Syllabus – Fall 2020
PHYS F611: Mathematical Physics I

Course Information

Credits	: 3 credits
Meeting Times	: MWF – 11:45am ~ 12:45pm (lecture)
Meeting Locations	: Zoom meeting
Course Homepage	: Google classroom

Instructor Information

Instructor	: Prof. Hyunju Kim Connor
Office	: Elvey 706B and Reichardt 120
Email	: hkconnor@alaska.edu
Phone	: (907) 474-5421
Website	: https://sites.google.com/a/alaska.edu/hkconnor
Office Hours	: MWF 12:45 – 1:45pm (Zoom), or
	By appointment (Zoom)

Prerequisites

Graduate standing, or permission of instructor

Textbook

Mathematical Methods for Physicists, 7th Edition by Arfken, Weber, and Harris.

Course Description

Mathematical tools and theory for classical and modern physics.
Core topics: Linear algebra including eigenvalues, eigenvectors and inner products in finite dimensional spaces. Infinite series. Hilbert spaces and generalized functions. Complex analysis, including Laurent series and contour methods. Applications to problems arising in physics. Selected additional topics, which may include operator and spectral theory, groups, tensor fields, hypercomplex numbers.

Course Goals

The main goal of this course is to introduce you to some fundamental advanced mathematical methods for physics at the beginning graduate level to help students learning better in other graduate physics courses and doing research in their graduate studies. Emphasis will be on application aspect of the subject rather than proofs of theorems.

Student Learning Outcomes

- Know how to apply some advanced mathematical methods to solve physical problems.
- Be able to solve most PhD Mathematical Physics comprehensive exam questions in recent years
- Can apply rigorous mathematical and logical manipulations in the study and research of Physics

Instructional Methods

3 1-hr online lectures per week
- Synchronous lectures will be held on MWF from 11:45am – 12:45 pm via Zoom meeting. Students are expected to attend the virtual lectures at the scheduled time.
- Every Zoom class will be recorded and provided to students via Google classroom in case that their internet connection is not ideal.

Tentative Course Schedule

We plan to cover Chapters 1 – 6 and 11 – 12 during the fall semester. Note that this is a rather ambitious schedule. My goal is to cover at least up to Chap. 11. We will not cover everything in these chapters because we have a limited amount of time, not because other topics are not important.

Week	Dates	Class Topics
1	Aug 24 – Aug 28	Chap. 1
2	Aug 31 – Sep 04	Chap. 1-2
3	Sep 07 – Sep 11	Chap. 2
4	Sep 14 – Sep 18	Chap. 3
5	Sep 21 – Sep 25	Chap. 3
6	Sep 28 – Oct 02	Chap. 4
7	Oct 05 – Oct 09	Chap. 4
8	Oct 12 – Oct 16	Chap. 5
9	Oct 19 – Oct 23	Chap. 5
10	Oct 26 – Oct 30	Chap. 6
11	Nov 02 – Nov 06	Chap. 6
12	Nov 09 – Nov 13	Chap. 11
13	Nov 16 – Nov 20	Chap. 11
14	Nov 23 – Nov 27	Chap. 12, Thanksgiving week
15	Nov 30 – Dec 04	Chap. 12

Grading:

Attendance/Participation	5%
Homework	35%
Midterm (**~Oct 16, 3hr exam**)	30%
Final exam (**Dec 07, 11:15 – 2:15 pm**)	30%
Total	100%

Note that the midterm schedule will be determined later. Final grades will be returned as letter grades with plus/minus modifiers. These will be derived from your overall percentage grade. The approximate conversions for each letter grade will be as follows: A+ (>97.5), A(>87.5), A-(>85), B+(>82.5), B(>72.5), B-(>70), C+(>67.5), C(>57.5), C-(>55), D+(>52.5), D(>42.5), D-(>40), F (<40)

Course Policies:
  (a) Attendance and participation in class is expected of all students.
  (b) This graduate-level course covers quite advanced topics and mathematics. We won't have enough time to go through all the text and derivations. Students are highly recommended to read and study the chapters by themselves before each class and ask questions during a class, office hours, or by setting up an appointment.
  (c) Homework will be posted and collected through the Google classroom. Please submit your homework on the due date stated in the homework. Late homework will not be accepted without evidence of illness or genuine emergency.
  (d) Students are encouraged to work together on the homework problems. However, the final materials must be their own answers.
  (e) Plagiarism and cheating are not accepted with no exception.

Academic Honesty
UAF expects and requires academic honesty from all members of the University community, and takes any act of plagiarism and cheating seriously. It is expected that all assignments, including homework and reports, that are turned in for this course must the original work of the individual student. Failure to comply with this policy will result in penalty as stipulated under UAF regulations.

Student Protections and Services
Every qualified student is welcome in my classroom. As needed, I am happy to work with you, disability services, veterans' services, rural student services, etc. to find reasonable accommodations. Students at this university are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. As required, if I notice or am informed of certain types of misconduct, then I am required to report it to the appropriate authorities. For more information on your rights as a student and the resources available to you to resolve problems, please go the following site: www.uaf.edu/handbook/.

UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: https://alaska.edu/nondiscrimination/.

Your instructor follows the University of Alaska Fairbanks Incomplete Grade Policy: "The letter "I" (Incomplete) is a temporary grade used to indicate that the student has satisfactorily completed (C or better) the majority of work in a course but for personal reasons beyond the student's control, such as sickness, has not been able to complete the course during the regular semester. Negligence or indifference are not acceptable reasons for an "I" grade."

Disabilities Services
The UAF Office of Disability Services implements the Americas with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. Any student who may need assistance with disabilities, should feel free to contact the instructor or directly to the Office of Disabilities Services (208 WHIT) by calling 907- 474-5655, or through email: uaf-disability-service@alaska.edu.

Effective Communication

Students who have difficulties with oral presentations and/or writing are strongly encouraged to get help from the UAF Department of Communication's Speaking Center (907-474-5470, speak@uaf.edu) and the UAF English's Department's Writing Center (907-474-5314, Gruening 8th floor), and/or CTC's Learning Center (604 Barnette Street, 907-455- 2860).