Physics 463, Fall 2017 **Special Topics in Physics** 3 Credits

Lectures: (365 Dillon Hall) Tuesday & Thursday: 10:00 – 11:20 am

… once again we are embarked on a new stage of exploration of fundamental laws of nature, a voyage guided largely by the search for and the discovery of new symmetries.
David Gross

Welcome to Physics 463! I strongly believe this will be a very useful course since it is designed to build up mathematical foundations that will be essential in any branch of physics. Moreover, it will give you a flavor of some of the exciting new aspects of Physics.

The content that we will cover in this course is two-fold. In the first part, we will discuss some advanced mathematics from a physics perspective. Some of you might have already taken courses in the Mathematics Department that cover some similar topics. However, unlike the math courses, we will try to motivate ourselves from a more physical point of view. We will explore why and how certain mathematics are useful for solving and understanding issues in Physics. Note that these math topics are essential for upper level and graduate level physics. It will cover three fourths of the total contents of the course.

Changing gear a bit, during the second and shorter half of the course, we will talk about some cool topics such as the role of symmetry in Physics. We will see how one can start with some basics assumptions and carry it on to the top most level of physics. If time permits, we will also cover a little bit about some cool areas of physics, such as cosmology.

Contact Information:
Instructor: Dr. Shajid Haque
Office: 289-1, Essex Hall
Phone: 519 253 30000 (Ext. 2655)
Email: shajid.haque@uwindsor.ca
(best way to contact me)
Website: http://www.uwindsor.ca/people/shajid/
Office Hour: See attached schedule. There are specific slots for office hour. But feel free to stop by at other times as well.

Prerequisite: 64-250, 62-215, and 62-216 or equivalent

Attendance: Attendance will be taken each class period. Regular attendance is expected of all students. If one class session is missed, not only will the experiences of that class be lost but also important connections to topics from previous and future classes.

Homework: There will be 6 homework sets during the semester. Late submission will be accepted with a 10% penalty for each extra day, up until three days after the deadline.

Midterm Exams: There will be two midterms. The questions on the exams will be based on material from lecture and the homework. It is important that you show all your work on exam problems so that partial credit can be assigned.

Final Exam: The final will be a comprehensive exam covering all the material covered in class and will be given on December 11, 2017 at 3:30 pm. *Final Exam make up will be administered on Thursday, December 21 on the Alternate Final Examinations Day. Students should plan their schedule accordingly.*

Make-up Exams: If you contact me BEFORE missing a scheduled exam and you provide acceptable documentation about why you will miss the exam, you may take a make-up exam. The

content of the make-up exam will be different from and possibly harder than the original exam. If you do not contact me within one week of the original exam date and provide acceptable documentation, I will record a grade of 0 for you for the exam.

Grading:

Homework	30%
Exams	40%
Final Exam	30%

Grade	Cumulative Score	Grade	Cumulative Score
A+	90-100	C	63-66.9
A	85-89.9	C-	60-62.9
A-	80-84.9	D+	57-59.9
B+	77-79.9	D	53-56.9
B	73-76.9	D-	50-52.9
B-	70-72.9	F	0-49.9
C+	67-69.9		

Policies: All electronic devices with the exception of your wrist-watch must be turned off and stowed during the entire duration of the lecture and lab hours. If you want to take notes on a tablet, please check with me first.

If you need to have your cell phone on for some reason (such as a sick family member), please let me know and keep the phone on vibrate.

Disability Services: Participants with various documented disabilities attend University with success. Student Disability Services (SDS) provides a variety of services and supports to students with documented disabilities (including: learning disabilities, attention deficit/hyperactivity disorder, acquired brain injuries, vision, hearing and mobility impairments, chronic medical conditions and psychiatric issues), who have registered with SDS.

If you have, or think you may have a disability, you may wish to visit SDS to learn how best to meet your academic goals. The SDS office is located in Room 117, Dillon Hall, contact number (519) 253-3000 ext. 3288 or online at www.uwindsor.ca/disability.

Academic Honesty: All work submitted for evaluation should be your own, and cannot have been submitted for a different course. You are not allowed to copy any material (homework, formula sheets, lab reports, etc.) from anyone - your classmates, previous students, or from outside the university. If you find a problem has been worked out somewhere – say in another textbook, you may reproduce the solution provided that the solution is correct and complete (justify), and you provide the attribution.

There will be a zero-tolerance policy towards plagiarism, and the policies outlined in the Undergraduate calendar will be strictly followed. Not knowing or unintentional copying is not an acceptable excuse. If you do not know, or are uncertain about what constitutes plagiarism, feel free to ask.

Course Evaluation: SET forms will be administered in the last two weeks of class. An informal survey will be conducted after the first month where you can provide feedback regarding making the class more exciting and engaging.

Tentative Schedule

Date	Exam & Homework	Topics
September 7		Coordinate Transformations
12 14	HW-1 (12 Sept-21 Sept)	Lorentz Transformation Curvilinear coordinates
19 21	HW-2 (21 Sept-28 Sept)	Vector Space
26 28		Ordinary Differential Equations (ODE)
October 3 5	Midterm 1 HW-3 (5 Oct-19 Oct)	Bessel Function
Break		***Study week and Thanksgiving***
17 19	HW-4 (19 Oct-31 Oct)	Partial Differential Equations (PDE)
24 26		Fourier Transformation
31 November 2	HW-5 (31 Oct-14 Nov)	
7 9	Midterm 2	Complex Variables
14 16	HW-6 (14 Nov-23 Nov)	
21 23		Symmetry in Physics
28 30		Physics from the first principle. Basics Cosmology
December 5		TBD
Friday December 11 3:30pm		**Final Exam** **Room: TBA**

Schedule Card for Fall 2017

Hour	Monday	Tuesday	Wednesday	Thursday	Friday
10:00-11:20		463-Special Topics in Physics 365 Dillon		463-Special Topics in Physics 365 Dillon	
10:30-11:20	350-Mechanics 288-1 Essex		350-Mechanics 288-1 Essex		350-Mechanics 288-1 Essex
11:30-12:30		Office Hour 289-1Essex		Office Hour 289-1Essex	
12:30-1:20	484/584-Laser 288-1Essex		484/584-Laser 288-1 Essex		484/584-Laser 288-1 Essex
1:30-2:20					350-Tutorial 2137 Erie
2:30-3:20	Office Hour 289-1Essex		Office Hour 289-1 Essex		Office Hour 289-1 Essex
3:20-4:20					
4:20-5:00					