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cENGR111 = Freshman Engr. (Spring'08)

INSTRUCTOR = Dr. Duc T. Nguyen
Office Hours = T,W,R; 12:30pm-1:
Room #1319 ECSB
Tel= 757-683-3761
Fax= 757-683-5354
Email= dnguyen@odu.edu

Date/Time = W/10:00am-11:50am
(call # ?????; the FIRST 5-week session = Jan. 12-Feb. 15, 2008)

Room/Building = ????

Required Materials = Introduction to MATLAB 6 for Engineers
by William J. Palm III, McGraw-Hill, ISBN # 0-07-234983-2
(2001)

Recommended Materials = Prof. Nguyen's lecture notes
http://www.lions.odu.edu/~skadi002

Compaq Visual FORTRAN (latest version, on CD-ROM),
32 bits, Window 98, 95 Intel Systems
Window NT Intel & Alpha Systems
http://www.compaq.com/fortran/

GRADING POLICIES:

(a) attending classes (lectures/recitations) = approx. 15 points/15 meetings applying to each student
(b) laboratory (using MATLAB, ...) = approx. 35 points applying to each student
(c) final project(s) presentations = approx. 50 points applying to each TEAM (approx. 5 students)

=====>> typing & presenting "engineering articles"
=====>> conducting your own (hands-on) experiments to find 2-D centroids, and also verifying your experimental results with MATLAB computer software (for integrations etc...)
=====>> formulating and/or solving Linear Programming (LP) problem(s)

PRE-REQUISITE FOR THIS COURSE

Some working knowledge (High-School level) of:

(a) using MICROSOFT WORD processing (or POWER POINT presentation)
(b) elemenntary derivative/anti-derivative (integration) formulas
(c) elementary matrix operations
(d) using (and having access to) INTERNET

GOALS/OBJECTIVES OF THIS COURSE

(a) providing capabilities to prepare/create/deliver GOOD PRESENTATIONS
(b) encouraging utilization of desktop/laptop/workstation COMPUTERS
(c) improving ENGINEERING/MATHEMATICAL SKILLS v.i.a. MATLAB computer software and/or using existing OPTIMIZATION SOFTWARE (i.e. Genetic Algorithms ...) v.i.a. INTERNET
(d) improving capabilities to FORMULATE and SOLVE engineering problems
(e) performing LABORATORY EXPERIMENT(S) to validate analytical results, whenever possible

DESIGN COMPONENTS FROM THIS COURSE

(a) design procedures to locate the centroid of the physical 2-D object

TENTATIVE TOPICS/SCHEDULES

Week 1: DERIVATIVES

Definitions/Notations; Examples; Rules of Derivatives;
Introduction to MATLAB computer software
Laboratory #1 (computerized, each "student") MATLAB Exercises

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Week 2: ANTI-DERIVATIVES (INTEGRATIONS)

Definitions/Notations; Examples; Rules of Anti-Derivatives;
MATLAB computer software
Laboratory #2 (computerized, each "student") MATLAB Exercises
Laboratory #3 (each "team", centroids of simple/complicated 2-D objects)
(by hand-calculation and also by hand-experiment)

Week 3: OPTIMAL DESIGN OF ENGINEERING SYSTEMS
Week 4: (continued)

Definitions/Notations (standard forms of optimization problems)
Linear Programming (LP) problems
Non-linear Programming (NLP) problems
Selected Examples^^
for LP problems
for NLP problems^^
Graphical Solutions for LP Problems (with 2 Design Variables)
Simplex Solutions for LP Problems (with 2 Design Variables)^^
Genetic Algorithms for Solutions of LP and/or NLP Problems^^
Laboratory #4 (Formulating and/or solving LP problems, by using
either GRAPHICAL, or SIMPLEX method), for each "team"

^^ = if time is available

Week 5: STUDENTS' PROJECT(S) PRESENTATIONS

(a) Microsoft Words (or preferable POWER POINT) presentations
of Prof. Nguyen's lecture notes ["team" project]
(b) Laboratory #3 (each "team", centroids of simple/complicated 2-D objects)
(c) Optimum solution of LP problem(s), by using either GRAPHICAL, or
SIMPLEX method.

Remarks:
To encourage students within each TEAM to learn from each others,
and to attend class lectures/recitations regularly, the instructor
will "randomly" pick 1 (or more) students from each team
(on the presentation dates)
to make a presentation on his/her entire team's behalf.