

Coordinates on Manifolds

PHY 460.001 Research in Physics --- Fall 2013 Syllabus

Physics Department --- Mercer University

Text: none, **Class Meetings:** TR 4-5pm, SEB 205
Instructor: Dr. Jose L. Balduz Jr, **email:** balduz_jl@mercer.edu, **phone:** 478- 301-2229
Office hours: MWRF 3-4pm, or by appointment (try email)...

In this course the student(s) will conduct independent research in theoretical physics. It is intended for physics majors in their junior or senior year, but some mathematics or engineering students might also be interested. The work involves both analytical and numerical calculations in an effort to understand how the definition of a manifold, in terms of coordinate patches, can be illustrated by direct example. The course prerequisites are PHY 161/162 General Physics I&II, PHY 305/306 Modern Physics I&II, MAT 191/192 Calculus I&II, MAT 293 Multivariable Calculus, MAT 330 Introduction to Differential Equations, and MAT 340 Linear Algebra.

Meetings: Although there will be no formal lectures in this course, the student and instructor will meet regularly, for about an hour twice a week. During these times we will discuss the conceptual basis of the ongoing work, as well as the details of its execution and the results. Related work by other researchers will also be discussed to provide sufficient background. It is imperative that the student be adequately prepared for each meeting, by means of continuous steady progress in the research work.

After each meeting the instructor will assign a grade to the student for that meeting, ranging from zero to ten. If the student failed to show up without proper excuse, or was completely unprepared, the grade will be a zero. If the student made satisfactory progress since the previous meeting, the grade will be a ten. Partial results will yield a grade somewhere in between. However, it will be permissible for the student to cancel up to two meetings without explanation. The overall meetings grade will be determined as a percentage of the maximum possible grade; it will be worth 20% of the total grade.

Paper: The student will produce a paper (in electronic but printable form) of sufficient length describing the results of the research work. This will include the following: a discussion of conceptual basis and goals of the research, a description of the means chosen to achieve the goals, the results of the calculations, and a discussion that includes interpretation of results and possible avenues for future work. It must be presented to the instructor no later than Monday, December 9. It will be worth 80% of the total grade.

Grading: Given the final percent grade, the final letter grade will be determined as follows: 90+ A, 85+ B+, 80+ B, 75+ C+, 70+ C, 60+ D, below 60 F.

Miscellaneous policies:

The College of Liberal Arts' academic misconduct policy will be followed. In addition, all students are bound by the Mercer University Honor Code.

Students requiring accommodations for a disability should inform the instructor at the close of the first class meeting or as soon as possible. The instructor will refer you to the ACCESS and Accommodation Office to document your disability, determine eligibility for accommodations under the ADA/Section 504 and to request a Faculty Accommodation Form. Disability accommodations or status will not be indicated on academic transcripts. In order to receive accommodations in a class, students with sensory, learning, psychological, physical or medical disabilities must provide their instructor with a Faculty Accommodation Form to sign. Students must return the signed form to the ACCESS Coordinator. A new form must be requested each semester. Students with a history of a disability, perceived as having a disability or with a current disability who do not wish to use academic accommodations are also strongly encouraged to register with the ACCESS and Accommodation Office and request a Faculty Accommodation Form each semester. For further information, please contact Carole Burrowbridge, Director and ADA/504 Coordinator, at 301-2778 or visit the ACCESS and Accommodation Office website at <http://www.mercer.edu/disabilityservices>.