Memorial University of Newfoundland
Department of Physics and Physical Oceanography

PHYS 4820 OUTLINE

Mathematical Physics II, Winter 2025

Prerequisite: Phys 3820 or all of Math 2051, 2260, 3202, 3210

INSTRUCTOR: Dr. Entcho Demirov, 864-8834 C-4051; email: entcho@mun.ca
LECTURES: Slot 07, Monday, Wednesday and Friday, 2:00 pm - 2:50 pm.
PLACE: C3067.
OFFICE HOURS: Monday, Wednesday 11:00 am – 12:00 am.
COURSE WEBSITE: course page on Brightspace, (online.mun.ca)

Calendar entry: Mathematical Physics II covers topics on the common partial differential equations of Mathematical Physics and boundary value problems; Sturm-Liouville theory, introduction to the theory of theory of distributions, Dirac delta function, Laplace and Fourier transforms, Green's functions, Bessel functions, Legendre functions, spherical harmonics, and other topics such as group theory.

Textbook:
Mathematical methods for physicists: a comprehensive guide, 7th Edition, by George B. Arfken, Hans Jürgen Weber, and Frank E. Harris Amsterdam; Boston: Elsevier/Academic c2013
Available at Queen Elizabeth II Stacks (QA37.A68 2013) and through online access https://qe2a-proxy.mun.ca/Login?url=https://www.sciencedirect.com/book/9780123846549/mathematical-methods-for-physicists (earlier editions of the above are fine).

Additional Readings:
Mathematics for Physicists by Susan M. Lea.

Evaluation:
- 30% Assignments (6 assignments)
- 30% Midterm tests (2 tests in class on 21 February and 21 March, each worth 15%)
- 40% Final exam (3 hours)

Outline (estimated number of lectures – 34 in total):

Tentative lecture topics:
- Welcome and Introduction (1)
- Sturm-Liouville Theory (4)
- Bessel Functions (4)
- Legendre Functions (4)
- Midterm review (1)
- Laplace Transforms (4)
- Fourier Transforms (4)
- Delta Functions, Theory of Distributions (4)
- Green's Functions (4)
- Group Theory (4 - optional)

General information from the University

Generative Artificial Intelligence:

The submission of work that has been created by generative artificial intelligence (GAI) tools and presented as a student's original work is considered an academic offence in this course. Students **may not** use GAI in any of the following ways:

(i) Submitting an assignment presented as their own. This includes but is not limited to essays, research papers, computer code, and solutions to mathematical problem.
(ii) Using GAI as an aid to completing an assignment, such as paraphrasing from GAI content.
(iii) Submitting answers to any quiz, test, or exam question using GAI solutions.

For more information review the library's Academic integrity page:

https://www.library.mun.ca/researchtools/guides/integrity/

and Artificial intelligence and your academic work page

https://www.library.mun.ca/researchtools/guides/integrity/ai/#d.en.67054

Accommodations for Students with Disabilities:
http://www.mun.ca/blundon/accommodations/

Student Code of Conduct:
https://www.mun.ca/policy/browse-or-search/browse-policies/university-policy/?policy=783

Respectful Learning Environment:
https://www.mun.ca/policy/browse-or-search/browse-policies/university-policy/?policy=612

6.7.5 Exemptions from Parts of the Evaluation
http://www.mun.ca/regoff/calendar/sectionNo=REGS-0601#REGS-1949

6.8.2 Exemptions from Final Examinations
http://www.mun.ca/regoff/calendar/sectionNo=REGS-0628

6.12 Academic Misconduct
http://www.mun.ca/regoff/calendar/sectionNo=REGS-0748

Notable Dates

See University Diary: https://www.mun.ca/university-calendar/diary-of-important-dates/
Winter break break is Monday, Feb. 24 to Friday Feb. 28.
Last day to drop a course without academic prejudice is Tuesday, March 4.
Last day of classes is Wednesday, April 9.
Final exams begin Saturday, April 12 and end Tuesday, April 22.