CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

ACADEMIC SENATE

GENERAL EDUCATION COMMITTEE

REPORT TO

THE ACADEMIC SENATE

GE-106-156

MAT 1940 – Mathematical Concepts for Elementary School Teachers (GE Area B4)

General Education Committee   Date: 07/20/2016

Executive Committee
Received and Forwarded   Date: 08/17/2016

Academic Senate   Date: <u>08/31/2016</u>
                                                              <u>First Reading</u>

                                                              <u>09/28/2016</u>
                                                              <u>Second Reading</u>

BACKGROUND:

This is a revisioned course for the semester calendar.

RESOURCES CONSULTED:
Faculty
Department Chairs
Associate Deans
Deans
Office of Academic Programs

DISCUSSION:

The GE Committee reviewed the ECO for this course and found it to satisfy the GE Student Learning Outcomes and other requirements for GE Area B4.

RECOMMENDATION:

The GE Committee recommends approval of GE-106-156, MAT 1940 – Mathematical Concepts for Elementary School Teachers for GE Area B4.

MAT - 1940 - Mathematical Concepts for Elementary School Teachers

C. Course - New General Education* Updated

General Catalog Information

College/Department	Mathematics and Statistics

Semester Subject Area	MAT	**Semester Catalog Number**	1940

Quarter Subject Area	MAT	**Quarter Catalog Number**	194

Course Title	Mathematical Concepts for Elementary School Teachers

Units*	(4)

C/S Classification*	C-02 (Lecture Discussion)

To view C/S Classification Long Description click: http://www.cpp.edu/~academic-programs/scheduling/Documents/Curriculum%20Guide/Appendix_C_CS_Classification.pdf

Component*	Lecture

Instruction Mode*	Face-to-Face

Grading Basis*	Graded Only

Repeat Basis*	

	May be taken only once

If it may be taken multiple times, limit on number of enrollments	1

Cross Listed Course Subject Area and Catalog Nbr (if offered with another department)	

Dual Listed Course Subject Area and Catalog number (If offered as lower/upper division or ugrd/grad)	

Choose appropriate type (s) of course(s)*	☐ Major Course
	☑ Service Course
	☑ GE Course
	☐ None of the above

General Education Area / Subarea*	B4

To view the General Education SubArea definitions, click http://www.cpp.edu/~academic-programs/scheduling/Documents/Ch.3-GeneralEducationProposals.pdf.

I. Catalog Description

Catalog Description	Deep analysis of the Number and Quantity Domain of the Common Core Standards in Mathematics for K-8 students. Deep understanding of numbers systems, the operations among them, their meaning and different algorithms that can be used. Identification of the conceptual foundation for these algorithms. Modeling of the Standards of Mathematical Practice. Emphasis on the use of different representations and different models for mathematical ideas. Discussion of the role of precise language and notation in the development of mathematical thinking. Analysis of different ways of argumentation in mathematics. This course has a field work component.

II. Required Coursework and Background

Prerequisite(s)	Within the last 2 semesters, must have either achieved a minimum placement score on the appropriate MDPT or C or better in MAT 0120, or MAT 1050, or

MAT 1060, or STA 1200; or, within last year must have earned 50 or better on the ELM; or, within the last 18 months must have earned either 550 or better on the SAT or 23 or better on the ACT.
NOTE: Students must complete MAT 1940, MAT 3940 and MAT 3950, to meet the GE Area B4 requirement.

Corequisite(s)	

Pre or Corequisite (s)	

Concurrent	

III. **Expected Outcomes**

List the knowledge, skills, or abilities which	1. Students will make sense of mathematical problems. They will identify

students should possess upon completing the course. *	relevant mathematical concepts, procedures, or representations that reveal important information about the problem and contribute to its solution.
Explain how the course meets the description of the GE SubArea(s). Please select appropriate outcomes according to the GE Area/SLO mapping.	The matrix below shows how the methods of assessment address the GE Outcomes. 2. Students will reason abstractly and quantitatively. They will make sense of alternative algorithms presented to them and decide whether they are correct or not. 3. Students will identify the different types of numbers and describe them in several modalities; they will develop confidence translating between the different representations of a mathematical concept (concrete, pictorical, symbolic, etc). 4. Students will make generalizations, formulate claims and prove their conjectures. They will critique the reasoning of others. 5. Students will use precise mathematical terminology to express an idea and they will make sense and use mathematical symbols. 6. Students will articulate their own mathematical thinking and they will critique the reasoning of other classmates and students. 7. Students will be familiar with current educational technology and educational materials that assist the mathematics learning process.
If this is a course for the major, describe how these outcomes relate to the mission, goals and objectives of the major program.	This is a Service and GE Course.

	Participation	Quizzes, Tests	Reports	Projects	Presentations
Ia	X	X	X	X	X
Ie	X	X		X	X
IIa	X	X		X	X
IVb			X	X	X

Describe how these outcomes relate to the associated GE Learning Outcomes listed below.*	GE Outcome Ia is related to Course Outcomes 4, 5, and 6. Students will write effectively for a mathematical audience using precise language and proper reasoning. This includes writing both in mathematical form, as well as written prose. GE Outcome Ie is related to Course Outcomes 1, 2, 3, and 5. Students will produce arguments in multiple forms, including quantitative, graphical, and symbolic. GE Outcome IIa is related to Course Outcomes 1, 2, and 3. Students will use mathematics and critical reasoning as a means for solving problems of both abstract and physical sorts. GE Outcome IVb is related to Course Outcomes 4, 6, and 7. Students will learn to properly generalize claims and will be able to use educational technology for demonstration to assist with the mathematical learning process.
General Education Outcomes*	**Ia. Write effectively for various audiences** **Ie. Apply and communicate quantitative arguments using equations and graphical representations of data.** **IIa. Apply scientific methods and models to draw quantitative and qualitative conclusions about the physical and natural world.** **IVb. Demonstrate activities, techniques, or behaviors that promote intellectual or cultural growth.**

To view the mapping, click https://www.cpp.edu/~academic-programs/Documents/GE%20SLO%20Mapping.pdf

IV. Instructional Materials

Provide bibliography that includes texts that may be used as the primary source for instruction, and other appropriate reference materials to be used in instruction. The reference list should be current, arranged alphabetically by author and the materials should be listed in accepted bibliographic form.

Instructional Materials*	Sowder,J. Sowder, L. & Nickerson, S. (2014) *Reconceptualizing Mathematics*. Freeman.
	Journals like T*eaching Children Mathematics* and *Mathematics Teaching in the Middle School*

Faculty are encouraged to make all materials accessible. Indicate with an asterisk those items that have had accessibility (ATI/Section 508) reviewed. For more information, http://www.cpp.edu/~accessibility

V. Minimum Student Material

List any materials, supplies, equipment, etc., which students must provide, such as notebooks, computers, internet access, special clothing or uniforms, safety equipment, lockers, sports equipment, etc. Note that materials that require the assessment of a fee may not be included unless the fee has been approved according to University procedures.

Minimum Student Material*	- notebook, graph paper, writing tools, construction tools, calculator.
	- access to the internet;
	- access to a computer with appropriate software. Printer

VI. Minimum College Facilities

List the university facilities/equipment that will be required in order to offer this class, such as gymnastic equipment, special classroom, technological equipment, laboratories, etc.

Minimum College Facilities*	
	-Classroom with tables & chairs in banquet style
	- Several Boards & poster paper
	- Computers with appropriate software for the students and the instructor & proyection system; printer; ipads.
	- Cabinets and storage space
	- Manipulatives

VII. **Course Outline**

Describe specifically what will be included in the course content. This should not be a repetition of the course description but an expansion that provides information on specific material to be included in the class, e.g. lecture topics, skills to be taught, etc. This should not be a week-by-week guide unless all instructors are expected to follow that schedule.

Course Outline*	
	• Reasoning about quantities
	• Numeration systems & place value
	• Understanding Whole Number Operations; use different models to represent them
	• Number Theory
	• Integers and operations

- Conventional and conventional ways of computing

- Using Numbers is Sensible ways; Number sense and Estimation

- Meanings for fractions

- Operations with Rational Numbers; use different models to represent them

- Multiplicative comparisons and multiplicative reasoning

- Ratio, rates, proportions and percentages

VIII. **Instructional Methods**

Describe the type(s) of method(s) that are required or recommended for the instruction of this course (lectures, demonstrations, etc.). Include any method that is essential to the course, such as the use of particular tools or software.

Instructional Methods*	- lecture and demonstrations - discussions - group work - computer labs
Discuss how these methods may be used to address the course and program outcomes, as appropriate. Include or attach a matrix to align the evaluation methods to the outcomes.*	- presentations - field experience (Gift of Numbers)

IX. **Evaluation of Outcomes**

Describe the methods to be used to evaluate students' learning, i.e. written exams, term papers, projects, participation, quizzes, attendance, etc.*	participation, quizzes, tests	x	x	x	x	x
	quizzes, tests,					
	reports					
	projects					
	presentations					

Describe the meaningful writing assignments to be included.*

The students will design a mathematical task focusing on the Numbers and Operations Domain of the Common Core Standards in Mathematics for K-8 students.

They will write a complete report that will include: the rationale for the selection of that task, its target audience, the materials needed and the learning goals. After the implementation of the task, the students will write a reflective report, comparing the plan with its implementation, changes that had to be made and ways their students coped with that mathematical task.

	01	02	03	04	05
participation	x	x	x	x	x

reports						
projects		x			x	x
presentations		x				x

If this is a general education course, discuss how these methods may be used to address the associated GE Learning Outcomes listed below. Include or attach a matrix to align the evaluation methods to the outcomes.*

The matrix below shows how the methods of assessment address the GE Outcomes.

	Participation	Quizzes, Tests	Reports	Projects	Presentations
Ia	X	X	X	X	X
Ie	X	X		X	X
IIa	X	X		X	X
IVb			X	X	X

X. This OPTIONAL Section is for describing Course/Department/College specific requirements.

Department/ College Required ECO Information (Optional)