

Electrical and Computer Engineering 711

COMPUTER-AIDED DESIGN

- Instructor: Dr. J.W. Bandler
- Recommended Texts: Current publications and software manuals. (There will be a charge to cover printing costs).
- Prerequisites: Undergraduate level background in numerical methods of analysis and optimization and permission of the instructor. Students must be familiar with C, C++, Matlab and Spice.
- Course Objectives: To give the student an introduction to and hands on experience with the state-of-the-art in CAD methodology and software, emphasizing techniques for statistical design and optimization of RF, wireless and microwave circuits. To cover practical aspects of nonlinear optimization with applications in CAE: design of engineering devices, circuits and systems.
- Course Outline:
- 1) Modern, user-friendly optimization techniques.
 - 2) General formulation of design problems.
 - 3) Analysis of linear and nonlinear circuits.
 - 4) Effective use of public domain and commercial simulators.
 - 5) Small- and large-change sensitivity evaluation.
 - 6) Design centering. Tolerance assignment. Postproduction tuning.
 - 7) Performance driven, yield driven and cost driven design.
 - 8) Optimization approaches to modeling of active devices using measured data.
 - 9) Practical implementation of least squares, least pth and minimax objectives.
 - 10) Statistical design centering, yield optimization and parameter extraction.
 - 11) The space mapping and surrogate modeling concepts in engineering modeling and optimization.
 - 12) Use of artificial neural networks in device modeling and circuit design.
- Hardware/Software: Projects may be carried out on workstations and PCs. Software systems available to students may include OSA90/hope, Agilent ADS, HFSS, Agilent Momentum, NeuroModeler and Sonnet.
- Style: Lectures, seminars, laboratory and private study.
- Evaluation: Students will solve problems and make oral presentations. Each student will carry out a project and write a final report. Use of industrially relevant data and design specifications is encouraged.
- Weighting: Assignments 15%, Oral Presentations 15%, Final Report 70%.