El Camino College
Mathematical Sciences Division

DCC Meeting
Thursday, September 5, 2019
1:00pm-2:00pm
MBA 118

1. Course review
    a. CS 14
    b. CS 3(Edwin)
    c. CS 16(Edwin)
    d. CS 7
    e. Math 12(Alice M, Sue Bickford)
    f. Math 130
    g. Math 140 (Linda, Mathew, Magan?)
    h. Math 60 (Suzy Tummers)

2. New Course Proposals
    a. Math 230 - Intro to Linear Algebra(G. Fry)
    b. Math 240 - Intro to Differential Equations(G. Fry)
    c. Data Science(Solomon R. Alice M.)
    d. MATLAB(Solomon, Satish, Edwin)
    e. Engineering(Pavan)

3. Re activation of CS degree.

4. Inactivation of Math 33

5. Evaluating the Co-requisites

EL CAMINO COLLEGE MATHEMATICAL SCIENCES DIVISION CURRICULUM COMMITTEE

Thursday, September 5, 2019

Present: Edwin Ambrosio, Sue Bickford, Carl Broderick, Diaa Eldanaf, Greg Fry, Milan Georgevich, Arturo Hernandez, Kenneth Key, Marlow Lemons, Matthew Mata, Pavan Nagpal, Jacquelyn Sims

Course Review

a. CS 14

b. CS 3

c. CS 16

d. CS 7

e. Math 12

f. Math 130

g. Math 140

h. Math 60

Computer Science 7 is a 2 year course review. This course has been offered once after it has been created and will be reviewed later this year.

Committee D is currently working on the finalizing the number of units for Math 12.

Math 130 was reviewed last semester and the only updates will be the textbooks.

Math 140 was worked on over the summer. Notes dated 2015 were received in June 2019 from CCC to add more content to the course. It was explained that the prerequisite was not a problem, only more content to be added. Because of the AB 705, it was mentioned that it needs to be clarified if this information is current, if more information needs to be added or removed. Dean J. Sims will send a reminder email to the articulation officer on next steps.

Math 60 is almost completed but has not been received by the DCC rep, but will be sent to Diaa Eldanaf once it is done.

New Course Proposals

Diaa Eldanaf will send out the updated New Course proposals to Janet Quezada. Deadline for CCC and DCC approval is September 16, 2019.

a. Math 230 - Intro to Linear Algebra

b. Math 240 - Intro to Differential Equations

c. Data Science

d. MATLAB

e. Engineering

Math 230 and Math 240 were approved by CM1. There was a discussion regarding the pre-reqs and matching skills for Math 240. CM1 will update this. Also, a comparison of the C-ID to the two new courses needs to be done to justify why going from 5 units to the 10 units.

Pavan Nagpal will send out the circuit and the Matlab for Engineering to the committee for review. It was recommended to respond in a timely manner to be able to get the resources in and possibly teach the courses sooner. MATLAB is focused more for Engineering students and was mentioned for this course to be cross listed so everyone can teach it.

It was recommended to do a virtual lab instead of a physical lab. It was explained that we do not have the necessary equipment and it is important to keep the lab with the courses.

Computer Science faculty are working with Lavonne Plum but are not sure if they will be ready for this semester. Solomon Russell, Edwin Ambrosio and Marlow Lemons met with ITS to figure out how to get a course running. ITS will provide support with a server.

Re activation of CS degree.

It was mentioned that evidence is needed to reactivate the Computer Science Degree. It was explained that specific individuals need to work on the Computer Science degree to get approved. It was stated by Kenneth Key, that there are 30 colleges that currently do not offer the Computer Science degree. There was a concern if the Computer Science Cohort will be affected by not having a Computer Science Degree. Dean J. Sims mentioned that the Computer Science Degree may be available for the Computer Science Cohort because students have 2 years of study at El Camino College.

Inactivation of Math 33

Math 33 is currently in the El Camino College Catalog but is no longer being offered, but will need to go through the inactivation process.

Evaluating the Co-requisites
Recommendations are below:

- Students can take a survey at the beginning and end of the semester
- Check the student dropout rate for the students that are taking the support class and the students that took the prerequisite

It was mentioned that a survey will be sent out early in the semester to get a sense of how students are feeling at that time.

Dean's Remarks
Dean Jacquelyn Sims recognized Edwin Ambrosio for being Co-Chair for the Mathematical Sciences Division Curriculum Committee.

El Camino College

DCC Approval Date: _____

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: MATH 240
1.5.2 Descriptive Title: Introduction to Ordinary Differential Equations
1.5.3 Catalog Description (written in complete sentences):

This course is an introduction to ordinary differential equations including both quantitative and qualitative methods as well as applications from a variety of disciplines. The course introduces theoretical foundations, including determining when solutions exist, and techniques for obtaining solutions, including power series solutions, numerical methods, Laplace transforms and systems of linear differential equations.

1.5.4 Prerequisite:
Math 191

Justification:
Sequential

1.5.5 Grading Method: Letter
1.5.6 Degree Status: Associate Degree Credit

1.6 Course Units, Hours, and Offerings
1.6.1 Credit Units: 5
1.6.2 Hours Lecture: 5 Hours Laboratory: 0 Activity Lab: 0
1.6.3 Maximum Semesters of Credit: 1 Maximum Credit Units: 5
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: _____ 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:

cover each topic intensively, provide background as necessary, and to incorporate useful techniques, such as the use of interactive computer graphics, Mathematica and other online resources. No corequisite course would be needed, but the five unit format would provide the instructor with the most flexibility and the student with the best opportunity to absorb the often difficult material, especially with the advent of AB 705 when students may be arriving in the class with a less comprehensive background. Students will be thoroughly prepared to transfer and move to upper division courses as well. Finally, these courses will not only be attractive to current students who want to be better prepared to transfer in a STEM related field, they will also attract students to come from other institutions, two-year or four-year, to fulfill these course requirements.

4. COURSE DEVELOPMENT INFORMATION

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

- 4.1.1 Faculty: Paul Yun, Jasmine Ng, Matthew Mata, Zach Marks, Ben Mitchell
- 4.1.2 Counselor(s):
- 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? Yes
If yes, identify the similar course(s) and explain why this proposed course should be part of the El Camino College curriculum.

This course would split an existing math department course, Math 270 Differential Equations and Linear Algebra, into two separate courses. Math 270 would be deactivated, so there would be no duplication.

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

Distance Education Addendum

I. Distance Education Addendum
New Delivery Method:
☐ Online (Complete Section A)
☐ Hybrid (Complete Section B)

A. Online (51% or more online instruction with an optional or mandatory on-campus orientation.)
Complete this section.

I. **Methods of Regular Effective Contact Between Instructor and Student** (Check all that apply)

A. Group Meetings:
☐Chat Room
☐Interactive Videoconferencing
☐Teleconference
☐On Campus
☐Other(Please specify)

B. Electronic/Technology-Assisted Contact
☐Online
☐Email
☐Listserv
☐Chat Room
☐Interactive Videoconferencing
☐Website/Bulletin Board
☐Telephone
☐U.S. Mail
☐On Camus
☐Other (Please specify)

C. Office Hours
☐Online
☐On Campus

II. **Methods of Evaluation**
☐Methods of Evaluation do NOT differ from those in the Course Outline of Record
☐Methods of Evaluation in the Course Outline of Record are modified or supplemented

☐On Campus
☐Other (Please specify)

C. Office Hours
☐Online
☐On Campus

II. Methods of Evaluation
☐Methods of Evaluation do NOT differ from those in the Course Outline of Record
☐Methods of Evaluation in the Course Outline of Record are modified or supplemented

III. Administration of Examinations
☐On Campus
☐Online
☐Email
☐U.S. Mail
☐Proctored Off Campus
☐Not applicable
☐Other (Please specify)

IV. Text/Supplemental Readings/Materials

☐Texts, Supplemental Readings, and Materials do NOT differ from those listed in the Course Outline of Record
☐Texts, Supplemental Readings, and Materials differ from those listed in the Course Outline of Record

V. Accommodations 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)

☐Instructors of the distance education version of this course will read and will comply with the Accommodations for Students with Disabilities and Instructional Delivery.

2. SOLVING PROBLEMS: Students will use differential equations to solve a variety of problems, including application problems.

3. GRAPHS: Students will use graphical techniques to solve differential equations or systems of differential equations.

4. PROOFS: Students will analyze and construct proofs relevant to differential equations.

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. Create and analyze mathematical models using ordinary differential equations.

   Homework Problems

2. Identify the type of a given differential equation and select and apply the appropriate analytical techniques for finding the solution of first-order and selected higher-order differential equations.

   Objective exams

3. Verify solutions of differential equations.

   Quizzes

4. Apply the existence and uniqueness theorems for ordinary differential equations.

   Other exams

5. Find power series solutions to ordinary differential equations

   Objective exams

6. Determine the Laplace Transform and inverse Laplace Transform of various functions using the definition, tables and shifting theorems.

   Written Homework

7. Solve differential equations using Laplace transforms.

   Objective exams

Lecture	10	IV	SERIES SOLUTIONS OF DIFFERENTIAL EQUATIONS A. Construction of Taylor Series B. Series solutions of differential equations with ordinary points C. Series solutions of differential equations with singular Points D. Introduction to Fourier Series
Lecture	15	V	LAPLACE TRANSFORMS A. Definition of the Laplace Transform B. Functions of exponential order C. Properties of Laplace Transforms D. Inverse Laplace Transforms E. Use of Laplace Transforms to solve initial value problems F. Use of Laplace Transforms to solve differential equations involving step functions G. Use of Laplace Transforms to solve differential equations involving functions with discontinuities H. Use of Laplace Transforms to solve differential equations involving the Dirac delta function I. The convolution integral
Lecture	20	VI	SYSTEMS OF DIFFERENTIAL EQUATIONS A. Systems of ordinary differential equations B. Systems of linear algebraic equations and matrices C. Matrix algebra D. Gaussian elimination E. Determinants F. Eigenvalues and eigenvectors G. Solving homogeneous systems of first-order linear differential equations with constant coefficients H. Diagonalization and fundamental matrices I. Complex-valued eigenvalues J. Repeated eigenvalues K. Nonhomogeneous linear systems of differential equations L. The phase plane and applications
Lecture	5	VII	NUMERICAL METHODS A. The Euler or tangent line method to approximate solutions of differential equations B. The Runge-Kutte method to approximate solutions of differential equations C. Taylor Series methods for approximating solutions of differential equations
Total Lecture Hours		90	
Total Laboratory Hours		0	
Total Hours		90	

Add additional fields as necessary.

V. **INSTRUCTIONAL METHODS: Select from this list. Use all that apply.**
Double click box to check.

B. Check all planned instructional activities that apply:

☒ Lecture	☒ Group Activities
☐ Lab	☐ Role play/simulation
☒ Discussion	☐ Guest Speakers
☒ Multimedia presentations	☐ Field trips
☒ Demonstration	☐ 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: 10 This should be 2 hours for each hour of lecture.

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

If multiple selections are offered, only representative texts need be listed.

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

William Boyce, Richard DiPrima and Douglas Meade. Elementary Differential Equations. 11th Edition. Wiley, 2017.

B. REQUIRED SUPPLEMENTARY READINGS

C. OTHER REQUIRED MATERIALS

Last Reviewed and/or Revised by

El Camino College

DCC Approval Date: _____

Originator: _____

1. COURSE SPECIFICATIONS

1.1 Division: Mathematics and Computer Science
1.2 Department: Mathematics
1.3 Subject: Mathematics
1.4 Discipline(s): Mathematics
1.5 Course Information
1.5.1 Title and Number: MATH 230
1.5.2 Descriptive Title: Linear Algebra
1.5.3 Catalog Description (written in complete sentences):

This course consists of the study of methods to solve and classify systems of linear equations, including row operations, Gaussian elimination and matrix algebra. Vector space and matrix theory are studied including inner products, norms, orthogonality, eigenvalues, eigenspaces, and linear transformations.

1.5.4 Prerequisite:
Math 191

Justification: Sequential

1.5.5 Grading Method: Letter
1.5.6 Degree Status: Associate Degree Credit

1.6 Course Units, Hours, and Offerings
1.6.1 Credit Units: 5
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B. COURSE OBJECTIVES List the major learning objectives for course. These must be stated in behaviorally measurable terms and demonstrate critical thinking skills.

1. Find solutions to systems of linear equations using various methods of linear algebra.

   Objective Exams

2. Use bases and orthonormal bases to solve problems in linear algebra.

   Homework Problems

3. Find the dimensions of spaces such as those associated with matrices and linear transformations.

   Written Homework

4. Find eigenvalues and eigenvectors and use them in applications.

   Objective Exams

5. Determine whether a given set constitutes a vector space or a subspace of a known vector space.

   Objective Exams

6. Determine whether a given set of vectors or functions is independent.

   Written Homework

7. Determine whether a set of vectors spans a given vector space.

   Objective Exams

8. Find a basis and the dimension of a vector space.

   Other Exams

9. Use the Gram-Schmidt process to find an orthonormal basis for a given subspace.

   Objective Exams

10. Determine whether or not a given operator is a linear transformation.

    Objective Exams

11. Find eigenvalues and eigenvectors and use them in applications.

    Written Homework

12. Prove basic results in linear algebra using appropriate proof-writing techniques. These include linear independence of vectors; properties of subspaces; linearity, injectivity and surjectivity of functions; and properties of eigenvalues and eigenvectors.

    Written Homework

			K. Nullity L. Change of basis M. Applications of vector spaces N. Proofs involving vector spaces
Lecture	15	V	EIGENVALUES AND EIGENVECTORS A. Eigenvalues, eigenvectors and eigenspaces B. The characteristic equation C. Diagonalization and similar matrices D. Eigenvectors and linear transformations E. Complex eigenvalues F. Discrete dynamical systems G. Applications to differential equations H. Proofs involving eigenvalues and eigenvectors
Lecture	15	VI	INNER PRODUCT SPACES A. The inner (or dot) product of a real vector space B. Properties of the inner product C. Norm of a vector D. Formula for the angle between vectors E. Orthogonality of two vectors in a real vector space F. Orthogonality and orthonormal bases G. The Gram-Schmidt process H. Inner product spaces
Lecture	10	VII	SYMMETRIC MATRICES A. Diagonalization B. Orthogonal diagonalization of symmetric matrices C. Quadratic forms and their classification D. The singular value decomposition
Total Lecture Hours		90	
Total Laboratory Hours		0	
Total Hours		90	

B. Check all planned instructional activities that apply:

☒ Lecture	☒ Group Activities
☐ Lab	☐ Role play/simulation
☒ Discussion	☐ Guest Speakers
☐ Multimedia presentations	☐ Field trips
☒ Demonstration	☐ Other (specify)

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Estimated Study Hours Per Week: 10 **This should be 2 hours for each hour of lecture.**

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

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

David Lay, Steven Lay, Judi McDonald. Linear Algebra and its Applications. 5th Edition. Pearson, 2016.

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**