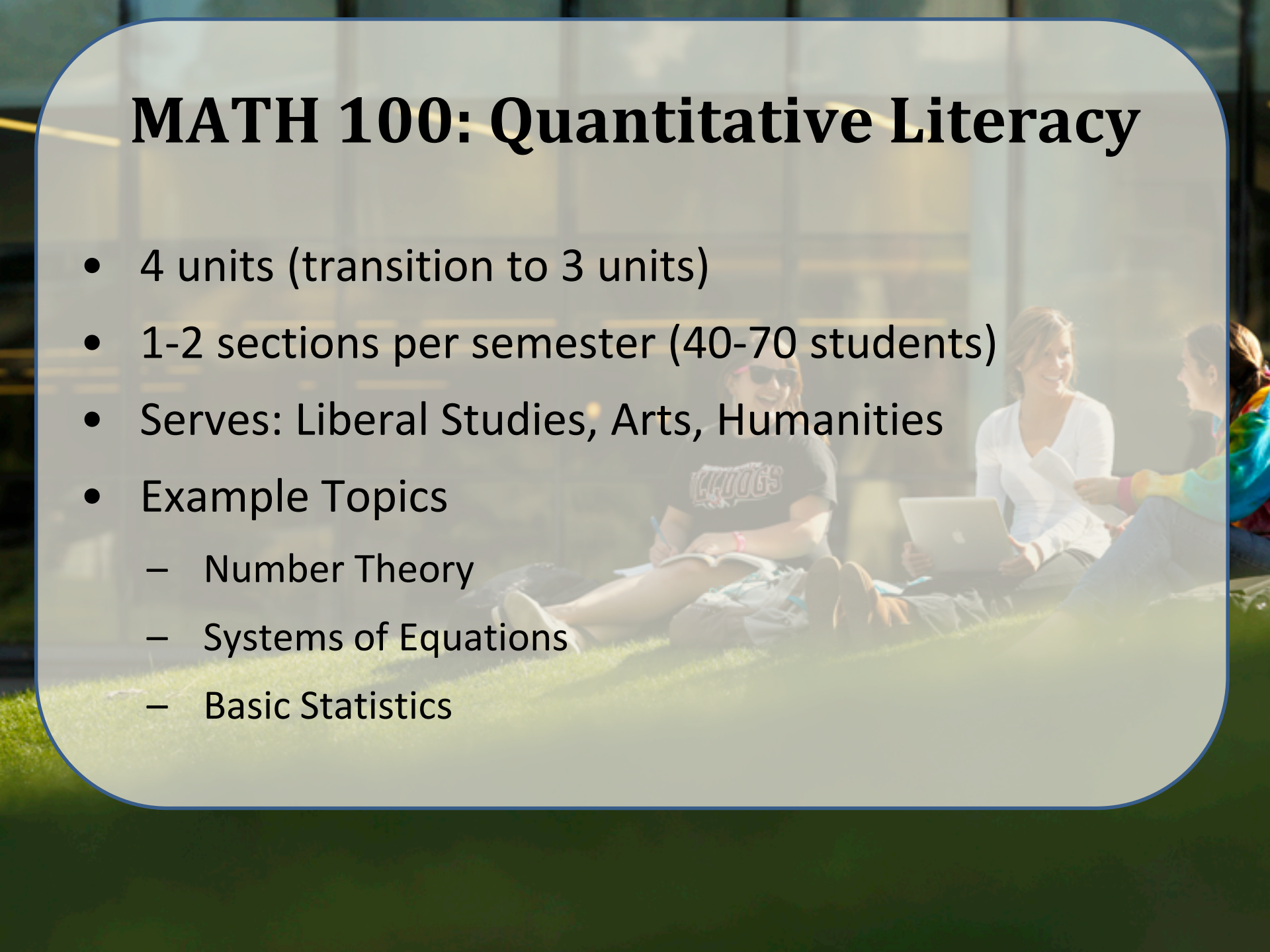


STAT 100: Introduction to Statistics

- 4 units (transition to 3 units)
- 5-6 sections per semester (65 students each)
- Serves: Psychology, Kinesiology, Health and Human Services, Environmental Studies,...
- Example Topics
 - Graphing Data
 - Hypothesis Testing
 - Confidence Intervals



MATH 100: Quantitative Literacy

- 4 units (transition to 3 units)
 - 1-2 sections per semester (40-70 students)
 - Serves: Liberal Studies, Arts, Humanities
 - Example Topics
 - Number Theory
 - Systems of Equations
 - Basic Statistics
- 
- A background image showing three students sitting on a grassy lawn outdoors. One student is wearing a black t-shirt with 'LEADERS' written on it and is looking at a laptop. Another student is wearing a white long-sleeved shirt and is also looking at the laptop. A third student is wearing a colorful jacket and is looking towards the other two. The scene is brightly lit, suggesting a sunny day.

MATH 115: Finite Mathematics

- 4 units (transition to 3 units)
- 2-3 sections per semester (50 students)
- Serves: Business, Communication Design
- Example Topics
 - Financial Mathematics
 - Systems of Linear Equations
 - Linear Programming

MATH 130: Precalculus

- 5 units (transition to 4? units)
- 5-6 sections per semester (40 students)
- Serves: Sciences, Math, Computer Science
- Example Topics
 - Functions and Their Graphs
 - Analytic Trigonometry
 - Polynomial and Rational Functions
 - Exponential and Logarithmic Functions

Developmental Math Curriculum

MATH 98

1. Foundational Concepts (e.g., fractions, percents, decimals, laws of exponents)
2. Linear Equations and Inequalities
3. Expressions and Literal Equations with variables
4. Graphing and Data Interpretation
5. Systems of Linear Equations and Inequalities

MATH 99

1. Factoring Expressions
2. Rational Exponents and Radicals; Rational Expressions and Equations Containing Rational Expressions
3. Quadratic Functions
4. Exponential Functions, Inverses and Logarithms
5. Intermediate Algebra Topics
6. Geometry
7. Introduction to Trigonometry



Current Developmental Math Program

California Award for Innovation in Higher Education

Summer “Early Start”

- Math 98/99 Bootcamps
4 days (8 hours)
200 students

Winter

- MATH 98/99 Bootcamps
3 days (8 hours)
120 students

Fall

- MATH 98
3-4 Sections
55 students
- MATH 99
1-2 Sections
60 students

Spring

- MATH 99
4 Sections
55 students



Current Model Success

POLL

How would you rate the success of your current Developmental Math Program?

- Very Poor
- Below Average
- Average
- Above Average
- Excellent

(Rating/MC)



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Co-requisite Model Plan

Three Components

Co-requisite Math Knowledge

Support for Course Content

Study Skill Development

1 unit, 2 hour activity period



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Timeline

- Fall 2017 - Planning and Tracking
- Winter 2017/18 – Policy and Procedures
- Spring 2018 - Professional/Pedagogical Development
- Summer 2018 - Curriculum Development
- Fall 2018 - Implementation and Evaluation
- Spring 2019 - Revision and Evaluation





Pre-req Math Knowledge

All current faculty are tracking the prerequisite mathematical knowledge necessary for each topic/week in each GE

Pre-req Math Knowledge

- Develop course specific modules
- Needs to be adaptive to student needs
- More than procedural practice
 - Transfer of Learning
 - Quantitative Reasoning
- Technology Support Options
 - EdReady (NROC)
 - ALEKS



Support Technology

POLL

Is there a particular support technology you use or plan to use to support math knowledge development?

- EdReady
- ALEKS
- MyMathLab
- Other

(Multiple Choice)



Support Current Course Content

- Course content changes due to transition to 3 units
- Meeting with Stakeholders
 - What are your program needs for General Mathematical Knowledge?
 - What are your program needs for GE Course Content?
 - What does Quantitative Reasoning look like in your program?





Support Current Course Content

- Not another lecture!
- Activity Driven
- Group Work
- Classroom Discussions
- Reading Apprenticeship

Study Skills Development

- Collaborating with the Cooperative Learning Center
- Peer Assisted Tutoring
- Goals
 - Embedded Tutoring and Study Skill Strategies
 - Tutors model study strategies within group learning
 - Students and Tutors connect within and outside of the classroom
 - Student Driven Learning



Co-req Grading Scheme

- Credit/No Credit
- Activity Completion/Participation
- Connected to performance in supported GE
- Determining how to deal with students who fail the co-req or the GE but not both



Grading Questions

POLL

How are you considering grading your co-reqs?

- Letter Grade
- Credit/No Credit
- Other

(Multiple Choice)



Professional Development

- We are not just changing our curriculum, we are changing our pedagogical culture
- Focus on Design
 - How do we teach our co-reqs (and GE) to support student success?
 - How do we design our co-reqs (and GE) to support student success?



Professional Development

- Reading Apprenticeship
- Quantitative Reasoning
 - Threshold Concepts
 - Transfer of Learning
- Active (group) Learning
- Formative Assessment Practices



Reading Apprenticeship

SOCIAL DIMENSION

- » Creating safety
- » Investigating the relationship between literacy and power
- » Sharing text talk
- » Sharing reading processes, problems, and solutions
- » Noticing and appropriating others' ways of reading

PERSONAL DIMENSION

- » Developing reader identity
- » Developing metacognition
 - » Developing reader fluency and stamina
 - » Developing reader confidence and range

COGNITIVE DIMENSION

- » Getting the big picture
- » Breaking it down
- » Monitoring comprehension
- » Using problem-solving strategies to assist and restore comprehension
- » Setting reading purposes and adjusting reading processes

KNOWLEDGE-BUILDING DIMENSION

- » Surfacing, building, and refining schema
- » Building knowledge of content and the world
- » Building knowledge of texts
- » Building knowledge of language
 - » Building knowledge of disciplinary discourse and practices

METACOGNITIVE
CONVERSATION



Quantitative Reasoning

How do we teach Quantitative Reasoning in our math courses?



Quantitative Reasoning

- Assignment Design
- Threshold Concepts
 - Meta-disciplinary
 - Disciplinary
- Transfer of Learning



Active Learning

A classroom scene with students and a teacher. A teacher is pointing at a globe, and students are looking at a laptop and another globe.

- Facilitate group work
- Facilitate whole class discussion
- Encourage active reflection
- Encourage open sharing of mistakes
- Activity design for active learning
- Active learning with technology

PD Specialists

Any specialists on your campus that would be good candidates for running professional development workshops?

(Free Response)



Evaluation

- Data collection and Analytics Team
 - Track success in course
 - Early Alert System
 - Track success in subsequent courses
- Build into LMS
- Data-Driven Decision Making
 - Course design
 - Pedagogy
- Seeking IRB approval for research



Current Evaluation Methods

POLL

Do you currently use data tracking methods in your courses?

- Yes
- No

(Rating/MC)



Current Evaluation Methods

POLL

How successful are those tracking methods?

- Very Poor
- Below Average
- Average
- Above Average
- Excellent

(Rating/MC)



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The Pre-calc Challenge

- Concern over MATH 98 students entering stand alone pre-calculus course
- Reduction of units to 3 or 4 (via EO 1100) poses a problem with content support for our least prepared students
- Failure is not an option (in our view)



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The Pre-calc Challenge

- Considering Multiple Models
 - Stretch Pre-calculus (2 semesters)
 - New “pre” Pre-calculus GE course
 - Other options?
- How are you approaching the pre-calc challenge?

(Discussion)



Pre-calculus Models

POLL

What model do you plan to adopt for the Calculus sequence?

- Stretch Pre-calculus
- College level prerequisite course for Pre-calculus
- Just Pre-calculus with the Co-req
- Other

(Multiple Choice)





Supporting Student Success

- We are pursuing every effort to support student success
 - Smaller class sizes
 - Build confidence through mentoring
 - Course coordination

Supporting Student Success

- What Best Practices and Pedagogical Innovations you are considering for co-req design to support student success?
- How do we continue to support faculty and staff as they support students' success in subarea B4 at all levels (department, college, university, CSU-system)?

(Discussion)



Thank you!

Feel free to contact me:

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See you November 16-17!



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