# 朝陽科技大學 094學年度第2學期教學大綱
# Numerical Methods 數值方法

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| 當期課號 | 2050 | Course Number | 2050 |
| 授課教師 | 張本杰 | Instructor | CHANG,BEN JYE |
| 中文課名 | 數值方法 | Course Name | Numerical Methods |
| 開課單位 | 資訊工程系(四日)二A | Department | |
| 修習別 | 選修 | Required/Elective | Elective |
| 學分數 | 3 | Credits | 3 |
| 課程目標 | 這門課的目標是提供學生數值方法的知識，主題包括：數值方法簡介、數值解與可析解的差異、數值方法的誤差與精確度、各種問題求解的數值方法。在完成這門課之後，學生將可以學習到下面幾點：1.瞭解數值解與可析解；2.瞭解Roots of Equations的數值方法；3.瞭解Linear Algebra Equations 的數值方法；4.瞭解Curve Fitting數值方法。 | Objectives | The goal of this course is to provide students with a basic knowledge of the Numerical Methods. The main topics include Numerical Methods introduction, Numerical and Analytical solutions, Error and accuracy of Numerical methods, and Various important NUmerical methods. Students will realize the following backgrounds of this course after completing the course: 1. The difference of Numerical and Analytical solutions; 2. The numerical methods for Roots of Equations; 3. The numerical methods for Linear Algebra Equations ; 4. The numerical methods for Curve Fitting. |
| 教材 | Text books<br>Steven C. Chapra, “Applied Numerical Methods with Matlab for Engineers and Scientists,” 1st ed., McGraw-Hill, 2005.(中文版,滄海)<br>Steven C. Chapra, “Applied Numerical Methods with Matlab for Engineers and Scientists,” 1st ed., McGraw-Hill, 2005.(高立)<br>Reference books<br>Steven C. Chapra and R. Canale, “Numerical Methods for Engineers: With Software and Programming,” 4th ed., McGraw-Hill, 2005.(中文版, 高立)<br><br>G. Lindfield and J. Penny, “Numerical Methods using MATLAB,” 2nd ed., Prentice Hall, 2000. (全華)<br><br>R. Schilling and S. Harris, “Applied Numerical Methods for Engineers using Matlab and C,” Brooks/Cole Publishing Company, 1999.(滄海) | Teaching Materials | Text books<br>Steven C. Chapra, “Applied Numerical Methods with Matlab for Engineers and Scientists,” 1st ed., McGraw-Hill, 2005.(中文版,滄海)<br>Steven C. Chapra, “Applied Numerical Methods with Matlab for Engineers and Scientists,” 1st ed., McGraw-Hill, 2005.(高立)<br>Reference books<br>Steven C. Chapra and R. Canale, “Numerical Methods for Engineers: With Software and Programming,” 4th ed., McGraw-Hill, 2005.(中文版, 高立)<br><br>G. Lindfield and J. Penny, “Numerical Methods using MATLAB,” 2nd ed., Prentice Hall, 2000. (全華)<br><br>R. Schilling and S. Harris, “Applied Numerical Methods for Engineers using Matlab and C,” Brooks/Cole Publishing Company, 1999.(滄海) |
| 成績評量方式 | Homework 30%<br>4~6 Homeworks<br>Midterm 25%<br>Final Exam 25%<br>Final Project (Build an integrated application for all numerical analysis) 20% | Grading | Homework 30%<br>4~6 Homeworks<br>Midterm 25%<br>Final Exam 25%<br>Final Project (Build an integrated application for all numerical analysis) 20% |
| 教師網頁 | | | |
| 教學內容 | 1. Mathematical modeling, numerical method, and problem solving<br>2. Matlab fundamentals and programming<br>3.Round-off and truncation errors<br>4. Roots of equations<br>5. Linear algebra equations and matrices<br>6. Gauss elimination | Syllabus | 1. Mathematical modeling, numerical method, and problem solving<br>2. Matlab fundamentals and programming<br>3.Round-off and truncation errors<br>4. Roots of equations<br>5. Linear algebra equations and matrices<br>6. Gauss elimination |

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| | 7. LU decomposition<br>8. Iterative mehtods<br>9. Curve fitting: straight line,polynomial interpolation, splines<br>10. Linear least-squares and nonlinear regression<br>11. Numerical differentation and integration | | 7. LU decomposition<br>8. Iterative mehtods<br>9. Curve fitting: straight line,polynomial interpolation, splines<br>10. Linear least-squares and nonlinear regression<br>11. Numerical differentation and integration |

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