**Department of Mathematics**

**School of Natural Sciences, Mathematics, and Engineering**

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**Program Description**

Mathematics is a unique and valuable science that can be exciting, enjoyable, and rewarding. The Department of Mathematics provides a collection of mathematics courses designed to challenge and stimulate all open minded and thoughtful students regardless of individual backgrounds or major interest areas. This is done by combining flexibility, applicability, and historical perspective in the design of the mathematics curriculum. Furthermore, depth of understanding and appreciation are not sacrificed to quantity; the major emphasis is upon inquiry, creativity, methods, techniques, and thought processes rather than bulk of material.

The classroom goal is to discover both the importance and beauty of mathematics by combining lectures with discussions, problem solving recitations, student presentations, writing assignments, computer experience, and any other workable approaches to learning. As such, the Department of Mathematics at CSUB is one of few institutions nationwide which includes an activity session in every 5 unit mathematics course. A student is encouraged to interpret and communicate mathematically with others, to follow self-direction and in-depth study, and to investigate the interplay of mathematical concepts. A teacher acts as a resource person, stresses the spirit and point of view of mathematics, and provides for feedback of the relative value of classroom activities.

Upon completion of any mathematics course, students are prepared to be participants in a highly technological, scientifically complex environment. From a subjective point of view, they should have an improved grasp of the art and beauty of rational reasoning and discourse both as an observer and a participant. From an objective point of view, they should have acquired new skills which, alone or in combination with others, will enhance both an understanding of and performance in the scientific world. A detailed description of student learning goals and objectives can be found at http://www.csub.edu/math/files/math SLOs.pdf

With the completion of a mathematics major, a student, depending upon the choice of upper division courses, may pursue: (1) a career or advanced studies in the mathematical sciences (Applied Concentration or Statistics Concentration); (2) a career in teaching (Teaching Concentrations, with or without a California Teaching Credential); (3) a course of graduate study leading to an advanced degree in pure mathematics (Theoretical Concentration); or (4) a career or advanced studies in economics or actuarial sciences (Economics Concentration). The Applied Concentration includes courses in differential equations, numerical analysis, complex analysis, and partial differential equations. The Statistics Concentration includes courses in statistics, design of experiments, analysis of variance and regression analysis. The Teaching Concentrations include courses in geometry, number theory, and probability and statistics. The Theoretical Concentration includes abstract algebra, real and complex analysis, probability, and number theory. The Economics Concentration mixes a solid mathematical background with courses in microeconomics, macroeconomics and econometrics. In all Concentrations, students gain experience through student presentations and discussion in recitation periods.

**Requirements for the Bachelor of Science Degree with a Major in Mathematics**

**Total Units Required to Graduate 180 units**

**Major Requirements 83-84 units**

 Core Mathematics Courses 38

 CMPS 221 5

 Concentration 40-50

**Other University requirements 77-87 units**

 CSUB 101 2

 American Institutions 10

 Area A 15

 Area B1, B2, B3 10\*

 Area C 15

 Area D 10\*

 Theme 1 0\*

 Theme 2 5

 Theme 3 5

 GRE 5

 GWAR (Exam) or Class 0-5

**Additional Units 0-20 units**

\*May be satisfied in major, minor, or other university requirement

**Requirements for the Major (83-84 units)**

Students seeking a major in Mathematics must complete the following:

1. MATH 201, 202, 203, 222, 300, 330, 340, 363

2. CMPS 221

3. One of the following concentrations:

a. **Applied Mathematics Concentration**

 (1) MATH 204, 205, 3313, 490

 (2) Two of MATH 305, 312, 350, or 402

 (3) One course from the following list: BIOL 201, 310; CHEM 211, 211L, 212, 212L; CMPS 222, 223; ECON 201, 202, 301, 302; MGMT 301, PHYS 221, 222. If one of these courses will be used to satisfy a General Education requirement, a different course must be taken to satisfy the Applied Mathematics Concentration requirement.

 (4) One additional upper division MATH elective1

b. **Economics Concentration**

 (1) MATH 140, 204, 205, 3313, 440 and 490

 (2) ECON 201, 202, 301, 302 and 420. [Econ 201

 satisfies GE Area D]

c. **Statistics Concentration**

 (1) MATH 140, 204, 3313, 415, 440 and 490

 (2) MATH 338 or 339

 (3) One additional upper division MATH elective1

d. **Teaching Concentration (does not include the required credential courses)**

 (1) MATH 3012, 301B, 360, 440, 450, 491

 (2) One of MATH 204 or 205

 (3) Two additional upper division MATH electives1

e. **Theoretical Mathematics Concentration**

 (1) MATH 204, 312, 3313, 430, 490

 (2) One of MATH 431 or 463

 (3) Two additional upper division MATH electives1

**Requirements for the Teaching-Concentration Major in Mathematics Including a California Teaching Credential: Blended Program in Mathematics**

The Mathematics Department offers a program which blends the single subject requirements in the mathematics teaching-**c**oncentration with the pedagogy courses in CSUB’s Single Subject Credential Program, yielding an integrated program of study over four years and requiring 205 units. Students graduate with both a BS in Mathematics and a Level 1 (Preliminary) Single Subject Credential in Mathematics. Students in the program will have an advisor in the Mathematics Department and an advisor in the School of Education.

**Total Units Required to Graduate 198-205 units**

**Major Requirements 123 units**

 Mathematics Courses 74

 CMPS 221 5

 Education Courses 44

**Other University requirements 75-80 units**

 CSUB 101 2

 American Institutions 10

 Area A 15

 Area B1, B2, B3 10\*

 Area C 15

 Area D 10\*

 Theme 1 0\*

 Theme 2 5

 Theme 3 5

 GRE 3\*\*-5

 GWAR (Exam) or Class 0-5

\*May be satisfied in major, minor, or other university requirement

\*\*EDTE 416 is a 3-unit class in the Credential Program that also satisfies the GRE requirement

**Requirements for the Major Including a California Teaching Credential (123 units)**

Students seeking the blended program in Mathematics must complete the following:

1. MATH 201, 202, 203, 222, 300, 3012, 301B, 330, 340, 360, 363, 440, 450, 491

2. CMPS 221

3. One of MATH 204 or 205

4. One additional upper division MATH elective1

5. EDSP 301

6. EDTE 401, 402, 403, 404, 410, 415

7. EDSE 431, 432, 433, 434, 435, 499

**Notes:**

1 *At most two of MATH 301, 331 and 430 can count towards the major; MATH 320 and 321 do not count toward the major.*

2 *MATH 331 and 430 together may substitute for MATH 301*

 *and an upper division MATH elective*.

3 *Cannot be substituted by MATH 301.*

**Honors Option**

A student may, with the approval of the Chair of the Department of Mathematics, undertake the Honors Program in Mathematics by completing the following:

1. One of the concentrations a, b, c, d or e.

2. An additional ten hours of upper division courses in mathematics (not to include MATH 320 or 321).

3. Included in 1 and 2 above, at least one of these upper division sequences in Mathematics: MATH 331-431, MATH 363-463*,* MATH 205-402, MATH 360-420,and MATH 340-440.

4. MATH 492 and presentation of an Honors thesis to the Department of Mathematics.

**Requirements for the Minor in Applied Statistics**

Although no minor is required for the BS degree in Mathematics, a minor in Applied Statistics is available, consisting of 20 quarter units chosen from MATH 140 (or equivalent), 338, 339, 340, 415 and 440.

**Requirements for the Minor in Mathematics**

Although no minor is required for the BS degree in Mathematics, a minor in Mathematics is available. The requirement is 20 units, at least 10 of which must be upper division. Lower division courses that can count are MATH 202, 203, 204, 205, 206, 212 and 222. Upper division courses that do not count are MATH 320 and 321.