COMPUTER & COMPUTATIONAL MATH (CCM)

CCM 150   Computer Science I   4 Credit Hours
An introduction to structured computer programming covering problem formulation, algorithm development, the C++ programming language, program testing and debugging, capabilities and elements of computer organization, and object-oriented software methodologies.
Prerequisite(s): MATH 115*
Corequisite(s): CCM 150L

CCM 172   Computing Environ for Math   3 Credit Hours
This course covers introductory programming techniques for Mathematics majors. Students will learn to program in sage and python. Topics include data types, variables and assignments, decisions, loops, functions, recursion, arrays and objects. Programming assignments focus on problems that are mathematical in nature, giving students an opportunity to use simulations to understand and verify familiar mathematical results. This course, or CIS/CCM 150, satisfies the programming requirement for the Mathematics concentration.
Prerequisite(s): MATH 115
Restriction(s):
Can enroll if Class is Freshman or Sophomore or Junior or Senior
Can enroll if College is Arts, Sciences, and Letters

CCM 390   Topics in Computational Math   1 to 3 Credit Hours
A course designed to offer selected topics in different areas of applied mathematics. The specific topics will be announced together with the prerequisites for each separate offering. Course may be repeated when the topics covered differ.

CCM 399   Independent Studies   1 to 3 Credit Hours
Readings or analytical assignments in Computers and Computational Mathematics in accordance with the needs and interests of those enrolled and agreed upon by the student and advising instructor.

CCM 404   Dynamical Systems   3 Credit Hours
This course is an introduction to nonlinear dynamics and chaos with applications taken from engineering and the sciences. Topics include: one dimensional flows and bifurcations, two dimensional linear systems, phase plane analysis, limit cycles, and bifurcations. The class will finish with an introduction to chaotic systems and, if time permits, a study of fractals and strange attractors. A minimum grade of C- is required in the prerequisite. Students cannot receive credit for both MATH 404 and MATH 504. (OC).
Prerequisite(s): MATH 228

CCM 451   Computer Graphics   3 Credit Hours
Basic geometrical concepts: graphics output primatives, two-dimensional transformations, windowing and clipping, three-dimensional viewing, visible surface detection methods, and graphical user interfaces. (F).
Prerequisite(s): (MATH 217 or MATH 227 or MATH 228) and ((CIS 350 or CIS 3501 or IMSE 350) or (ECE 370 and MATH 276) or (ECE 370 and ECE 276))
Restriction(s):
Cannot enroll if Class is

CCM 458   Introduction to Wavelets   3 Credit Hours
This course will introduce the students to theory and application of wavelets using linear algebra. Topics will include the discrete Fourier transform, the fast Fourier transform, linear transformations, orthogonal decomposition, discrete wavelet analysis, the filter bank, Haar Wavelet family, Daubechies's Wavelet family, and applications. Students cannot receive credit for both MATH 458 and MATH 558. (OC)
Prerequisite(s): MATH 217 or MATH 227
Restriction(s):
Can enroll if Class is Sophomore or Junior or Senior

CCM 472   Introduction to Numerical Analysis   3 Credit Hours
This course is an introduction to numerical analysis and scientific computing. Topics include: floating point representation, round off error, root finding techniques, interpolation, numerical integration, Gaussian elimination and techniques for solving linear systems, minimizing functions, and methods for solving ordinary differential equations numerically. A minimum grade of C- is required in the prerequisite. Students cannot receive credit for both MATH 472 and MATH 572. (F).
Prerequisite(s): MATH 227 or MATH 228

CCM 473   Matrix Computation   3 Credit Hours
A study of the most effective methods for finding the numerical solution of problems which can be expressed in terms of matrices, including simultaneous linear equations, orthogonal projections and least squares, eigenvalues and eigenvectors, positive definite matrices, and difference and differential equations. (AY).
Prerequisite(s): MATH 217 or MATH 227

*An asterisk denotes that a course may be taken concurrently.

Frequency of Offering

The following abbreviations are used to denote the frequency of offering: (F) fall term; (W) winter term; (S) summer term; (F, W) fall and winter terms; (YR) once a year; (AY) alternating years; (OC) offered occasionally