

Mathematics and Computer Science

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The Department of Mathematics and Computer Science offers a wide variety of courses in service to students in many disciplines. We provide general education courses in mathematics and computer science for all students, general physics for science and math majors, minors in mathematics and computer science for students in many majors, and a rigorous undergraduate curriculum in mathematics.

B.S. in Mathematics

32 hours of mathematics beyond the Central Curriculum requirement. MA 120, 218, 230, 318, 322, 324, 326, 328, 336, 442 and at least two hours of MA 460 must be taken. Mathematics majors must take at least six hours of advanced mathematics courses at Louisiana College. To gain experience in the applications of mathematics, each major must take CS 250-251, plus at least 12 hours of natural science, including PH 240-221. A minor is required.

B.S. in Mathematics Education

The B.S. in Mathematics Education requires MA 120, 218, 230, 318, 322, 324, 326, 328, 336, 442, 2 hours of MA 460(1), and CS 250-251. Mathematics Education majors must take at least six hours of advanced mathematics courses at Louisiana College. The professional education curriculum for secondary teachers (see Department of Teacher Education) must be completed.

Minor in Mathematics

21 hours of mathematics including MA 111, 112, 218, 318, 230 and six hours chosen from MA 322, 324, 328 and 336. This will satisfy state requirements for certification in mathematics and can serve as a second teaching field.

Minor in Computer Science

MA 120, CS 250-251, 350-351, plus seven additional hours of upper level computer science.

Teacher Certification in Computer Science

CS 150, 290, and 12 hours in computer science.

Teacher Certification in Computer Literacy

CS 150, 290, and 3 hours in computer science (must include programming.)

Computer Science Courses (CS)

140 **Computers for Allied Health**

Practical overview of computer and information technology using a mixture of lectures and hands-on computer experience. Topics include: understanding common computer technology; appreciating how technology affects our society from practical and moral perspectives; using software applications (word processing, spreadsheets, database manager, PowerPoint). Credit one hour.

150 **Introduction to Computer Technology**

Practical overview of computer and information technology using a mixture of lectures and hands-on computer experience. Topics include: understanding common computer terminology; learning how different parts of a computer system work together; appreciating how technology affects our society from practical and moral perspectives; using software applications (word processing, spreadsheets, database managers, PowerPoint) and a basic introduction to computer programming. Credit three hours. (Fee \$30)

250-251 **Structured Programming**

Introduction to the principles of problem solving and algorithm development used in computer programming. Data types, control structures, and object-oriented programming design are taught through lecture sessions. Programming implementation and debugging is emphasized through hands-on laboratory sessions. These topics are the foundation for good programming design and advanced computer science theory. Prerequisite: CS 150, BA 200, or one unit of high school credit in computer science; MA 100 and 111 recommended. Lecture credit three hours; laboratory credit (251) one hour. Lecture and lab must be taken concurrently. (Fee \$30)

290 **Instructional Use of Computers (Also Education 290)**

The theory and use of media and technology in instruction. Emphasis on the use of technology to enhance instruction and student teaching. Prerequisite: Education 190. Credit three hours. (Fee \$58)

305-306 **COBOL**

Programming methodology, good style and accepted programming practices will be taught using COBOL. Knowledge of programming is assumed. Prerequisite: CS 250. Lecture credit three hours; laboratory credit (CS 306) one hour. (Fee \$30)

310 **Data Base Systems**

Advanced computer file structuring techniques using data base management. Prerequisite: CS 150 or 250. Credit three hours. (Fee \$30)

320 **Computer Architecture**

Computer hardware as it relates to software development and operating systems. Prerequisite: CS 250. Credit three hours. (Fee \$30)

330-331 Assembler

Programming techniques in assembly language. Prerequisite: MA 218 and CS 250. Lecture credit three hours; laboratory credit (CS 331) one hour. (Fee \$30)

340 Operating Systems

Computer organization and architecture are related to major concept areas of operating systems principles. Prerequisite: CS 330. Credit three hours. (Fee \$30)

350-351 Data Structures

Representation and use of methods used to organize data. Arrays, stacks, queues, linked lists, trees and graphs. Recursion and sorting will be discussed. Prerequisite: MA 218 and CS 250. Lecture credit three hours; laboratory credit (CS 351) one hour. (Fee \$30)

360-361 Advanced Programming

Advanced programming techniques introduced in a programming language other than that used in CS 250. Prerequisite: CS 250. Lecture credit three hours; laboratory credit (361) one hour. Lecture and lab must be taken concurrently. (Fee \$30)

365 Directed Study in Programming

Through completion of a software solution to a substantial problem, the student will learn software engineering principles and good programming practices. Students may take this course two times for credit. Offered DIS. Prerequisite: CS 350. Credit one hour. (Fee \$30)

370-371 Scientific Programming with FORTRAN

Advanced programming applications from the scientific fields using the programming language FORTRAN. Applications will cover data structures, matrix manipulations, simulation and models, and numerical methods. Prerequisites: CS 150 or CS 250, MA 111 and MA 218. Lecture credit three hours; laboratory credit (CS 371) one hour. (Fee \$30)

430 Decision Support Systems

Overview of decision support systems, including spreadsheets, database managers and expert systems. Application to decision making processes. Introduction to artificial intelligence, knowledge representation and reasoning. Prerequisites: CS 150 or 250, CS 310. Credit three hours. (Fee \$30)

445 Internship in Computer Science

On-the-job training and experience related to career work in Computer Science/Information Systems/Data Processing. Prerequisites: Senior standing or completion of at least 15 hours in computer science and permission of the department. Credit one to three hours (Pass/Fail). Students must petition for admission in the semester prior to the desired semester of internship.

450 Senior Project

A capstone course with emphasis on application of the knowledge acquired in the major, minor, and computer science fields in the planning, development, and implementation of a computer-based project. Prerequisite: senior standing, substantial completion of the major and 15 hours in Computer Science including CS 250, 305 or 330 or 350, and 310 (or equivalents). Credit three hours. Students must petition for admission in the prior semester and submit a project proposal. (Fee \$30)

Earth Science Courses (ES)

103-104 Introduction to Natural Science: Environmental Studies (Also CH 103-104)

A general education experience introducing students to the major environmental topics of ecosystems, human populations, energy concerns, food production, and pollution. Whenever appropriate, the chemical explanations of the above topics will be emphasized. Lecture credit three hours; laboratory credit one hour. (Fee \$50)

205 Introduction to Astronomy

The nature and origin of the wondrous objects in the sky including planets, stars, galaxies, nebulae, and stellar remnants. The nature and measurement of light from which we obtain our understanding of the heavens. Prerequisite: MA 111. Offered once per year. Lecture credit three hours.

206 Astronomy Lab

Visual, telescopic, and computer-based study of the night sky, understanding and use of telescopes, recognition of constellations and locations of deep sky objects. Co-enrollment in ES 205 is recommended but not required. Laboratory credit one hour. (Fee \$30)

220 Introduction to Meteorology

A study of the dynamics of the Earth's atmosphere, including weather and violent storms. Examination of the energy systems which control climate and weather. Credit three hours.

221 Meteorology Lab

Analysis of weather and weather patterns. Instrumental weather recording. Weather prediction. Co-requisite: ES 220. Credit one hour. (Fee \$30)

225 Meteorology II

A study of the major storm systems of the Earth's atmosphere, climate, and the effects of human activities on climate and the atmosphere. Prerequisite: ES 220. Credit three hours.

Mathematics Courses (MA)

- 90 Mathematical Skills**
The course will review fundamentals of arithmetic and algebra. It is designed for students who have not mastered the basic skills of these subjects. No credit towards major or minor. Three hours add-on credit. (Fee \$5)
- 95 Intermediate Algebra**
Polynomials, linear and nonlinear equations and inequalities, exponents, radicals, systems, relations and functions. For students who have studied algebra but are not prepared for College Algebra. Prerequisite: MA 90 or satisfactory mathematics score on ACT. Three hours add-on credit. (Fee \$5)
- 100 Finite Mathematics**
Elementary logic, sets, combinatorics, probability, introduction to descriptive statistics. This course provides practice in the application of mathematical reasoning to ordinary situations. Credit three hours. (Fee \$5)
- 111 College Algebra**
Real numbers, expressions, equations, inequalities, graphing, polynomials, rational functions, conic sections, systems, exponentials, and logarithms. Advisors may suggest MA 95 for students whose high school preparation in algebra is weak. Departmental standard calculator required. Credit three hours. (Fee \$5)
- 112 Trigonometry**
Intended as a preparation for calculus. Triangle solving, applications, graphs, identities, inverse functions, trigonometric equations, and complex numbers. Departmental standard calculator required. Credit three hours. (Fee \$5)
- 115 Precalculus**
A preparation for calculus emphasizing advanced algebra and functions. Linear quadratic, logarithmic, exponential, polynomial, rational, and trigonometric functions will be studied. The course will include graphing and problem-solving with these functions. Credit three hours. (Fee \$5)
- 120 Discrete Mathematics**
An introduction to combinatorial models and their applications. Topics include sets, relations, functions, logic, permutations, combinations, statements, graphs, trees, probability, recurrence, and finite state machines. Departmental standard calculator required. Credit three hours. (Fee \$5)
- 207 Theory of Arithmetic**
Sets, relations, functions, whole numbers, numeration, algorithms, integers, primes, factoring, rational and real numbers. Intended for prospective elementary teachers. Prerequisite: MA 100 or 111. Credit three hours. (Fee \$5)
- 208 Elementary Geometry**
Critical thinking, logic, informal geometry, measurement, metric system, coordinates, and transformations. Intended for prospective elementary teachers. Prerequisite: MA 207. Credit three hours. (Fee \$5)

- 211 Elementary Statistics**
Data and samples, descriptive statistics, regression, probability distributions (binomial, normal, t, chi-square), hypothesis testing, estimation of parameters, analysis of variance. Prerequisite: MA 100 or MA 111. Departmental standard calculator required. Credit three hours. (Fee \$5)
- 218 Calculus I**
Functions, limits, derivatives, extrema, differentials. Prerequisite: MA 112. Departmental standard calculator required. Credit three hours. (Fee \$5)
- 230 Introduction to Logic (Also Philosophy 230)**
A study of the interaction of language and reasoning with an introduction to symbolic logic. Prerequisite: three hours in mathematics. Credit three hours. (Fee \$5)
- 318 Calculus II**
Antidifferentiation, area, definite integrals, fundamental theorem, transcendental functions, applications of integration, methods of integration. Prerequisite: MA 218. Departmental standard calculator required. Credit three hours. (Fee \$5)
- 322 Calculus III**
Conic sections, plane curves, parametric equations, polar coordinates, infinite series. Prerequisite: MA 318. Departmental standard calculator required. Credit three hours. (Fee \$5)
- 324 Modern Geometry**
Axioms, definitions, and theorems; finite geometries, constructions, non-Euclidean geometries. Recommended for secondary mathematics teachers. Credit three hours. (Fee \$5)
- 326 Multivariable Calculus**
Vectors, dot and cross products, curves, surfaces, functions of several variables, partial derivatives, multiple integrals. Prerequisite: MA 322. Departmental standard calculator required. Credit three hours. (Fee \$5)
- 328 Modern Algebra**
Number Theory, groups, homomorphisms, rings and fields. Prerequisite: MA 218. Credit three hours. (Fee \$5)
- 336 Linear Algebra**
Linear systems, matrices, determinants, vector spaces, spanning, independence, linear transformations, eigenvalues. Prerequisite: MA 218. Departmental standard calculator required. Credit three hours. (Fee \$5)
- 427 Set Theory and Logic**
Logic, sets, relations and functions, denumerable and nondenumerable sets, cardinal and ordinal numbers, Peano axioms, axiom of choice. Prerequisite: MA 328 or 336. Credit three hours. Offered by DIS. (Fee \$5)

442 Differential Equations

Introduction to ordinary differential equations: first-order methods, homogeneous and nonhomogeneous linear equations, systems of differential equations, Laplace transforms, power series, numerical methods, applications. Prerequisite: MA 322. Credit three hours. (Fee \$5)

456 Theory of Numbers

Induction, divisibility, primes, congruences, conditional congruences, number-theoretic functions. Prerequisite: MA 218. Credit three hours. Offered by DIS. (Fee \$5)

460 Seminar

An introduction to areas of advanced study. Prerequisite: mathematics majors or minors with junior or senior standing and permission of the instructor. Credit one hour. (May be repeated for four hours credit) (Fee \$5)

461 Research and Directed Reading in Mathematics

Prerequisite: mathematics majors with senior standing and permission of the instructor. Credit three hours. (Fee \$5)

480 Numerical Analysis

Course introduces modern approximation techniques to solve mathematical problems and applied problems in other disciplines such as physics, engineering, computer science, economics, biology and social sciences. Prerequisite: MA218 and 318 required. MA442 recommended. Credit three hours. (Fee \$5)

Physics Courses (PH)

101 Introduction to Natural Science: Physical Science

An introduction to the principles of physics and the application of those concepts in meteorology, geology and astronomy. Prerequisite: A college math course numbered 100 or higher. Lecture credit three hours.

102 Physical Science Lab

An introduction to the execution and evaluation of scientific experiments with examples from physics, meteorology, and astronomy. Corequisite: PH 101. Laboratory credit one hour. (Fee \$30)

220 General Physics I

An algebra-based study of Newtonian mechanics including waves and fluids, plus thermodynamics. Prerequisite: MA 112. Departmental standard calculator required. Lecture credit three hours.

221 General Physics I Lab

Principles of quantitative experimentation, documentation, data analysis, evaluation, and presentation, with extensive use of computers. Experiments in Newtonian mechanics, wave behavior, and thermodynamics. Co-requisite: PH 220 or 240. Departmental standard calculator required. Laboratory credit two hours. (Fee \$30)

- 222 General Physics II**
 An algebra-based study of electricity, magnetism, electronics, optics, and modern physics. Prerequisite: PH 220. Co-enrollment in PH 223 is strongly recommended. Departmental standard calculator required. Lecture credit three hours.
- 223 General Physics II Lab**
 Experimental verification and reinforcement of principles in electricity, magnetism, electronics, and optics. Co-requisite: PH 222 or 242. Departmental standard calculator required. Laboratory credit two hours. (Fee \$30)
- 250 Introduction to Acoustics**
 A course designed to introduce the various aspects of acoustics which include production of sound by various sources (voice, musical instruments, etc.), propagation of sound, and perception and judgment of sound by the human brain
- 340 General Physics I with Calculus**
 A calculus-based study of Newtonian mechanics including waves and fluids and thermodynamics.
- 342 General Physics II with Calculus**
 A calculus-based study of electricity, magnetism, electronics, optics, and modern physics.

Suggested Curriculum for Mathematics Majors

First Year	Hrs	Second Year	Hrs
English 101, 102 -----	6	English 200 or 201 -----	3
History 101, 102 -----	6	Math -----	6
Math 218, 318* -----	6	Math 120 -----	3
Religion 101, 102 -----	6	Math 322 -----	3
HP 100 -----	1	Natural Science -----	8
LC Connection 100 -----	1	Computer Science -----	4
Computer Applications -----	3	HP activity -----	2
		Social Science -----	3
		Foreign Language -----	3
Total -----	29		
		Total -----	35
Third Year	Hrs	Fourth Year	Hrs
Math -----	6	Math -----	9
Natural Science -----	4	Minor/Elective -----	15
Philosophy 230, 300 -----	6	Math 460 -----	2
Oral Communication -----	3	Fine Arts -----	3
Minor/Elective -----	12		
Social Science -----	3	Total -----	29
Total -----	34		

*Well-prepared students will be able to obtain credit by examination in college algebra and in trigonometry; others should take Mathematics 111/112 in the first year and begin the calculus sequence in the second year.

Suggested Curriculum for Mathematics Education Majors

First Year	Hrs	Second Year	Hrs
English 101, 102 -----	6	English 200, 201 -----	6
History 101, 102 -----	6	Math 218, 318, 322, 324 -----	12
Math 120, 230 -----	6	Foreign Language -----	3
LC Connection 100 -----	1	Education 290, 295 -----	6
Education 190, 196, 198 -----	9	Fine Arts -----	3
Biology 101-102 -----	4	Religion 101, 102 -----	6
HP 100 -----	1		
		Total -----	36
Total -----	33		
Third Year	Hrs	Fourth Year	Hrs
Math 326, 328 and 336 -----	9	Math 442 -----	3
Philosophy 300 -----	3	Math 460 -----	1
Education 310, 335 -----	6	Education 375, 393 -----	6
Physics 240-221 -----	5	Education 466 -----	9
Math 460 -----	1	HP activity -----	1
HP activities -----	2	History 221, 222, or GE 201 -----	6
Computer Science 250-251 -----	4	Second Teaching Field -----	8
Second Teaching Field -----	3		
		Total -----	34
Total -----	33		

*Well-prepared students will be able to begin the calculus sequence in the first year.

The following program is listed under Pre-Professional Curricula page 77:
Pre-Engineering