The School of Arts and Sciences

EXECUTIVE COMMITTEE

PROFESSOR RALPH J. GILMORE, *Chairman*

PROFESSOR GUY H. ALBRIGHT   PROFESSOR WILLIAM A. BLAKELY

GENERAL STATEMENT

The School of Arts and Sciences is intended to serve two distinct purposes. First, it will provide instruction for students who want to continue their general education beyond the secondary or high school, but who do not plan to pursue studies in the advanced schools of the college or in professional schools. For such students the purpose is to insure their acquaintance with the arts and sciences that interpret and control modern civilization. Under the general direction of the executive committee of the school the students who plan to remain in college only four semesters will elect such courses as will seem to serve best their personal interests and desires.

Second, the School of Arts and Sciences is intended to serve most effectively that larger number of students who expect to enter one of the advanced schools of the college. The first four semesters in college in addition to the work in the high school will enable such students to obtain adequate elementary preparation in the natural and social sciences, in languages and literature, in art, in mathematics, and other subjects prerequisite to advanced studies in the subject or subjects of their choice. Again, the advisory service available to the students who expect to continue their studies beyond the first four semesters in college will enable them to select such courses as will prepare
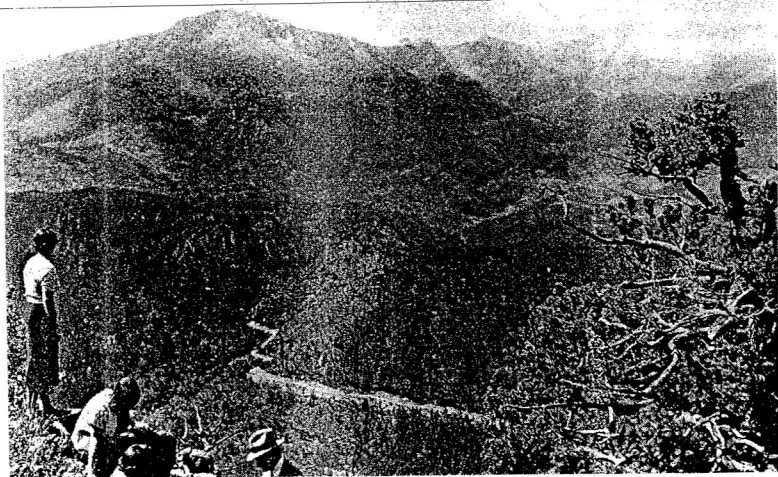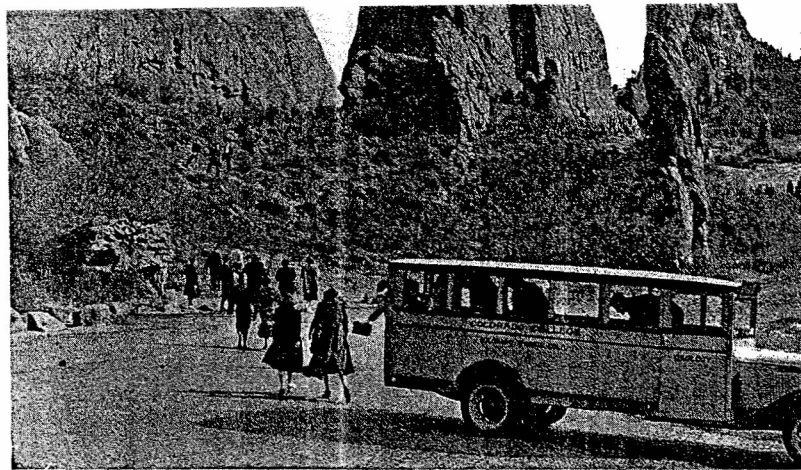
them best for the more scholarly and independent study of their subjects of concentration in the advanced schools of the college.

The students in the School of Arts and Sciences will have considerable liberty in the choice of their subjects of study. For purposes of obtaining desirable distribution and concentration during the first four semesters the subjects of study have been divided into three groups.

1. LANGUAGES, LITERATURE, and the FINE ARTS. This group includes: art, dance, English, French, German, Greek, Italian, Latin, music, Spanish.

2. SOCIAL SCIENCES. This group includes: anthropology, business administration and banking, economics, education, history, philosophy, political science, psychology, religion, sociology.

3. MATHEMATICS and the NATURAL SCIENCES. This group includes: astronomy, biology, chemistry, engineering science, geology, graphics, mathematics, physics, surveying.

The only scholastic requirements imposed upon the students in the School of Arts and Sciences are: First, at least two courses in consecutive semesters in some one subject, and, second, at least one course in each of the other two groups of subjects. Students will elect the remainder of their work under the general direction of the executive committee of the school and in consultation with the chairman of the department in which they expect to do the major part of their work.

In view of the fact that few courses in the general field of social sciences are open to freshmen, a special provision has been made for students whose interests lie in that general field. Such students may satisfy the requirement as to two courses in the same subject in consecutive semesters by electing History 101 and 102 in the first year and sociology, economics, or political science thereafter.

Students in the School of Arts and Sciences who intend to make their field of concentration a fine art involving the mastery of a technique, should make definite provision for its pursuit during the first four semesters.

Those students who, for professional reasons, plan to concentrate later in engineering science should, prior to registration, consult with Dean H. E. Mathias, director of admission, in regard to their program.

GEOLOGY CLASS IN THE GARDEN OF THE GODS

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1945 Colorado College catalog degree requirements

the other two groups of subjects; the average of all work in the first four semesters must be a fourth general group; a fourth general group in the subject in which the student expects to do the major part of his work in an advanced school; and a fourth general group in at least two three-hour courses in English or the approval of the chairman of the department of English.

Scholarship Requirements

Regularly enrolled students are required to pass three-fourths of their regular schedule of courses each semester to remain in college. A student whose average is below a fourth general group at the end of his fourth semester is placed on scholarship probation. He may be continued under this probation for two more semesters. If at the end of his sixth semester his scholarship average is still below a fourth general group, he is asked to withdraw from college for at least one semester, and his return is subject to the action of the executive committee of the appropriate advanced school.

Admission to Advanced Schools

Upon the satisfactory completion of the work prescribed for the School of Arts and Sciences, students are formally admitted to work in the advanced schools by the appropriate executive committee.

Bachelor of Arts Degree

The requirements for the Bachelor of Arts degree are first, the completion of the work in the School of Arts and Sciences or its equivalent; second, admission to an advanced school; third, the completion of 64 semester hours in an advanced school; and fourth, passing a comprehensive examination in the field of the student's major interest. The student's work in an advanced school is under the direction of an adviser who, with the student, outlines a schedule of courses to be approved by the chairman of the department in which the major part of the student's work is to be done. The senior year must be spent in residence.

A.B. Degree in Business Administration and Banking

The Judson M. Bemis Department of Business Administration and Banking offers a special program of study leading to the degree of Bachelor of Arts in Business Administration and Banking. For this degree 40 semester hours, or their equivalent, in business and economics are required.

Bachelor of Arts Degree with Honors

The Bachelor of Arts degree with honors may be conferred upon those students whose general scholarship group is two or better, and who receive the recommendation of the department in which the major part of their work has been done and of the committee in charge of the general comprehensive examination. The degree *summa cum laude* is conferred only by a special vote of the faculty after individual consideration of each case.

Master of Arts Degree

The requirements for the degree of Master of Arts are:

1. Any graduate of an approved college may be allowed to enroll for graduate study, but in order to become a candidate for the Master of Arts degree he must be approved by the department in his field of concentration and by the executive committee of the appropriate school.

2. To be admitted to candidacy for the Master of Arts degree in any department, a student must have fulfilled the requirements for undergraduate concentration in that department at Colorado College, or have done equivalent

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101 (Marine M 2) MARINE ORGANIZATION II
Naval court martial system; the convening authority; training films; evidence; trial procedure; inquiries and investigations; use of Marine Corps manual; company administration; muster rolls; service record books; pay; correspondence and endorsements. 1 hour.
—GUENTHER

MATHEMATICS

105 and 106 (Navy M1 and M2) ELEMENTARY MATHEMATICAL ANALYSIS I AND II
First semester: This course is designed for students who enter with two or less units of mathematics. Within the limits of the student's background the following areas will be considered. Elementary College Algebra: Fundamental concepts, variable, constant, function; review of axioms, elementary operations; factoring; fractions; formulas; the graph; linear equations; simultaneous linear equations in two unknowns; quadratic equations; exponents and radicals; variations. Trigonometry: Angles and their measures, trigonometric functions, linear interpolation and use of tables; right triangles; fundamental identities; logarithms, including introduction to use of slide rule; functions of multiple angles; addition formulas; identities; inverse trigonometric functions; trigonometric equations; laws of sines, cosines, and tangents; oblique triangles.

Second semester: A continuation of Elementary Mathematical Analysis I. The following areas will be considered. Trigonometry: Introduction to spherical trigonometry. Analytic Geometry: Points in rectangular and polar coordinate systems; analytic equivalents of distance, slope, etc.; loci; straight line; circle; conic sections; polar and parametric equations; introduction to solid analytic geometry, including cylindrical and spherical coordinate systems. College Algebra: determinants and solution of systems of equations; simultaneous quadratics (with graphical solution), theory of equations; complex numbers. 5 hours, each semester (2-semester course).
—ALBRIGHT, JORDAN, HANSMAN, LOVITT, SISAM

107 and 108 (Navy M3 and M4) MATHEMATICAL ANALYSIS III AND IV
First semester: This course is designed for students who enter with two and one-half or more units of high school mathematics, including one and one-half units of algebra. College algebra: Fundamental concepts of college algebra, laws, operations; review of factoring, fractions, linear equations, the graph, quadratic equations and simultaneous quadratic equations, binomial theorem; variation, progressions; determinants and systems of linear equations; exponents, radicals; logarithms. Trigonometry: Angles and their measures; the trigonometric functions; significant figures and approximate computation; linear interpolations and use of tables; right triangles; identities; functions of multiple angles and addition formulas; inverse functions; trigonometric equations; oblique triangles; right and oblique triangles in spherical trigonometry.

Second semester: A continuation of Mathematical Analysis III. Analytic Geometry: Points in rectangular and polar coordinate systems; distance, slope, angle between lines; loci; straight line; circle; conic sections; polar and parametric equations; tangents and normals; curve tracing in various systems; translation and rotation; empirical determinations (curve fitting); direction cosines and

numbers; the plane and line; quadric surfaces and sections; cylindrical and spherical coordinates. College Algebra: Permutations, combinations, and probability; theory of equations; complex numbers and DeMoivre's theorem. 5 hours, each semester (2-semester course).　　　　　　　　　　　—JORDAN, HANSMAN, SISAM

112　MATHEMATICAL THEORY OF INVESTMENTS

Logarithms, simple and compound interest, annuities, amortization, valuation of bonds, sinking funds, depreciation. Prerequisite, Mathematics 105 or 107, or one and one-half units of high school algebra. 4 hours. (Suspended for duration).　　　　　　　　　—ALBRIGHT

121　TRIGONOMETRY

Functions of one and two angles; inverse functions, logarithms, solution of triangles, applications. Prerequisite, one and one-half units of high school algebra and one of geometry. 4 hours. (Suspended for duration).　　　　　　　　　　　—SISAM

122　ANALYTIC GEOMETRY

Plane loci of the first and second orders, higher plane curves, solid analytic geometry. Prerequisite, Mathematics 105 and 106, or 107, or consent of instructor. 4 hours. (Suspended for duration).
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124　THEORY OF EQUATIONS

Solution of cubic and quartic equations, properties of an algebraic equation in one unknown, determinants, linear equations, resultants, and discriminants. Prerequisite, Mathematics 106, or 108, or 122. 4 hours. (Suspended for duration).　　　　　　　　—LOVITT

203 (Navy M5)　CALCULUS I

Functions; limits and limit theorems (without proof); the derivative and its interpretations; derivatives of algebraic functions; maxima and minima; rates; derivatives of transcendental functions; applications, including Newton's methods of approximation and tangents and normals; derivatives of higher order; the differential with applications; definite integral with applications such as length, area, surfaces, and volume, moments, centroids, moments of inertia; improper integrals. Prerequisite, first year of Mathematics. 4 hours.
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204 (Navy M6)　CALCULUS II

A continuation of Calculus I. Applications of the definite integral such as work and attraction curvature, curve tracing; indeterminate forms; series of constant terms; power series with Taylor's and Maclaurin's theorems with remainder term and applications in integration; partial differentiation with applications; multiple integrals with applications. 4 hours.　　　　　　　—LOVITT

207　ELEMENTARY STATISTICS

Charts and graphs, the frequency distribution, index numbers, analysis of time series, and correlation. Prerequisite, Mathematics 106 or 108, or permission of instructor. 3 hours.　　　—HANSMAN

211 and 212 (Navy M8 and M9)　ELEMENTARY NAVIGATION AND NAUTICAL ASTRONOMY IA AND IIA

First semester: Basic mathematics with emphasis on the elements of spherical trigometry and elementary vector mathematics. (Class 3). *Second semester:* Covers the astronomical background necessary to an understanding of the principles of celestial navigation and inherent in the practice of celestial navigation. Prerequisite, Navigation and Astronomy 211 (Class 3.) 3 hours, each semester (2-semester course).　　　　　　　　　　　　—ALBRIGHT

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Courses in the School of Natural Sciences

301 (Navy A1) ANALYTICAL MECHANICS I
Concept and definition of force, scaler, and vector quantities; combination and resolution of forces, parallelogram law, and triangle law; principle of moment and couples, including forces in space; graphical and analytical condition for equilibrium, force polygon, and string polygon, equilibrium of forces as applied to simple structures and machines, free body sketches, stress diagrams, method of sections, loaded cables; conditions of equilibrium for various force systems; coplanor and noncoplanor; principles of friction applied to wedges, screws, and bearings; centroids and areas, volumes, and masses; hydrostatic pressure and moment of pressure; area and volume theorems (Pappus and Guldinus). Prerequisite, to be accompanied by, or preceded by Calculus I, II. 2 hours.   —LOVITT

302 ANALYTICAL MECHANICS II
Motion of a particle, work and energy, friction, impact, dynamics of rigid bodies, applications to physics and engineering. Prerequisite, Analytical Mechanics 301. 2 hours.   —LOVITT

***305 and 306 DIFFERENTIAL EQUATIONS**
Methods for the solution of ordinary and partial differential equations, applications. Prerequisite, Mathematics 203 and 204. 3 hours, each semester (2-semester course).   —SISAM

***308 and 309 SOLID ANALYTIC GEOMETRY**
Equations of the plane and right line in space, quadric surfaces, special surfaces of higher order. (Suspended for duration). Prerequisite, Mathematics 203 and 204, or consent of instructor. 4 hours, each semester (2-semester course).   —SISAM

***311 and 312 VECTOR ANALYSIS**
Vector and scaler algebra and geometry, differentiation and differential operators. Applications to electrical theory and to mechanics, dynamics, and hydro-dynamics. Prerequisite, Mathematics 203 and 204. (Suspended for duration). 4 hours, each semester (2-semester course).   —ALBRIGHT

***315 and 316 ADVANCED CALCULUS**
Partial differentiation, multiple integrals, Taylor's theorem, elliptic integrals, line integrals, Fourier's series, calculus of variations, applications. Prerequisite, Mathematics 203 and 204. 3 hours, each semester (2-semester course).   —SISAM

317 and 318 ADVANCED MATHEMATICAL STATISTICS
Methods of analyzing and interpreting statistical data. Finite differences; supply and demand; frequency curves; sampling theory; tests of significance; analysis of variance. Prerequisites, Mathematics 204 and 208 or permission of instructor. 3 hours, each semester (2-semester course).   —LOVITT

401 THE TEACHING OF MATHEMATICS
The history of mathematics and the aims and methods of teaching mathematics in the secondary schools. Prerequisite, high school algebra and geometry and senior standing. 4 hours.   —SISAM

402 READINGS IN MATHEMATICS
Readings, discussions, and reports on selected topics in college mathematics. Prerequisite, senior standing and concentration in mathematics. 3 hours.   —SISAM

*Of courses 301 and 302 to 315 and 316, only two are ordinarily given in any one year.

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409 and 410 FUNCTIONS OF A COMPLEX VARIABLE
Fundamental properties of functions of a complex variable, linear transformations, infinite series, analytic continuation, Riemann surfaces, multiple periodic functions. Prerequisite, consent of instructor. (Suspended for duration). 4 hours, each semester (2-semester course).   —SISAM

MUSIC

*THEORETICAL MUSIC COURSES

105 FUNDAMENTALS OF MUSIC
A study of those elements basic to music including acoustics, notation, scale structures. A general history of the development of music from that of the Greeks up to the twentieth century. Introduction to elements of style and form used in periods covered. 2 hours.
                                                                  —DEPARTMENT

107 and 108 SOLFEGE
Ear training and sight singing using text and "methods"; introduction to keyboard work. Studies in rhythm, and note value combination (phrasing); eurhythmics; study of chords and intervals as related. Training of the eye for sight-singing; extensive drills using numbers, letters, syllables and, finally, words and accompaniments. Part-singing; various clefs. 2 hours, each semester (2-semester course).   —LIST

113 and 114 THEORY
Background and study of strict counterpoint in two voices. Chorale. Elementary harmony, figured bass, harmonization of melodies, original writing in four voices up through two and three-part song-forms. 2 hours, each semester (2-semester course).   —GROSS

119 and 120 HISTORY OF THE ORCHESTRA
A study of the history of orchestral instruments, the orchestra, and orchestration from early beginnings down to Debussy and Ravel. 2 hours, each semester (2-semester course).   —SYKES

155 and 156 HISTORY OF VOCAL MUSIC
For singers and those interested in singing. A study of the development of song, oratorio and opera from the earliest times. Illustrated by phonograph records. 2 hours, each semester (2-semester course).
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201 and 202 ORCHESTRATION
A study of the various instruments of the orchestra as to their technical peculiarities and difficulties, ranges, transpositions, capabilities, musical possibilities, singly and in combination; scoring of master works and, depending on the student, original work for symphonic orchestra. Reference is made throughout to the best scores and recordings. 4 hours, each semester (2-semester course).
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* MINIMUM NATIONAL ASSOCIATION OF SCHOOLS OF MUSIC REQUIREMENTS FOR STUDENTS CONCENTRATING IN MUSIC.
The selection of courses for students planning to concentrate in music should be as follows during the first four semesters:

First and second semesters:
Music 107-108 (Solfege) 2 hours, plus
Practical music course, 2 hours

Third and fourth semesters:
Music 207-208 (Advanced Solfege) 2 hours, and
Music 113-114 (Theory) 2 hours, plus
Practical music course for 2 or 3 hours each semester

This plan would leave Music 213 and 214 (Advanced Theory) to be taken during last four semesters