

Academic Org: Dept of Computer Sci & Engg – Subject: Computer Science

Course: CSCI3340 **Course ID:** 014540 **Eff Date:** 2024-07-01 **Crse Status:** Active **Apprv. Status:** Approved **[New Course]**
Scientific Computing 科學計算

This course aims to provide students with basic knowledge of scientific and numerical computational methods to solve various mathematical problems that arise in science and engineering. Topics include linear systems, non-linear systems, interpolation, least squares, eigenvalue, stochastic simulation, quadrature, ODEs, PDEs, etc.

本科旨在為學生提供科學及數值的計算方法基本知識，以解決科學及工程領域中出現的各種數學問題。本科主題包括線性系統、非線性系統、插值、最小平方法、特徵值、隨機模擬、積分、常微分方程、偏微分方程等。

Grade Descriptor: A

EXCELLENT – exceptionally good performance and far exceeding expectation in all or most of the course learning outcomes; demonstration of superior understanding of the subject matter, the ability to analyze problems and apply extensive knowledge, and skillful use of concepts and materials to derive proper solutions.

有關等級說明的資料，請參閱英文版本。

B

GOOD – good performance in all course learning outcomes and exceeding expectation in some of them; demonstration of good understanding of the subject matter and the ability to use proper concepts and materials to solve most of the problems encountered.

有關等級說明的資料，請參閱英文版本。

C

FAIR – adequate performance and meeting expectation in all course learning outcomes; demonstration of adequate understanding of the subject matter and the ability to solve simple problems.

有關等級說明的資料，請參閱英文版本。

D

MARGINAL – performance barely meets the expectation in the essential course learning outcomes; demonstration of partial understanding of the subject matter and the ability to solve simple problems.

有關等級說明的資料，請參閱英文版本。

F

FAILURE – performance does not meet the expectation in the essential course learning outcomes; demonstration of serious deficiencies and the need to retake the course.

有關等級說明的資料，請參閱英文版本。

Equivalent Offering:

Units: 3 (Min) / 3 (Max) / 3 (Acad Progress)

Grading Basis: Graded

Repeat for Credit: N

Multiple Enroll: N

Course Attributes:

Topics:

COURSE OUTCOMES

Learning Outcomes:

At the end of the course of studies, students will have acquired:

1. Proficiency in computational methods for solving a range of mathematical problems that arise in engineering.
2. Programming techniques to implement algorithms for diverse engineering applications.
3. Knowledge regarding the advantages and limitations of various computational methods.

Course Syllabus:

Week 1: Finite precision arithmetic: Machine numbers, rounding errors, stability.

Week 2: Linear systems: LU factorization, Cholesky decomposition, pivoting, conditioning.

Week 3: Non-linear systems: bisection, iteration methods, Newton's methods.

COMPONENTS

LAB : Size=50; Final Exam=N; Contact=1
LEC : Size=50; Final Exam=Y; Contact=3

ENROLMENT REQUIREMENTS

1. CSCI3340

Enrollment Requirement Group:

Prerequisite: (ENGG1120 or ESTR1005 or MATH1030 or MATH1038 or MATH1550) AND (ENGG1130 or ESTR1006 or MATH1010 or MATH1020 or MATH1018 or MATH1510 or MATH1520)

New Enrollment Requirement(s):

Pre-requisite = (ENGG1120 or ESTR1005 or MATH1030 or MATH1038 or MATH1550) AND (ENGG1130 or ESTR1006 or MATH1010 or MATH1020 or MATH1018 or MATH1510 or MATH1520)

Additional Information

eLearning hrs for blended cls 0
VTL-Onsite face-to-face hrs 0
VTL-Online synch. hrs 0
VTL-Online asynch. hrs 0
No. of micro-modules 0
Research components (UG) 0%

< E N D O F R E P O R T >