

**PHYSICS 650**  
**ELECTRODYNAMICS I**

FALL 2019 / Monday, August 26 – Friday, December 20

Last Day of Instruction: Thursday, December 12

Watanabe Hall 417A / MWF, 9:30 AM - 10:20 AM

**Instructor**

Dr. Chester Vause

Professor, Department of Physics & Astronomy

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Office Hours: After class or by appointment.

**Prerequisites (UHM Catalog)**

Physics 450, and Physics 600 (or concurrent), or Math 402

**Textbooks (Physics 650-651)**

“The Classical Theory of Fields” (4<sup>th</sup> revised English ed.) Course of Theoretical Physics, Volume 2, L. D. Landau and E. M. Lifshitz (Pergamon Press, Oxford, 1975)

“Electrodynamics of Continuous Media” Course of Theoretical Physics, Volume 8, L. D. Landau and E. M. Lifshitz (Pergamon Press, Oxford, 1984, 2<sup>nd</sup> ed. revised and enlarged English ed. by E. M. Lifshitz and L. P. Pitaevskii)

[recommended]

**Student Learning Outcomes (Physics 650-651)**

Among the student learning outcomes of this course are the abilities to:

- (a) Understand the Principle of Relativity, and the use of tensor analysis methods to formulate geometric concepts in Einstein’s formulation of Special Relativity
- (b) Present the electrodynamics of charged point particles as a classical relativistic field theory.
- (c) Formulate the fundamental principles of electrodynamics as a branch of classical mechanics in terms of the Principle of Least-Action, the Lagrangian, Hamiltonian, and covariant formulations.
- (d) Study of static and time-dependent applications of electrodynamics of point particles, electromagnetic waves, radiation of charged particles.
- (e) Provide the formulation of macroscopic electrodynamics using the principles of thermodynamics. Statics, dynamics, and phenomenological constitutive relations of macroscopic bodies (metals, insulators, superconductors).

**Exams**

Exams are either take-home (details decided upon assignment) or in-class closed-book, two student-generated note pages per new material (2 for Exam 1, 4 for Exam 2, 6 for Final Exam). In either case, scientific calculator, only. No internet devices or electronic storage media.

Exam dates are:

Exam 1	Friday October 4, 2019
Exam 2	Friday November 8, 2019
Final Exam	Friday December 20, 2019, 9:45AM-11:45AM

Each Exam (including the Final Exam) is based on material covered since the previous Exam. Each Exam is worth 1/3 of the final grade total score:

$$\text{TOTAL SCORE}(\%) = (\text{EX1}(\%) + \text{EX2}(\%) + \text{FNL}(\%)) / 3$$

### Grade Scale

Letter grade is determined from the total score according to the following scale:

A- (86%-90%)	A (91%-95%)	A+ (96%-100%)
B- (61%-70%)	B (71%-80%)	B+ (81%-85%)
C- (31%-40%)	C (41%-50%)	C+ (51%-60%)
	F (0%-20%)	D (21%-30%)

*NO INCOMPLETE GRADE GIVEN*

### NOTICE

Be prepared to take the tests in-class as assigned. This is not negotiable. If you have time conflicts, decide if this course is your first priority. I do not “work around” student’s personal plans (travel and otherwise) and schedules.

This course is a lecture format. If you come to class, plan to stay. Excessive coming and going will not be tolerated. If you are late, enter quietly through the back door. Do not disturb the class.

No electronic recording and no electronic storage of any kind of lectures and lecture board writing.

No internet devices (electronic smart phones, pads/tablets, computers, etc.). Turn off your wireless telephones, etc., and PUT THESE AWAY. Do not attend to these during class (no texting, etc.) as such behavior is distracting to the instructor and your classmates.