EGM 6321 Principles of Engineering Analysis 1, Fall 2011
Dr. L. Vu-Quoc

Instructor: Dr. L. Vu-Quoc, Tel: 392-6227, E-mail: vu-quoc AT ufl dot edu

- Office: NEB 135 (New Engineering Building)
- Classroom: CSE E122
- Class time:
  Tue, period 8 (3:00pm - 3:50pm)
  Thu, periods 7 + 8 (1:55pm - 3:50pm)
- Office hours:
  Tue, periods 6 + 7 (12:50pm - 1:40pm, 1:55pm - 2:45pm)
  Thu, period 6 (12:50pm - 1:40pm)

IMPORTANT ANNOUNCEMENTS:

Academic and administrative issues:

- Academic Honesty: All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a student at the University of Florida and to be honest in all work submitted and exams taken in this class and all others.
- ASME ethics web page: Code of ethics, etc.
- Accommodations for Disabilities: Students with disabilities who are requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodations.

NOTE: Please reload often all web pages to your browser, since I am continuously adding new materials to these web pages.

- Syllabus
- Policy
- Course wiki
- Homework report guidelines
- Wiki HW reports
- Schedule of courses, Academic deadlines and calendars (Fall 11 Spring 12), Fall-Spring class periods
- Deadline for Drop/Add and Late Registration: 11:59 pm EDT on Fri, 26 Aug 2011.

Home page: Loc Vu-Quoc
E-mail: vu-quoc AT ufl.edu
MAE Department
Course objective:

The objectives of this course is to develop analytical methods to solve ordinary differential equations (ODEs) with applications in many areas of engineering. Many of these ODEs come from certain methods of solution of partial differential equations (PDEs). Others come from dynamical problems.

Topics: Some sample topics are (depending on the level of students and time available):

- 1st-order ODEs (linear, nonlinear): Test of exactness, integrating factor method
- 2nd-order ODEs (linear, nonlinear): Test of exactness, reduction-of-order methods, 2nd-order linear ODEs with varying coefficients, superposition of solutions (homogeneous solution, particular solution), power-series (Frobenius) method
- PDEs: Curvilinear coordinates, separation of variables, reduction to ODEs, applications (vibration, fluids, electromagnetics)
- Orthogonal polynomials, Legendre functions: Historical development, PDEs on spherical coordinates, separation of variables, method of trial solution, Legendre differential equation (linear 2nd-order ODE with varying coefficients), homogeneous solution, orthogonality, linear independence, solution of non-homogeneous Legendre equation (variation of parameters), solution by superposition (homogeneous, particular), Fourier-Legendre series, Rodrigues's formula, other applications (Gauss-Legendre quadrature)
- Unified general theory of classical orthogonal polynomials: Fundamental equation of hypergeometric type, Jacobi equation and functions (include Legendre and Chebyshev), Hermite equation and functions, Bessel equation and functions, applications (Laplace equation in cylindrical coordinates), general Rodrigues's formula, orthogonality
- Other topics: Further applications orthogonal polynomials (spectral method, generalized polynomial chaos), Contour integral and complex variables, etc.

See course wiki for more details.

Text and other resources:

Recommended:

  UF library QA371.Z88 1989, 2 copies, one for in-library use.
  UF library QA371 .B773 2001

See course wiki for more details.
Grade determination:

Homework/project (30%), exams (70%).

Exam dates: With the schedule T 8 R 7+8, we have 44 class meetings in Fall 2011 (class begins on Mon, 22 Aug 11, ends on Wed, 7 Dec 11).

Exam 1: Thu, 13 Oct 11, 2 periods, in class, during the 8th week from the beginning of the semester. Off-campus students have 3 days, after the on-campus in-class exam date, to arrange for their exam to be taken, scanned, and e-mailed back to me by 5:00 pm EDT on Mon, 17 Oct 2011. NOTE: Deadline for off-campus students is Mon, 17 Oct 11, 5pm EDT.

Exam 2: Thu, 1 Dec 11, 2 periods, in class, during the 7th week after Exam 1. Off-campus students have 3 days, after the on-campus in-class exam date, to arrange for their exam to be taken, scanned, and e-mailed back to me by 5:00 pm EST on Mon, 5 Dec 2011. NOTE: Deadline for off-campus students is Mon, 5 Dec 11, 5pm EST.

Homework / Projects:

There will be HW assignments, which are to be solved following Cooperative Learning Techniques. HW should be thought of as mini projects, which may include "hand solution" with the help of Matlab. Students may develop their own Matlab codes. For a tutorial on how to use Matlab, see Matlab matters. See the course policy for more details.