

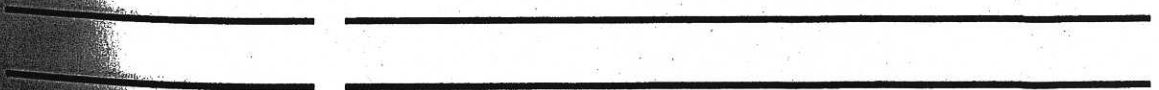
Semester System

**SAMFORD UNIVERSITY
BULLETIN**

1995-1996

Academic Year

**Birmingham, Alabama 35229
(205) 870-2011**



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ACADEMIC AFFAIRS

DEGREES

- Samford University grants 22 degrees:
- Associate of Science (A.S.)
 - Associate of Science in Nursing (A.S.N.)
 - Bachelor of Arts (B.A.)
 - Bachelor of General Studies (B.G.S.)
 - Bachelor of Music (B.M.)
 - Bachelor of Science (B.S.)
 - Bachelor of Science in Business Administration (B.S.B.A.)
 - Bachelor of Science in Education (B.S.Ed.)
 - Bachelor of Science in Nursing (B.S.N.)
 - Bachelor of Science in Pharmacy (B.S.Pharm.)
 - Master of Accountancy (M.Acc.)
 - Master of Business Administration (M.B.A.)
 - Master of Divinity (M.Div.)
 - Master of Science in Environmental Management (M.S.E.M.)
 - Master of Music (M.Mus.)
 - Master of Music Education (M.Mus.Ed.)
 - Master of Science in Education (M.S.Ed.)
 - Master of Theological Studies (M.T.S.)
 - Educational Specialist (Ed.S.)
 - Juris Doctor (J.D.)
 - Doctor of Ministry (D.Min.)
 - Doctor of Pharmacy (Pharm.D.)

ASSOCIATE DEGREE REQUIREMENTS

A minimum of 64 semester hours must be completed.

Grade Point Average

A grade point average of 2.000 in both the Samford average and the higher education average is required. The HIED average contains SU work as well as transfer work. A student must have at least a 2.000 average in the major field. Transfer students are required to complete 12 semester hours of resident credit in core curriculum courses.

BACHELOR'S DEGREE REQUIREMENTS

A minimum of 128 semester hours must be completed.

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Grade Point Average

A grade point average of 2.000 in both the Samford average and the higher education average is required. The HIED average contains SU work as well as transfer work. Not more than eight hours in music ensembles, drama participation, and physical education activity courses may apply toward the 128 hours required for graduation. Consult departmental listings for specific core requirements, major requirements, and number of semester hours required and grade point averages to achieve. A student must have at least 2.000 average in both the major and minor fields.

Last 32 Hours

The last thirty-two (32) semester hours must be completed at Samford. Exception: After completing ninety-six (96) semester hours, a student may not transfer more than eight (8) semester hours or two courses to Samford.

Upper Level At least 40 semester hours of credit must be earned in junior and senior level courses.

Writing Proficiencies The University considers the development of the student's writing proficiency one of its most important objectives. To emphasize this objective, the University has a two-fold writing requirement. All students must complete English 102 or English 103 at Samford with a grade of 'C' or better. All other students must take a Writing Proficiency Examination. This includes those a) who have made less than a 'C' in English 102 or 103 at Samford, or b) who have transferred equivalents of these courses into Samford. In addition, students must take two courses beyond the general curriculum requirements which require a significant amount of writing. These courses are designated with a 'W' in semester schedules and in the Bulletin/Catalog.

Convocation Each full-time student is required to attend Chapel/Convocation Programs. University regulations regarding attendance are outlined in the Student Handbook.

Required Physical Activity Program Students with physical disabilities may consult the Chair of the Department of Exercise Science and Sports Medicine to fulfill this requirement.

A student may register and receive credit for the same activity course twice.

GRADUATE DEGREE REQUIREMENTS Specific descriptions and requirements for the various graduate degrees are described in academic department sections of this catalog.

PROFESSIONAL DEGREE REQUIREMENTS The A.S.N., B.M., B.S.Pharm., B.S.Ed., B.S.N., M.B.A., M.S.E.M., M.Mus., M.Mus.Ed., Ed.S., J.D., Pharm.D., M.Div., and D.Min., are professional degrees conferred upon students who have completed closely prescribed courses of study varying in duration and in the number of semester hours of credits required. Students in those professional divisions should consult the appropriate dean for details of their degree requirements as early as possible.

ADDITIONAL DEGREES A student who has received a Bachelor's Degree must complete at least 32 semester hours (including 6 hours of religion) beyond the first degree in order to receive an additional Bachelor's degree.

MAJORS/ CONCENTRATIONS/ DEGREES Each student should declare a major by their Junior year. This information must be on file in the Student Records Office. Students desiring to change a declared major must do so at the beginning of the registration periods for each semester or term. An undeclared major is acceptable for the freshman and sophomore years. A minor is not required in all majors; however a student is encouraged to consult with his/her academic advisor to determine whether a minor or some selection or concentration of courses might enhance the academic experience.

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DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

ADMINISTRATION

Bruce W. Atkinson, Chair (1995)
B.A., Pomona College; Ph.D., University of California
Ruric E. Wheeler, University Professor (1953)
A.B., Western Kentucky University; M.S., Ph.D., University of Kentucky

FACULTY

Janice O. Case, Associate Professor (1987)
B.S., University of Alabama at Birmingham; M.S., Louisiana Tech University;
Ed.D., Mississippi State University
George T. Crocker, Associate Professor (1969)
B.S., Union University; M.S., Auburn University; M.S., University of
Alabama at Birmingham
Susan T. Dean, Professor (1985)
B.A., Vanderbilt University; M.S., Ph.D., University of Alabama at
Birmingham
David L. Foreman, Associate Professor (1986)
B.A., Baylor University; M.A., Indiana University; Ph.D., Louisiana State
University
Mary H. Hudson, Assistant Professor (1968, 1978)
A.B., Samford University; M.A., University of Alabama
Sonny O. Tendian, Assistant Professor (1992)
B.A., M.S., Cambridge University; Ph.D., University of North Carolina
Timothy R. Wagenmaker, Assistant Professor (1994)
B.S., Michigan State University; M.A., Ph.D., University of Michigan

DEGREE/MAJORS

The Department of Mathematics and Computer Science offers majors in
Computer Science, Engineering Physics, and Mathematics leading to a
Bachelor of Science degree.

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In the joint program with Auburn University, the University of Alabama at
Birmingham, Washington University, Mercer University and the University of
Southern California, students interested in engineering may take a five-year
curriculum which leads to two bachelor's degrees. Under this arrangement, the
student will take at Samford a three-year general program and, in the School of
Engineering of the participating Engineering School, a two-year general
technical curriculum. On the satisfactory completion of the five-year curriculum
the student will receive the degree of Bachelor of Science from Samford and the
degree of Bachelor of Engineering from the participating engineering school.

The Bachelor of Science degree in Engineering Physics is offered jointly by the
Department of Physics and the Department of Mathematics and Computer
Science for the purpose of preparing young men and women for employment in
industry. It is not the usual degree that would be granted by an engineering
college. In fact, the program deliberately avoids premature specialization and
provides instead broad coverage of the physical sciences which are basic for
those who wish to pursue careers in industrial research and development.

The four-year curriculum provides a rigorous undergraduate discipline in
mathematics through differential equations and advanced engineering
mathematics, (b) general physics followed by advanced courses in electronics.

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Mathematics and Computer Science

magnetism, electronics, wave motion, and nuclear physics, (c) the basic work in electrical and mechanical engineering, and (d) a strong arts and science background to enable students to express themselves adequately.

CORE REQUIREMENTS FOR COMPUTER SCIENCE AND MATHEMATICS

Humanities - 18 hours

- English Composition - 6 hours, 2 courses
Engl 101 and 102 or
*Engl 103 and upper level English course
- English Literature - 6 hours, 2 courses
Engl 201 and 202 or
Engl 211 and 212
- Religion - 6 hours, 2 courses
Relg 101, 102 or 300

Natural Sciences - 14 - 16 hours

- Two Laboratory sciences in Biology, Chemistry or Physics
- Math requirement may be satisfied by any one of the following sequences:
 - Math 103, 201
 - Math 101, 205
 - Math 101, 102
 - Math 101, 108
 - Math 111, 205

Social Sciences - 12 hours

- Hist 101 and 102
- Choose 1 course from 2 fields: Economics, Geography, Journalism and Mass Communication, Psychology, Political Science, or Sociology

World Languages - 8 hours

- Eight hours in intermediate level courses (201 - 202)* French, German, Latin or Spanish

Fine Arts - 4 hours

- Choose two courses from Art 300, Scat 300 or Musc 300

Physical Activity - 4 hours

- Phed 120 and
Choose 3 additional Physical Education activity courses.

* Students who score high enough on placement criteria may register for these courses.

MAJOR REQUIREMENTS

Computer Science

- These courses in computing are to be taken by all Computer Science majors:
- Cosc 101, 101L: Computing I and Pascal Programming I
 - Cosc 201, 201L: Computing II and Pascal Programming II
 - Cosc 310: Files and Databases
 - Cosc 320: Computer Organization
 - Cosc 330: Programming Languages
 - Cosc 340: Operating Systems
 - Cosc 409W: Software Development
 - Cosc 490: Senior Project

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Computer Science majors are also required to take 6 hours of elective Cosc courses as described below.

There are two tracks of study in computing, which have the following requirements in addition to the core requirements:

The "business computing" track:

Computing:

Cosc 101, 101L, 201, 201L, 310, 320, 330, 340, 409W, and 490; Cosc 215 Business Applications Programming; and three one-hour language courses selected from Cosc 102L - 104L and 202L-204L (at least one of these must be at the 200 level);

Mathematics:

Math 103, 201, and 325;

Business:

a minor.

The "mathematical/scientific" track:

Computing:

Cosc 101, 101L, 201, 201L, 310, 320, 330, 340, 409W, and 490; 6 hours of Cosc electives, at least 3 hours of which must be upper-level;

Mathematics:

a minor including Math 325;

Physics:

Phys 101-102 or 203-204.

Students planning to do graduate work in computing should follow the Mathematics/scientific track, and take as electives any additional upper-level computing courses specified as prerequisites for the graduate program.

Mathematics

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In addition to the core curriculum requirements, the following are minimum requirements for a major in mathematics:

1. The calculus sequence (Math 103, 201, 202, 203) 12 hours.
2. Eighteen hours of math courses numbered 300 or above, of which at least 9 hours must be at the 400 level.
EXCEPTION: With permission of the Mathematics Department Chair, mathematics majors pursuing a teaching certification may substitute 6 hours taken from Math 101, 102, 112, 205 in place of 6 hours of upper level courses.
3. Proficiency in a computer language (at least Cosc 101 and Cosc 101L).

Students planning to earn an Alabama teacher's certificate in mathematics should consult with the departmental chair and should see the School of Education section of this catalog.

CORE REQUIREMENTS FOR JOINT PROGRAM IN ENGINEERING

Humanities - 18 hours

English Composition - 6 hours, 2 courses

Engl 101 and 102 or

*Engl 103 and upper level English course

English Literature - 6 hours, 2 courses

Engl 201 and 202 or

Engl 211 and 212

Religion - 6 hours, 2 courses

Relg 101, 102 or 300

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Natural Sciences - 20 hours

Chem 203 and 204
Phys 203 and 204

Social Sciences - 15 hours

Hist 101 and 102
Econ 201 and 202
Soci or Pols
Journalism and Mass Communication

Fine Arts - 4 hours

Choose two courses from Art 300, Scat 300 or Musc 300

Physical Activity - 4 hours

Phed 120 and
Choose 3 additional Physical Education activity courses.

* Students who score high enough on placement criteria may register for these courses.

MAJOR REQUIREMENTS

Engr 101 and 101L Computing and Programming I, 4 hours
Engr 310 Engineering Mechanics, 3 hours
Engr 320 Computer Organization, 3 hours
Engr 330, 331 Electrical Engineering 4 hours
Math 103, 201 Calculus I, II, 6 hours
Math 202, 203 Calculus III, IV, 6 hours
Math 302 Differential Equations, 3 hours
Three electives from mathematics courses numbered 300 or above, 9 hours

The student must select additional courses approved by an advisor to complete the requirement of 96 semester hours at Samford.

CORE REQUIREMENTS FOR ENGINEERING PHYSICS

Humanities - 18 hours

English Composition - 6 hours, 2 courses
Engl 101 and 102 or
*Engl 103 and upper level English course
English Literature - 6 hours, 2 courses
Engl 201 and 202 or
Engl 211 and 212
Religion - 6 hours, 2 courses
Relg 101, 102 or 300

Natural Sciences - 10 hours

Chem 203 and 204

Social Sciences - 15 hours

Hist 101 and 102
Econ 201 and 202
Sociology or Political Science, 1 course

Physical Activity - 4 hours

Phed 120 and
Choose 3 additional Physical Education activity courses.

* Students who score high enough on placement criteria may register for these courses.

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MAJOR REQUIREMENTS

Engr 101 and 101L Computing I and Programming I, 4 hours
Engr 310 Engineering Mechanics, 3 hours
Engr 320 Computer Organization, 3 hours
Engr 330, 331 Electrical Engineering, 4 hours
Math 103 Calculus I, 3 hours
Math 201, 202, 203 Calculus II, III, and IV, 9 hours
Math 302 Differential Equations, 3 hours
Math 305 Applied Mathematics, 3 hours
Math 405 Special Functions, 3 hours
Math 411 Numerical Analysis, 3 hours
Phys 203, 204 Physics I-II, 10 hours
Phys 334 Electronics, 4 hours
Phys 350 Modern Physics, 3 hours
Phys 420 Thermodynamics and Kinetic Theory, 3 hours
Phys 454 Quantum Mechanics, 3 hours
Phys 491, 492 Seminar, 2 hours

The students must select additional courses with the approval of the departmental advisors (Mathematics and Physics) to make a total of 128 semester hours and satisfy University graduation requirements.

PRE-ENGINEERING

Samford offers two years of basic engineering acceptable toward a degree in engineering. Since mathematics, chemistry, and physics are basic in all engineering curricula, it is not necessary to separate the fields in the first two years. A student may thus complete at Samford half the curriculum required in any of the following fields of engineering: mechanical, electrical, civil, chemical, highway, and aeronautical.

CORE REQUIREMENTS FOR PRE-ENGINEERING

Humanities - 18 hours

English Composition - 6 hours, 2 courses
Engl 101 and 102 or
*Engl 103 and upper level English course
English Literature - 3 hours, 1 courses
Engl 201 or Engl 211

Natural Sciences - 35 hours

Math 103, 201, 202, 203, 302 - 15 hours
Chem 203, 204 - 10 hours
Phys 203, 204 - 10 hours

Engineering

Engr 101, 101L, 320*, 330, 331

Elective, 17 hours Select from the following to complete 72 hours in 2 years

Hist 101
Econ 202*
Mgmt 302*
Math 304*, 305*
Scat 215
Engr 310

*These courses have prerequisites.

* Students who score high enough on placement criteria may register for these courses.

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MINOR REQUIREMENTS

Computer Science

A minor in Computer Science requires 18 hours of computing courses excluding Cosc 100; Cosc 101, 101L, 201, and 201L are required, and at most 4 hours may come from the language lab courses (Cosc 102L - 104L, 202L - 204L). Students interested in a minor in computing are strongly urged to meet with a computer science advisor for help in course selection.

Engineering

A minor in engineering may be obtained by successfully completing 18 hours in engineering with at least six hours at the junior or senior level. Engineering courses not taught at Samford may be taken at the University of Alabama in Birmingham through the Cooperative Program with that university.

Mathematics

The following are minimum requirements for a minor in mathematics:
The calculus sequence (Math 103, 201, 202, 203) 12 hours.
Nine hours of math courses at the 300 or 400 level.
Proficiency in a computer language (at least Cosc 101 and Cosc 101L).

SUMMER WORKSHOPS FOR TEACHERS

The following three hour courses have been approved for Summer workshops for teachers: Math 206 Algebra for Teachers, Math 207 Statistics for Teachers, Math 308 Math Concepts for Teachers, Math 309 Geometry for Teachers.

GRADUATE PROGRAMS FOR TEACHERS

The following three hours courses have been approved for the graduate level program for teachers: Math 500 Theory of Numbers, Math 502 Modern Abstract Algebra, Math 504 Theory of Functions of a Complex Variable, Math 505 Special Functions, Math 508 Mathematics Seminar, Math 509 and 510 Mathematical Probability and Statistics, Math 511 Numerical Analysis, Math 512 Numerical Solution of Differential Equations, Math 516 Operations Research, Math 519 and 520 Advanced Calculus, Math 521 General Topology.

COMPUTER SCIENCE

Cosc 100 INTRODUCTION TO COMPUTING

A survey course which includes a history of computing, description of system components, programming fundamentals, discussion of programming languages, processing methods, and applications. Introductory hands-on experience with word processing, spreadsheet, database, and communications software. Introductory hands-on exposure to the processes of problem-solving and programming. Credit: 3 hours.

Engl 211 and 212
Religion - 6 hours, 2 courses
Relg 101, 102 or 300
Natural Sciences - 10 hours
Chem 203 and 204
Social Sciences - 15 hours
Hist 101 and 102
Econ 201 and 202
Sociology or Political Science, 1 course

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**Cosc 101
COMPUTING I**

This course introduces students to fundamental aspects of the field of computing, focusing on problem-solving and software design concepts and their realization as computer programs. Topics include procedural abstraction, control structures, iteration, recursion, data types and their representation, and iterative approximation methods. An introduction to a high-level language (Pascal), for the purpose of gaining mastery of these principles, will be provided in lectures and in closely-coordinated laboratory experiences. Cosc 101L must be taken concurrently. Prerequisites: Cosc 100 and Math 101, or permission of the instructor. Credit: 3 hours.

**Cosc 101L
PASCAL
PROGRAMMING I**

Laboratory activities supporting computing principles discussed in Cosc 101. Includes both closed and open labs. Closed lab meets two times per week. Must be taken concurrently with Cosc 101, except by permission of the instructor. Credit: 1 hour.

**Cosc 102L
FORTRAN
PROGRAMMING I**

Implementation of specific algorithms, developed in Cosc 101, in the FORTRAN programming language. Meets for lecture once (or twice, as needed) per week, with a significant amount of time spent in open lab. Prerequisite: Cosc 101. Credit: 1 hour.

**Cosc 103L
BASIC
PROGRAMMING I**

Implementations of specific algorithms, developed in Cosc 101, in the BASIC programming language. Meets for lecture once (or twice, as needed) per week, with a significant amount of time spent in open lab. Prerequisite: Cosc 101. Credit: 1 hour.

**Cosc 104L
C PROGRAMMING I**

Implementations of specific algorithms, developed in Cosc 101, in the C programming language. Meets for lecture once (or twice, as needed) per week, with a significant amount of time spent in open lab. Prerequisite: Cosc 101. Credit: 1 hour.

**Cosc 201
COMPUTING II**

Continuation of Cosc 101. This course moves students into the domain of software design, introducing principles that are necessary for solving large problems. Here, the classical software design process serves as a basis for treating such topics as abstract data types, specifications, complexity analysis and file organization. Basic data structures (queues, stacks, tree, and graphs and transformations (sorting and searching), are introduced as representative of the fundamental tools that are used to aid in this process. Principles of file and database organization are also introduced. Prerequisites: Grade of 'C' or better in Cosc 101 and 101L. Corequisite: Cosc 201L. Credit: 3 hours.

**Cosc 201L
PASCAL
PROGRAMMING II**

Laboratory activities supporting computing principles discussed in Cosc 201. Includes both closed and open labs. Closed lab meets two times per week. Must be taken concurrently with Cosc 201, except by permission of the instructor. Prerequisites: Grade of 'C' or better in Cosc 101 and 101L. Credit: 1 hour.

**Cosc 202L
FORTRAN
PROGRAMMING II**

Implementation of specific algorithms, developed in Cosc 201, in the FORTRAN programming language. Meets for lecture once (or twice, as needed) per week, with a significant amount of time spent in open lab. Prerequisite: Cosc 201 and 102L. Credit: 1 hour.

**Cosc 203L
BASIC
PROGRAMMING II**

Implementations of specific algorithms, developed in Cosc 201, in the BASIC programming language. Meets for lecture once (or twice, as needed) per week, with a significant amount of time spent in open lab. Prerequisite: Cosc 201 and 103L. Credit: 1 hour.

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**Cosc 204L
C PROGRAMMING II**

Implementations of specific algorithms, developed in Cosc 201, in the C programming language. Meets for lecture once (or twice, as needed) per week, with a significant amount of time spent in open lab. Prerequisite: Cosc 201 and 104L. Credit: 1 hour.

**Cosc 215
BUSINESS
APPLICATIONS
PROGRAMMING**

Presentation of the basic concepts of COBOL (the most widely used business programming language) and its applications, with significant out-of-class time spent on implementation experiences. Prerequisite: Grade of 'C' or better in Cosc 101. Credit: 3 hours.

**Cosc 310
FILES AND DATABASES**

Study in the design, creation, and maintenance of data files; implementation of several methods in high-level language(s). Sorting and searching techniques. Underlying concepts and structures in design and implementation of database management systems. Lab experiences include implementation of DBMS systems using commercially available software. Prerequisite: Grade of 'C' or better in Cosc 201. Credit: 3 hours.

**Cosc 320
COMPUTER
ORGANIZATION**

Concepts of computer systems and computer architecture. Fundamentals of logic design, organization and structure of the major hardware components of computers, the mechanics of information transfer and control within a computer system. Lab experiences in assembler language programming. Prerequisite: Grade of 'C' or better in Cosc 201. Credit: 3 hours.

**Cosc 330
PROGRAMMING
LANGUAGES**

A short history of programming languages and styles precedes the study of an important collection of programming paradigms. The historical material includes data types, data control, sequence control, run-time storage, language translation, and semantics. The paradigms and their languages include procedural, functional, logic, and object-oriented programming. Language features which support parallel and distributed computing are introduced. The utility of various interactive tools and environments, as well as very high level languages, to complement these paradigms in the programming domain, is also examined. Prerequisite: Grade of 'C' or better in Cosc 201. Credit: 3 hours.

**Cosc 340
OPERATING SYSTEMS**

An in-depth treatment of computer architecture, technological choices, and the operating system interface with the hardware, the application, and the system user. Contemporary social and professional issues, such as intellectual property, risks and liabilities, and system security, are studied in the context of architecture and operating systems design. Prerequisite: Grade of 'C' or better in Cosc 201. Credit: 3 hours.

**Cosc 408
INDEPENDENT STUDY**

Available, with consent of the instructor, to students with working knowledge of a high-level language and well-defined plans for study. Requirements include a written report on the results of the study, and an oral presentation may be required at the discretion of the instructor. Prerequisites: Grade of 'C' or better in Cosc 201, 6 hours of upper-level Cosc courses, written proposal, and consent of the instructor. Credit: 1 to 3 hours. At most three hours of credit for Cosc 408 may be counted toward the computer science major.

**Cosc 409W
SOFTWARE
DEVELOPMENT**

A study of the techniques of software development emphasizing the life-cycle of an information system. Includes a team project, oral presentation(s), and a term paper and/or several shorter papers. Lab experiences using computer-assisted software development tools as appropriate. Prerequisites: Grade of 'C' or better in Cosc 201, and at least 6 hours of upper-level Cosc courses. Credit: 3 hours.

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Cosc 437 INTRODUCTION TO TELE- COMMUNICATIONS

This course, offered at UAB through the cooperative exchange program, may be taken as upper-level Cosc electives with permission of the (Samford) department. Design issues, terminology and methodology of telecommunications. Hardware components, including transmission facilities, data terminal equipment, multiplexers and concentrators. Network protocols and live control procedures. Systems design. Teleprocessing software, including communications monitors and teleprocessing access methods. Prerequisite: Grade of 'C' or better in Cosc 201, and 6 hours of upper-level Cosc courses. Credit: 3 hours.

Cosc 450 CURRENT TOPICS

Study of problems, and their solutions, which are of current interest in the computing field. This includes problems from such diverse areas as combinatorics, graph theory, numerical analysis, systems programming, graphics, artificial intelligence, supercomputing, and parallel processing. Topics include complexity classes and problem-solving techniques such as divide-and-conquer, dynamic programming, backtracking, and branch-and-bound. Prerequisites: Grade of 'C' or better in Cosc 201, at least two 300-level Cosc courses, two semesters of calculus, and discrete mathematics. Credit: 3 hours.

Cosc 462 INTRODUCTION TO ARTIFICIAL INTELLIGENCE

This course, offered at UAB through the cooperative exchange program, may be taken as upper-level Cosc electives with permission of the (Samford) department. Problem-solving methods in artificial intelligence, heuristic programming; models of memory and cognition. Prerequisite: Cosc 330 and one other upper-level Cosc course. Credit: 3 hours.

Cosc 477 INTRODUCTION TO COMPUTER GRAPHICS

This course, offered at UAB through the cooperative exchange program, may be taken as upper-level Cosc electives with permission of the (Samford) department. Basic concepts of vector and restore graphics and applications. Hardware and software issues included. Prerequisite: Grade of 'C' or better in Cosc 201, and 6 hours of upper-level Cosc courses. Credit: 3 hours.

Cosc 490 SENIOR PROJECT

Capstone experience including the analysis, design, implementation, testing, documentation, and oral presentation of a computer project of significant size. Topic, scope, and programming language(s) must be approved in advance by the professor. Prerequisites: Cosc 409W, 6 other hours of upper-level Cosc courses, senior standing, and consent of the professor. Credit: 3 hours.

ENGINEERING

Engineering courses not taught at Samford may be taken at the University of Alabama in Birmingham through the Exchange Program with that university.

Engr 102 ENGINEERING DRAWING I

An introduction to the principles and practices involved in construction of engineering drawings. Credit: 3 hours.

Engr 103 ENGINEERING DRAWING II

A continuation of Engr 102. Descriptive Geometry is included in this course. Prerequisite: Engr 102. Credit: 2 hours.

Engr 107 SURVEY OF ENGINEERING

An introduction to the different branches of engineering as well as a study of logical approaches to engineering problems. Prerequisite: Math 101 (corequisite: Math 102). Credit: 1 hour.

Engr 300 MATERIALS OF ENGINEERING

An introductory course to the physical properties of engineering materials and basic concepts of phase information. Prerequisite: Chem 110, Math 103 and 201, and Phys 203 with a corequisite of Phys 204. Credit: 3 hours.

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The following engineering courses are dual listed and descriptions are given in the other sections as indicated: Engr 101, 101L Computing I, See Cosc 101, 101L; Engr 102 L Fortran, See Cosc 102L; Engr 310 Engineering Mechanics, See Phys 310; Engr 320 Computer Organization, See Cosc 320; Engr 330-331W Electrical Engineering, See Phys 330-331W; Engr 334W Electronics, See Phys 334W; Engr 420 Thermodynamics, See Phys 420; Engr 430 Advanced Electronics, See Phys 430.

MATHEMATICS

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**Math 100
INTERMEDIATE
COLLEGE ALGEBRA**

Designed primarily for freshmen whose curriculum requirements include college algebra but whose grade on the entrance test does not permit their registration for Math 101. This course does not satisfy any mathematics requirement for graduation at Samford University. Credit: 3 hours.

**Math 101
COLLEGE ALGEBRA**

Course includes a review of fundamentals: functions, linear and quadratic equations, inequalities, and systems of equations. Prerequisites: Math 100, or one year of high school algebra and satisfactory score on the math placement test. Credit: 3 hours.

**Math 102
TRIGONOMETRY**

This course is designed to introduce the student to the basic concepts of trigonometry. It includes a discussion of the trigonometric functions with their graphs, identities, and equations. Also, the course covers solutions of both right and oblique triangles and complex numbers. Prerequisite: Math 101. Credit: 3 hours.

**Math 103
CALCULUS I**

This course introduces the student to calculus. Limits, continuity, the derivative, applications of the derivative, and an introduction to the integral are studied. Prerequisite: Math 101 and 102, or a satisfactory score on the placement test. Credit: 3 hours.

**Math 108
BUSINESS CALCULUS
SURVEY**

This course presents differential and integral calculus with applications to business and social sciences. The course includes a discussion of functions and graphics. Prerequisite: Math 101. Credit: 3 hours.

**Math 111
GENERAL
ELEMENTARY
COLLEGE
MATHEMATICS**

Designed to describe the historical, cultural, and philosophical significance of mathematics. It seeks to develop problem-solving techniques by studying patterns and simple logic applications. The number system is studied in detail including natural numbers, whole numbers, integers, rational numbers, and real numbers. Simple equations and inequalities are solved. An introduction to computers using BASIC is included. Credit: 3 hours.

**Math 112
MATHEMATICS FOR
ELEMENTARY
TEACHERS**

This course satisfies three hours of math graduation requirements for elementary or early childhood education majors only. The course is a continuation of Math 111 and covers the topics of problem solving, numeration systems, geometry, and statistics. Prerequisite: Grade of 'C' or better in Math 111. Credit: 3 hours.

**Math 201
CALCULUS II**

Continues the study of calculus begun in Math 103. The derivatives and integrals of trigonometric, exponential, logarithmic, and hyperbolic functions, methods of integration, and applications of the integral are studied. Prerequisite: Grade of 'C' or better in Math 103. Credit: 3 hours.

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**Math 202
CALCULUS III** Covers analytic geometry, polar coordinates, parametric equations, indeterminate forms and l'Hopital's rule, and the formal definition of limits. Prerequisite: Grade of 'C' or better in Math 201. Credit: 3 hours.

**Math 203
CALCULUS IV** Completes the calculus sequence. It introduces several new concepts including infinite sequences and series, vectors, partial derivatives, and multiple integrals. Prerequisite: Grade of 'C' or better in Math 202. Credit: 3 hours.

**Math 205
STATISTICS** Presentation of the statistics needed to understand factual information as well as probability decision making in today's complex civilization. Prerequisite: Math 101 or Math 111. Credit: 3 hours.

**Math 301
COLLEGE GEOMETRY** This course reexamines elementary geometry from an advanced viewpoint and introduces other geometries. Prerequisite: Math 202. Credit: 3 hours.

**Math 302
DIFFERENTIAL
EQUATIONS** A study of the solutions of ordinary differential equations. Prerequisite: Math 202. Credit: 3 hours.

**Math 304
LINEAR ALGEBRA** A study of linear algebra using matrices. Prerequisite: Math 202. Credit: 3 hours.

**Math 305
APPLIED
MATHEMATICS FOR
PHYSICS AND
ENGINEERING** A study of vector calculus including line integrals, Green's theorem, Stokes' theorem, and the divergence theorem. Prerequisite: Math 202. Credit: 3 hours.

**Math 325
DISCRETE
MATHEMATICS** A mathematical foundation for computer science including topics such as sets, logic relations, graphs, recurrence relations, Boolean algebra, and combinatorics. Prerequisite: Math 108 or Math 201. Credit: 3 hours.

**Math 400W
THEORY OF NUMBERS** An introduction to the theory of numbers through a study of divisibility, congruencies, quadratic reciprocity, Diophantine equations, factorization, and algebraic numbers. Prerequisite: Math 202. Credit: 3 hours.

**Math 402
MODERN ABSTRACT
ALGEBRA** An introduction to abstract algebra by discussing properties of sets, semigroups, monoids, groups, rings, integral domains, and fields. Prerequisite: Math 304 or Math 400. Credit: 3 hours.

**Math 404
THEORY OF
FUNCTIONS OF A
COMPLEX VARIABLE** Analytic functions, transformation and mapping, complex integration, power series, residues and poles, conformal mapping, and additional theory of functions. Prerequisite: Math 203. Credit: 3 hours.

**Math 405
SPECIAL FUNCTIONS** Series solution of differential equations, Fourier Series, Bessel functions, orthogonal polynomials, Legendre functions, Mathieu functions, boundary value problems. Prerequisite: Math 302. Credit: 3 hours.

**Math 408
MATHEMATICS
SEMINAR** For honors thesis or special reading. Credit: 1 to 3 hours, maximum nine hours.

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**Math 409-410
MATHEMATICAL
PROBABILITY AND
STATISTICS**

Probability, discrete and continuous random variables, expected values and moments, special distributions, sampling, point estimation, multivariate normal, sampling distributions, tests of hypotheses, regression and linear analysis, experimental design, and non-parametric methods. Prerequisite: Math 203. Credit: 3 hours each course.

**Math 411
NUMERICAL ANALYSIS**

Finite differences, interpolations, differentiation and integration, Lagrangian formulas, solutions of equations and systems of equations, and curve fitting. Prerequisite: Math 203. Credit: 3 hours.

**Math 412
NUMERICAL SOLUTION
OF DIFFERENTIAL
EQUATIONS**

A study of the application of numerical procedures to both ordinary and partial differential equations including the study of existence and convergence. Prerequisite: Math 203. Credit: 3 hours.

**Math 416
OPERATIONS
RESEARCH**

A study of linear programming problems using the simplex algorithm and theory of duality. Special types of linear programming problems considered are transportation, transshipment, assignment, and shortest route problems; critical path scheduling; minimal tree spanning; and maximal flow problems. Also dynamic programming will be discussed. Prerequisite: Math 203. Credit: 3 hours.

**Math 419
ADVANCED CALCULUS
FUNCTIONS OF ONE
VARIABLE**

Elements of set theory, topology of the real line functions, sequences, series, continuity, differentiation, and the Riemann integral. Prerequisite: Math 203. Credit: 3 hours.

**Math 420
ADVANCED CALCULUS
FUNCTIONS OF
SEVERAL VARIABLES**

Partial derivatives, differentials, Jacobians, multiple integrals, and line and surface integrals. Prerequisite: Math 203. Credit: 3 hours.

**Math 421
GENERAL TOPOLOGY**

Elementary set theory, topological spaces, including metric spaces, subbases for topology, connectedness, compactness, continuity, homomorphisms and topological invariance. Prerequisite: Math 203. Credit: 3 hours.

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