

# Morgan 1965-66

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A one-hour per week orientation course is required for all freshman students. This course is for one semester and does not yield credit.

## HONORS WORK

A number of the major departments offer honors work to selected students above the freshman year who have demonstrated unusual ability. Honors work is of a more advanced character than that done in the regular courses and requires more organizational ability and initiative than is normally expected of undergraduate students. Generally, it includes semi-independent work of a critical and/or analytical nature, periodic reports and the preparation of honors papers in connection with a course or series of courses in the major field. In addition, the student is strongly advised to enroll in a series of specially tailored general education courses ranging from the sophomore through the senior year.

A student is admitted to this program only upon recommendation of the Head of his or her major department and acceptance by the Honors Coordinating Committee. For admission to and continuance in the program the student must maintain a 3.0 cumulative average and a 3.0 in the major field.

## REQUIREMENTS FOR GRADUATION

### I. Basic Requirements

In addition to meeting the basic and major requirements, the student must earn at least 128 credits and 256 quality points.

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#### A. General Education Requirements\*

- 1. English Composition 101-102..... 6 credits
- 2. Social Science ..... 15 credits
  - Introduction to Social Science
  - (Man in Society 101-102) (6 credits)
  - American History 201-202 (6 credits)
  - Social Science Elective (3 credits)
    - Political Science 201 or
    - Sociology 201 or
    - Economics 210 or
    - Anthropology 301
- 3. Modern Foreign Language\*\*..... 6 credits
  - For students majoring in biology, chemistry, English\*\*\*, history, political sci-

\*Effective September 1962. (Applicable only to students who entered as freshmen in or after September 1962. Students enrolled prior to this date will be governed by the Catalog in effect when they entered.)

\*\*If the introductory courses in a foreign language were presented to satisfy admissions requirements, no college credit can be earned for introductory courses, i.e. 101-102 on the college level.

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ence, geography, psychology\*\*\*, philosophy\*\*\*, sociology, economics, physics and music education

\*\*\*For students majoring in English, philosophy, and psychology..... 12 credits

Two semesters of a foreign language pursued in proper sequence will be considered as one year of that language for purposes of satisfying departmental language requirements.

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| 4. Humanities .....   | 15 credits   |
| Humanities 201-202-301  | (8 credits)  |
| Art 308   | (2 credits)  |
| Music 291   | (2 credits)  |
| Philosophy 300  | (3 credits)  |
| 5. Natural Science .....  | 12 credits   |
| Physical Science 113-114 or   |              |
| Physical Science 111-112  | (6 credits)  |
| and   |              |
| Biological Science 107-108  | (6 credits)  |
| or  |              |
| Two one-year courses in laboratory sciences—biology, and chemistry or physics | (16 credits) |
| 6. Health and Physical Education.....   | 6 credits    |
| Health Education  | (2 credits)  |
| Physical Education (activity courses)   | (4 credits)  |
| 7. Senior Course—Great Issues (Philosophy 402)....                            | 2 credits    |
| 8. Military Science .....   | 8 credits    |
| (For freshman and sophomore men)  |              |

## II. Major Requirements

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- A. A candidate for graduation must complete from 30 to 50 semester hours in a field of concentration in addition to the basic requirements. The required courses for each major offered are determined by the department.
  - B. In each major area the number of quality points earned must equal twice the number of semester hours pursued.

## III. Elective Requirements

- A. The department head will assist the student in choosing additional courses to complete 128 semester credit hours. Such courses may be directly related to the departmental major or may be selected from other departments in terms of the personal needs and interests of the individual student.

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Those who have successfully pursued the College Honors Program will have the designation "Honors Work" beside their names on the commencement program.

#### DEGREES

G The Bachelor of Arts degree will be awarded to those who satisfactorily complete 128 semester hours of work in the required distribution of courses. The number of quality points must be at least twice the number of credits attempted. This is the equivalent of a general average of at least 2.0. This degree is granted to those completing a major in art, English, foreign languages, geography, history, sociology, economic theory, philosophy, or political science. There must be a minimum quality-point average of 2.0 in the major field of study. Six to twelve hours of a foreign language are required for this degree.

The Bachelor of Science degree will be awarded to those who satisfactorily complete 128 semester hours of work in the required distribution of courses. The number of quality points must be at least twice the number of credits attempted. This is the equivalent of a general average of at least 2.0. This degree is granted to those completing a major in biology, chemistry, business administration, psychology, health education, physical education, mathematics, music education, physics, art education, science education, elementary education, or secretarial science. There must be a minimum quality-point average of 2.0 in the major field of study.

#### MINIMUM REQUIREMENTS FOR CONTINUATION IN COLLEGE

The student must exhibit behavior patterns expected of a college student. Good citizenship demands maturity in social relationships, honesty, and sensitiveness to the good of the group.

In the area of achievement the student must maintain at least a 2.0 (C) cumulative average.

#### Probation

A quality point average of less than 1.5 automatically places the student on probation. A student on probation is ineligible to hold elective positions or to represent the College in any capacity. To insure the proper observation of this regulation, the names of all students proposed for elective offices or representation in public extracurricular activities shall be submitted to the Director of Student Activities for approval.

During the semester succeeding the one in which probation is incurred, a student may not carry more than 12 semester hours of work, but must carry a minimum of 12 hours in order to be removed from probation. To be removed from probation the student must earn a quality-point ratio of 2.0 or better.

#### DROPPING STUDENTS FOR POOR SCHOLARSHIP

1. Any freshman in the "A" Curriculum who fails to earn a 1.8 average at the end of two semesters of work will be dropped

DEPARTMENT OF MATHEMATICS

PROFESSOR TALBOT, Head of Department

PROFESSORS BOHUN-CHUDYNIV, SAUNDERS; ASSOCIATE PROFESSOR EMBREE; ASSISTANT PROFESSORS RAJANNA, RAWLINGS, SEELY; INSTRUCTOR KOWARSKI; ASSISTANT BOOKER; LECTURERS DOUGLASS, MARKERT, PALMER, RILEY, RUSSELL, SMITH

Objectives of the Department

It is the purpose of the department to assist students to develop an appreciation of the power, orderliness of thought, and precision of expression in mathematics and to provide training in mathematics necessary for the study of other subjects. In this process ideals of perfection as to logical structure and correct mental habits will be formed. Students who complete a major in the department are prepared to teach mathematics on the secondary level and to become mathematicians in government services and industry. A proper distribution of courses will enable the student to meet admission requirements of graduate schools.

**Requirements for a major in Mathematics:** Students desiring a major in mathematics must earn a minimum of thirty semester hours of mathematics distributed according to either of the two sequences depending upon the needs of the student: (1) Mathematics 111, 121, 126, 241-242, or (2) Mathematics 113, 114, 241-242. In addition, the following courses must be completed: Mathematics 115, 304, 305, one course in algebra, Mathematics 311, 312, or 413, and one course in geometry, Mathematics 322 or 421. In general, majors should complete Mathematics 242 by the end of the sophomore year and they usually will take considerably more courses in mathematics on the 300 level than required. The supporting course is Physics 201-202. Majors are strongly urged to include among their electives two of the following languages: German, French, Russian.

A student who has completed a year of high school algebra and a year of plane geometry should be prepared to pursue Mathematics 111, 113 or 121. The approval of the Mathematics Department is necessary in order to pursue Mathematics 115, 116 and any mathematics course numbered above 305. Only those students who maintain a high quality of work will be approved to pursue these courses.

Students are assigned beginning courses in mathematics according to their performance on the general classification test given to all entering freshmen during registration.

Qualified students who plan to major in mathematics, chemistry, biology, physics, economics, psychology, or science education should elect Mathematics 113-114. A student who receives credit for Mathematics 113-114 cannot thereafter receive credit for Mathematics 111, 121 or 126. Also, a student cannot receive credit for Mathematics 110 if he has previously received credit for any course in mathematics numbered above 110. High school deficiencies may be removed by passing Mathematics 110. In this case no college credit will be given.

HONORS PROGRAM

After a student has completed Mathematics 115 and 242 he may be invited by the Department of Mathematics to study for honors. In order to be eligible for participation in this program, a student's scholastic standing in terms of grade or honor points shall not be less than 3.0 in general average and not less than 3.0 in all mathematics courses completed. The following mathematics courses on the upper level must be completed with high distinction: Mathematics 304, 305-306, 312, 413, 322 or 421, 451 or 452. It is recommended that both 451 and 452 be completed.

107. Fundamentals of Modern Mathematics—Four hours; 3 credits.

Intended primarily for elementary education majors this course covers sets, mathematical logic, structure of the number system, and the development of the principles of arithmetic and algebra from the laws of the number system.

108. Fundamentals of Modern Mathematics—Three hours; 3 credits.

A continuation of Math. 107, this course treats mathematical systems, topics from algebra, basic statistical measures and intuitive geometry.

110. Fundamentals of Mathematics — Four hours; 3 credits.

This course is designed for those students with limited mathematical background. Emphasis is placed upon teaching students how to study mathematics. Elementary mathematics will be reviewed from a modern point of view in which there will be a discussion of sets with applications to geometry, number system and algebraic structures.

111. College Algebra — Three hours; 3 credits.

Quadratics, progressions, permutations, combinations, complex numbers, binomial theorem, determinants, and other selected topics will be presented in this course.

113. Introduction to Mathematical Analysis — Four hours; 4 credits.

This is the first half of a unified course in modern college algebra, analytic trigonometry, and analytic geometry with an introduction to elementary calculus.

114. Introduction to Mathematical Analysis — Four hours; 4 credits.

This course is a continuation of Mathematics 113. Prerequisite: Mathematics 113.

115. Foundations of Analysis and Sets — Two hours; 2 credits.

Elementary calculus of sets, axiomatic treatment of the number system and a brief introduction to the concepts of groups, rings, integral domains, fields and order properties will be included.

116. Foundations of Analysis and Sets — Two hours; 2 credits.

As a continuation of Mathematics 115 the following topics will be included: Dedekind cuts; graphs and correspondences; functions and



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mappings; union, intersection and product of families of sets; coverings and partitions; and axiom of choice and Zorn's lemma.

121. Plane Trigonometry — Three hours; 3 credits.

The following topics will be included in this course: definitions and relations of trigonometric functions, logarithms, solutions of right and oblique triangles, trigonometric identities and equations.

126. Analytic Geometry — Four hours; 4 credits.

This course includes a discussion of Cartesian coordinates, loci and their equations, translation and rotation of axes, parametric representation, polar coordinates, and loci in space.

151. Introduction to Computer Programming — Two hours; 2 credits.

In this course the general principles of computer programming, largely in Fortran, are developed, and applications are made by the students to their fields of study or service.

241. Differential and Integral Calculus — Four hours; 4 credits.

This course develops the theory and formulae for differentiation and integration with applications to geometry and physics. Prerequisite: Mathematics 114 or 126.

242. Differential and Integral Calculus — Four hours; 4 credits.

As a continuation of Mathematics 241 the following topics will be included: definite integrals, power series, multiple integrals, partial differentiation and simple differential equations. Prerequisite: Mathematics 241.

304. Introduction to Differential Equations — Three hours; 3 credits.

This is a first course dealing with methods of solving ordinary differential equations with application to geometry and physics. The following topics are included: equations of the first order and first degree; equations of the first order but not of the first degree; singular solutions; linear equations with constant and variable coefficients; equations of more than one variable. Prerequisite: Mathematics 242.

305. Advanced Calculus — Three hours; 3 credits.

The following topics will be in this course: limits and continuity, derivatives, Riemann integrals, uniform convergence, partial differentiation, line, surface and space integrals, improper integrals. Prerequisite: Mathematics 242.

306. Advanced Calculus — Three hours; 3 credits.

This course is a study of elementary functions of a complex variable, Cauchy's integral theorem and formula, residues and poles, power series, introduction to the solutions of differential equations by series.

311. Theory of Equations — Three hours; 3 credits.

This is a course designed to familiarize the student with complex numbers, trigonometric solutions of equations, cubic and quartic equations, properties of polynomials and polynomial functions, isolation and

computation of real roots, determinants and systems of linear equations, symmetric functions, and criteria for ruler and compass constructions.

**312. Introduction to Matrices — Three hours; 3 credits.**

This course is a study of linear transformations and matrices, linear vector spaces, equivalent and canonical forms, quadratic and hermitian form, Cayley-Hamilton theorem, invariant factors and elementary divisors.

**322. Solid Analytic Geometry — Three hours; 3 credits.**

This course leans heavily on determinant theory to discuss lines, planes and transformation of coordinates in space; quadric surfaces, the general equation of the second degree, and properties of quadrics.

**413. Introduction to Modern Algebra — Three hours; 3 credits.**

In this course the number system and elementary theory of groups will be studied. Rings, integral domains, fields and ideals as well as an introduction to polynomials and matrices over a field will be considered.

**421. Higher Geometry — Three hours; 3 credits.**

This course introduces the student to projective, advanced Euclidean and non-Euclidean geometries. Some topics discussed are transformation theory, projective theory of conics, Desargues' theorem, duality, projectivities; parabolic, hyperbolic and elliptic geometries.

**431. Mathematical Theory of Statistics — Three hours; 3 credits.**

An introduction to the probability theory necessary to serve as a basis for the study of statistics will be presented. The following topics will be included: graphical representation of frequency distributions; moments and moment generating functions; various special distribution functions including the Bernoulli, Poisson, rectangular and normal distributions; joint frequency functions, linear and multiple correlation and regression.

**432. Mathematical Theory of Statistics — Three hours; 3 credits.**

This course is a continuation of Mathematics 331. The normal distribution, Student's distribution, the F-distribution, and the Chi-Square distribution will be studied. Principles of testing hypotheses and estimation will be considered as well as small sample theory.

The two courses in Mathematical Theory of Statistics are not a duplication of Psychology 316-317 or Economics 311-312, since Mathematics 431-432 emphasize the mathematical theory of statistics and require a knowledge of calculus as a prerequisite.

**440. Senior Seminar — Three hours; 3 credits.**

The aim here is to aid the student in integrating his knowledge of mathematics and in developing to a higher level his problem-solving ability. Materials will be selected from a number of sources including courses required for a major and topics which are not part of any regular course. This course is required of senior mathematics majors who do not present credit in the conference course.

**451. Conference Course — 6 credits.**

Elective for seniors. First semester.

**452. Conference Course — 6 credits.**

Elective for seniors. Second semester.