University of Victoria Engineering

Faculty of Engineering

COURSE OUTLINE

ELEC 573 Engineering Design by Optimization: II

Term – SPRING 2016 (201601)

Instructor

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Office Hours

Days: Wednesdays
Time: 14:40 – 16:40
Location: EOW 427

Course Objectives

To learn fundamental theory, main stream contemporary methods and algorithms of constrained optimization. Applications of these algorithms to real-world problems in engineering and science will be an integral part of the course.

Learning Outcomes

Thorough understanding of the basic concepts and theory of constrained optimization; working knowledge of the methods and algorithms to be covered by the course.

Syllabus

Introduction and Basic Elements of Unconstrained Optimization Motivation and structure of constrained optimization problems.	3
Theory of Constrained Optimization Lagrange multipliers. First-order necessary conditions. Second-order conditions. Convexity. Duality.	8
Linear Programming General properties. Geometric interpretation of linear programs. Simplex methods. Interior-point methods. Examples and case studies.	6
Convex quadratic Programming (QP), SDP, and SOCP Active set methods. Interior-point methods. SDP algorithms. Second-order cone programming problems. Examples and case studies.	7
Concepts and Methods for General Convex Problems Subgradient and conjugate functions. L_1-L_2 minimization. Alternating direction method of multipliers.	7
Nonconvex Constrained Optimization Sequential convex programming method. Sequential QP programming. Convex-concave procedure (CCP). Examples and case studies.	7

A-Section(s): A01 / CRN 21193
Days: Tuesdays, Wednesdays & Fridays
Time: 1:30 – 2:20 pm
Location: ELL 061

Required Text

Lecture notes to be posted on line.

Assessment:

Assignments:	30 %	
Project	30 %	Date: Due on the same day as the final exam.
Final Exam	40 %	

Note:

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Graduate Calendar.

http://web.uvic.ca/calendar/GRAD/FARe/Grad.html

Note to Students:

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

Accommodation of Religious Observance

http://web.uvic.ca/calendar/GI/GUPo.html

Policy on Inclusivity and Diversity

http://web.uvic.ca/calendar/GI/GUPo.html

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour, which contains important information regarding conduct in courses, labs, and in the general use of facilities.

http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the entry in the current Graduate Calendar for the UVic policy on academic integrity.

http://web.uvic.ca/calendar/FACS/UnIn/UARe/PoAcI.html

Course Lecture Notes

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.