Math 300 (C1) Spring - Summer 2018

Advanced Boundary Problems I

Lecture C1: May 7 – August 3, 2018

Course Information

Department of Mathematical and Statistical Sciences
University of Alberta

Lecture C1: M W F 9:00 - 9:50 CAB 243 (for remainder of the term)

Instructor: Ed Leonard, 679 CAB

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web: http://www.math.ualberta.ca/~isaac/

(class notes, handouts, solutions, etc. will be available here)

office hours: T Th 10:00 - 12:00 in CAB 679, or by appointment

Course Objectives:

Learn about the three most important classes of partial differential equations of applied mathematics, that is, the heat equation, the wave equation, and Laplace's equation. Apply elementary solution techniques and be able to interpret the results.

Course Description:

Derivation of the classical partial differential equations of applied mathematics, solutions using separation of variables. Fourier expansions and their application to boundary value problems. Introduction to the Fourier transform. Emphasis on building an appropriate mathematical model from a physical problem, solving the mathematical problem, and carefully interpreting the mathematical results in the context of the original physical problem.

Course Prerequisites:

Math 201 and 209 or equivalents. Notes: (1) Open only to students in Engineering, Specialization Computing Science, Specialization Physics, and Specialization Geophysics. (2) This course may not be taken for credit if credit has already been obtained in MATH 337.

Required Textbook:

Partial Differential Equations: Theory and Completely Solved Problems

by T. Hillen, I. E. Leonard, H. van Roessel

Assignments:

There will be between 7 and 8 problem sets given during the term. Each problem set will consist of 10 problems taken from the text.

Problem sets will not be collected for marking. Solutions to the problem sets will be posted on the

course webpage:

web: http://www.math.ualberta.ca/~isaac/math300/ss18

Examination problems will be similar to problems from these problem sets.

Examinations:

Midterm I ..... (in class, Wednesday June 6, 2018) 20%
Midterm II ..... (in class, Friday July 13, 2018) 30%
Final Exam ..... (in CSIS 1 160, 9:00 - 11:00 Wednesday August 8, 2018) 50%

Grade Evaluation:

The final grades are not curved, the grade distribution is as follows:

Grade	Percent	Grade	Percent
A+	95 – 100	C+	65 – 69
A	90 – 94	C	60 – 64
A−	85 – 89	C−	55 – 59
B+	80 – 84	D+	50 – 54
B	75 – 79	D	45 – 49
B−	70 – 74	F	0 – 44

The instructor reserves the right to make minor adjustments to the above distribution in order to obtain an overall fair grading scheme.

Deadlines:

For the 13-week Spring and Summer courses running May 7 - August 3, 2018, note the following deadlines:

Last day to **Add/Drop Courses:** May 18, 2018

Last day for **50% Refund:** June 7, 2018

Last day to **Withdraw:** July 18, 2018

Format of Examinations:

Midterm Exams: 50 minute written examination. No calculators, cell phones or other electronic equipment, or course materials are allowed.

Final Exam: 2 hour written examination. No calculators, cell phones or other electronic equipment, or course materials are allowed.

Missed Term Examinations:

A student who cannot write the quiz or the midterm examination because of an incapacitating illness, severe domestic affliction or other compelling reasons can apply for deferral of the weight of the missed quiz or examination to the final examination.

Applications for deferral of term work worth less than or equal to 20% of the final grade must be made in writing to the *instructor*, with supporting documentation, within 48 hours of the missed quiz or examination date.

Applications for a deferral of term work greater than 20% of the final grade must be made to the *instructor* within 48 hours of the missed quiz or examination and must be supported by a completed University of Alberta Medical Statement Form or other appropriate documentation (Calendar section 23.5.6).

Deferral of term work is a privilege and not a right; there is no guarantee that a deferral will be granted. Misrepresentation of facts to gain a deferral is a serious breach of the *Code of Student Behaviour*.

Deferred Final Examination:

A student who cannot write the final examination because of an incapacitating illness, severe domestic affliction or other compelling reasons can apply for a deferred final examination.

Such an application must be made to the student's Faculty Office within 48 hours of the missed examination and must be supported by a completed University of Alberta Medical Statement or other appropriate documentation (Calendar section 23.5.6).

Deferred examinations are a privilege and not a right; there is no guarantee that a deferred examination will be granted. Misrepresentation of facts to gain a deferral is a serious breach of the *Code of Student Behaviour*.

If granted, the deferred final examination for this course will be held at a time and location convenient to both the student and the instructor.

Reexamination:

A student who writes the final examination and fails the course may apply for a reexamination. It should be noted that reexaminations are rarely granted in the Faculty of Science. These exams are governed by University (Calendar section 23.5.5) and Faculty of Science Regulations (Calendar Section 182.5.9). Misrepresentation of facts to gain a reexamination is a serious breach of the *Code of Student Behaviour*.

Student Responsibilities:

Academic Integrity:

> The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the *Code of Student Behavior* (online at http://www.ualberta.ca/secretariat/appeals.htm) and avoid any behavior which could potentially result in suspicion of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

All forms of dishonesty are unacceptable at the University. Cheating, plagiarism, and misrepresentation of facts are serious offenses. Anyone who engages in these practices will receive at minimum a grade of zero for the examination or paper in question and no opportunity will be given to replace the grade or redistribute the weights. Any offense will be reported to the Senior Associate Dean of Science, who will determine the disciplinary action to be taken.

Examinations:

Your student photo I.D. is required at examinations to verify your identity. Students will not be allowed to begin an examination after it has been in progress for 30 minutes. Students must remain in the examination room for at least 30 minutes from the time the examination commenced. Electronic equipment is not to be brought to the examination.

Cell Phones: Cell phones are to be turned off during lectures, labs, and seminars. Cell phones are not to be brought to examinations.

Students with Disabilities:

Students who require accomodation in this course due to a disability are advised to discuss their needs with Specialized Support and Disability Services (2-800 Student Union Building).

Academic Support Centre:

Students who require additional help in developing strategies for better time management, study skills, or examination skills, should contact the Academic Support Centre (2-703 Student Union Building).

Additional tutorial services are available through the Mathematics and Applied Sciences Centre

http://www.uofaweb.ualberta.ca/MASC/

Coming Soon: Topics for Midterm Examination I

Chapter 1. Introduction

1.1 Partial Differential Equations
1.2 Classification of Second-Order Linear PDEs
1.3 Side Conditions
1.4 Linear PDEs
1.5 Steady-State and Equilibrium Solutions
1.6 First Example for Separation of Variables
1.7 Derivation of the Diffusion Equation
1.8 Derivation of the Heat Equation
1.9 Derivation of the Wave Equation
1.10 Examples of Laplace's Equation

Chapter 2. Fourier Series

2.* Topics covered before Midterm I (from May 23 - June 4)

2.1 Introduction
2.5 Statement of Convergence Theorem
2.4.1 Fourier Cosine and Sine Series
2.6 Term-by-Term Differentiation of Fourier Series
2.6 Term-by-Term Integration of Fourier Series
2.8 Complex Form of Fourier Series