service agency. The committee is prepared to advise students relative to such examinations. Furthermore, many local governments admit to competition only those who have a legal residence in their jurisdiction. (3) Students who plan to continue with graduate work after completion should be certain to so inform the committee as early as possible in order that the program may be planned for that objective.

REQUIREMENTS FOR THE A.B. DEGREE

Lower Division

All degree programs must include the following lower-division requirements. The total requirement is represented by Column I plus Column II. It is recommended that the total requirement be completed in the lower division, but the work listed in Column II may be postponed until the upper division. Clear upper division ("U. D. Clear") is based, then, on the satisfactory completion of 90 units, including all work listed in Column I.

	I	II
Natural Science (may include some mathematics)	12	6
Year laboratory science	Yes	
Personal Hygiene	Yes	
Social Science	12	6
Year course	Yes	
Constitution	Yes	
English and Speech	9	0
English Composition (6 units)	Yes	
Psychology	5	0
Physical Education (two years)	3	0
Freshman Orientation	1	0

Scholarship Requirements

In order to qualify for clearance to the Upper Division, a candidate must pass with at least a "C" average the required courses in natural science, social science, and English. All candidates for the degree must maintain at least a "C" average in their major subject, as well as in their total record, in order to be eligible for graduation.

Students who plan to complete requirements for transfer to another college or university should consult the bulletin of that institution regarding scholarship requirements. Most universities require more than a "C" average for candidacy for the general secondary credential.

Majors and Minors

Each candidate for the liberal-arts degree should fulfill the requirements for one major and at least one minor. Students who plan to continue in graduate school for the general secondary credential should select the major and the minor from subjects taught in high school.

The candidate should consult heads of the departments concerned for program advice. Major and minor requirements are determined by the department head and often can be adjusted to meet the student's needs.

Upper Division

All liberal-arts students on the completion of ninety or more units are classified in the Upper Division and use special Upper-Division registration booklets when registering. Their registration books will show "with deficiencies," however, until the candidate has completed, with at least a "C" average, the subject matter listed in Column I above. The student must have a "C" average in the required courses in social science, natural science, and English as well as on his total record. When these requirements are completed satisfactorily, the student's record card will show "U. D. Clear." Note that for graduation at least one year of work, 45 quarter units, must be completed subsequent to the time that lower-division requirements have been satisfied and the "U. D. Clear" notation appears on the record. A total of 180 quarter units is required for graduation.

Students are advised to check frequently with the Registrar's Office regarding degree requirements in order to avoid any confusion in the interpretation of this requirement.

1944-1945

TEACHER TRAINING

San Jose State College offers work leading to the general credentials (ing kindergarten-primary, general elementary, and junior high school fields, to special credentials in art, business education, home economics, industrial librarianship, music, physical education, speech, and speech correction. ' is also offered, chiefly in the summer session, leading to elementary administr and supervision certification.

Requirements for general credentials and for the administration and s vision credentials are outlined under the department of education. Requirer for special credentials are outlined under the announcement of the depart concerned.

REQUIREMENTS FOR THE A.B. DEGREE

In all departments of the college, candidates for the bachelor of arts d must have completed at least 180 quarter units for graduation. At least 45 u including part of the last year's work, must be completed in residence. Not than 60 units may be counted toward the degree in any one department, alth methods courses offered by the department may be counted as education and be taken in addition to the sixty-unit limitation.

Lower Division

All degree programs must include the following lower-division requiren The total requirement is represented by Column I plus Column II. It is recomme that the total requirement be completed in the lower division, but the work list Column II may be postponed until the upper division. Clear upper division ("I Clear") s based, then, on the satisfactory completion of 90 units, including all listed in Column I.

	I	II
Natural Science (may include some mathematics)	12	6
Year laboratory science	Yes	
Personal Hygiene	Yes	
Social Science	12	6
Year course	Yes	
Constitution	Yes	
English and Speech	9	0
English Composition (6 units)	Yes	
Speech 2A	Yes	
Psychology	5	0
Physical Education (two years)	3	0
Fundamentals (for teacher-training)		Yes
Freshman Orientation	1	

Scholarship Requirements

All candidates for a degree must maintain at least a "C" average on the lc division requirements in natural science, social science, and English, as wel in their major subject and their total record, in order to be eligible for gradua Candidates for general credentials, as well as candidates for the special secon credential in physical education (women), and home economics, must mainta scholarship average of 1.25 until the time of graduation. Librarianship candi must maintain the required average of 1.5. Candidates for the special secon credential in home economics must also maintain a 1.5 average in home-econo subjects.

MATHEMATICS

(Including Aeronautics and Engineering)

Professor HEATH; Associate Professors HEASLET (on leave), MYERS (acting head); Assistant Professor GRATZ; Instructors FLANAGAN, SMITH (on leave).

The courses in the mathematics department are designed to satisfy students with varying objectives. All students in science and engineering, as well as those who expect to do quantitative work in any of the social sciences, will find adequate instruction for their needs. Prospective teachers in the elementary and secondary schools are able to obtain a minor or major in the field of mathematics and students planning on advanced work in the universities may complete their undergraduate teaching major here. The work required for a major in this department presupposes at least six semesters of high school mathematics, including trigonometry. Deficiencies may be made up by proper selection from courses 6, 7, and 8.

It is strongly recommended that prospective teachers of seventh and eighth grade arithmetic in the elementary schools or general mathematics in junior high schools choose their electives from the following courses: Mathematics 4, 6, 7, 8, 104, and 393. See Education Department announcement for list of recommended electives satisfying minors. Consult the adviser and the head of the mathematics department. Courses to be taken will depend upon the mathematics the student has had in high school.

1. Minor in Mathematics. This will accompany a pre-secondary major in some other field. The requirements are

Math. 30, 35, 36	15 units
Upper division courses in mathematics (selected from courses numbered over 100)	9 units
Total	24 units

2. A.B. Degree with Major in Mathematics. This program gives the first four years of the course required for the general secondary credential or prepares for graduate work in mathematics. The requirements for the major are as follows:

The work above required for a minor	24 units
Additional upper division courses	12 units
Total	36 units

PROGRAM FOR THE A.B. DEGREE IN MATHEMATICS

The universities require the candidate for an advanced degree in mathematics to be able to read German and French. Provided one of the languages has been taken in high school only one need be taken in college.

Students who are planning to spend the fifth year in a university to qualify for the general secondary credential should minor in some subject taught in high school, and should include in their program certain of the undergraduate requirements in education of the university to which they will transfer. Consult the Dean of the Upper Division and the department head for recommended courses.

Program Recommended for Mathematics Majors

First Year	*Autumn*	*Winter*	*Spring*
Physical Education	½	½	½
Eng. 1A, 1B, 1C—English Composition	3	3	3
Social Science or Natural Science†	3	3	3
*German (or French)	5	5	5
Math. 30, 35, 36	5	5	5

† Natural Science should total 18 units, including a year laboratory course.
* If part of this language has been taken in high school, count one year of high school equivalent to one quarter in college.

Second Year	*Autumn*	*Winter*	*Spring*
Physical Education	½	½	½
Natural Science	3	3	3
Social Science (including Constitution)	3	3	3
*German (or French)	3	3	3
Math. 37, 135, 136	3	3	3
Electives	3	3	3
H.H. 11—Hygiene (for men)	1	–	–
Third Year			
Natural Science or Social Science	3	3	3
Psy. 55—Gen. Psy.	5	–	–
Mathematics (Upper division courses)	3	3	3
Minor or courses in Education	3	3	3
Electives	2	7	7
Fourth Year			
Mathematics (Upper division courses)	3	3	3
Minor	3	3	3
Electives	9	9	9

DESCRIPTION OF COURSES

Lower-Division Courses

3. Slide Rule. Use of the slide rule in calculations involving multiplication and division, squares and square roots, trigonometric functions, and logarithms.
One unit; autumn, winter — ASPINWALL

4. Mathematics for Women. An elementary mathematics course particularly intended to satisfy the needs of women in industry and at home. Includes a review of arithmetic, elementary algebra and geometry, and related topics.
Three units; winter — FLANAGAN

6. Survey of Mathematics. This course provides a review of arithmetic, the fundamental theorems of geometry, and elementary algebra. It is open only to students with not more than two years of high school mathematics (1 year of algebra and 1 year of geometry).
Three units; autumn, winter — FLANAGAN, MYERS

7. Intermediate Algebra. An intensive course in algebra, covering the usual material through progressions; open only to students with 2½ years of high school mathematics (1½ years of algebra and 1 year of geometry) or Mathematics 6.
Three units; autumn, winter — MYERS, FLANAGAN

8. Trigonometry. An elementary course with applications. Open only to students with at least 2½ years of high school mathematics (1½ years of algebra and 1 year of geometry), or credit in Mathematics 7.
Five units; autumn, winter, spring — FLANAGAN

18. Spherical Trigonometry. The trigonometry of great circles on the surface of a sphere with applications to navigation. Prerequisite: Plane Trigonometry.
Three units; spring — FLANAGAN, MYERS

20. College Algebra. Prerequisite: Two years of high school algebra or Math. 7.
Three units; autumn, winter, spring — MYERS

30. Analytic Geometry. Prerequisite: Trigonometry. To assure competence a placement examination is given on the first day of this course. Students falling below minimum requirements are usually expected to take Math. 20.
Five units; autumn, winter, spring — FLANAGAN, HEATH

* If part of this language has been taken in high school, count one year of high school equivalent to one quarter in college.

35. Differential Calculus. Prerequisite: Math. 30.
Five units; autumn, winter, spring

36. Integral Calculus. Prerequisite: Math. 35.
Five units; autumn, spring

37. Applications of Calculus. Additional material in the calculus, power series, numerical integration. Prerequisite: Math. 36.
Three units; autumn

60. Mathematics of Investment. Prerequisite: Two years of high school algebra or Math. 7.
Five units; spring

Upper Division Courses

101. Elementary Geometry from an Advanced Standpoint. A course in geometry for prospective teachers. Prerequisite: Math. 36.
Three units; winter

102. Logic of Algebra. A study of the foundations of mathematics. Prerequisite: Math. 36.
Three units; spring

104. History of Mathematics. Historical survey of mathematical development from earliest beginnings to modern times. Prerequisite: Math. 36 or permission of the instructor.
Three units; spring

115. Projective Geometry. A course in nonmetrical modern geometry with applications to the conics. Prerequisite: Math. 36.
Three units; autumn

118. Non-Euclidean Geometry. Prerequisite: Math. 36.
Three units; autumn

120. Theory of Statistics. Development of formulas with some applications for averages, percentiles, measures of deviation, standard measures, reliability of constants, product-moment correlation, partial and multiple correlation, probability, the normal curve, elements of curve fitting.
Three units; spring

128. Advanced Algebra. Theory of equations, determinants, and matrices. Prerequisite: Math 36.
Three units; winter

135. Advanced Calculus I. Functions, partial differentiation, and multiple integrals, with geometric applications. Prerequisite: Math. 37.
Three units; winter

136. Advanced Calculus II. Differential equations. Prerequisite: Math. 135.
Three units; spring

137. Advanced Calculus III. Fourier series, orthogonal functions, line and surface integrals. Prerequisite: Math. 136.
Three units; autumn

140. Functions of a Complex Variable. Conformal mapping, study of analytic functions, complex integration, residues, and power series. Prerequisite: Math. 136.
Three units; spring

142. Vector Analysis. The algebra of vectors, the differentiation of vectors, the differential operators gradient, divergence, and curl, together with applications to geometry and physics. Prerequisite: Math. 36.
Three units; winter

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144. Infinite Series. Prerequisite: Math. 135.
Three units; autumn — HEASLET

146. Theory of Numbers. Euclid's algorithm, study of prime numbers, congruences of first and higher degrees, theorems of Fermat, Euler, and Wilson, quadratic residues. Prerequisite: Math. 36.
Three units; winter — FLANAGAN, HEASLET

393. The Teaching of Mathematics
Two or three units; by arrangement — STAFF

AERONAUTICS

Program for A.B. Degree in Aeronautics

A four-year program with a major in aeronautics has been designed to give a broad semiprofessional background in aeronautics for those who are interested in making some phase of aviation a profession.

PROGRAM RECOMMENDED FOR A.B. DEGREE IN AERONAUTICS

Lower Division

First Year	*Autumn*	*Winter*	*Spring*
Aero. 11A, 11B, 11C—General Aeronautics	4	4	4
Aero. 30, 31, 32—Aeronautics Laboratory	4	4	4
Mathematics	5	5	5
*Social Science	3	3	3
Physical Education	½	½	½
Second Year			
Aero. 150, 151, 152—Adv. Aeronautics Lab.	4	4	4
Physics	4	4	4
Radio 5A, 5B, 5C—Radio Code	2	2	2
English 1A, 1B—Composition	3	3	–
Speech 2A—Fundamentals of Speech	–	–	3
Social Science	3	3	3
Physical Education	½	½	½

Upper-division offerings in aeronautics are restricted at the present time. It is expected that regular upper-division courses will be resumed after the war. For the time being, the adviser should be consulted regarding the program for the junior and senior years.

DESCRIPTION OF COURSES

Lower Division Courses

11A. General Aeronautics. Essential principles of flight of all types of aircraft; aerodynamics; static stability, controllability, performance, engines and instruments.
Four units; autumn

11B. General Aeronautics. Elementary principles of aerology and their application to air navigation. Continuation of Aero. 11A, but Aero. 11A is not a prerequisite.
Four units; winter

11C. General Aeronautics. Principles of aircraft navigation and problems pertaining to navigation. Continuation of Aero. 11B, but Aero. 11A and Aero. 11B are not prerequisites.
Four units; spring

* 18 units in social science, including Constitution, and 18 units in natural science, including a year laboratory course, are required.

San Jose State 1944-45