Syllabus Subject to Modification

SYLLABUS
PHYS. 3310.001
Methods of Theoretical Physics

Dr. Sandra Quintanilla
Fall 2017
Lecture: MWF 11:00 – 11:50 a.m
Physics Building Room 112
Recitation: M 12:00 – 12:50 p.m
Physics Building Room 112

Office: Phys. 309
email: squintanilla@unt.edu
Phone 565-4739
Office hours: W 12.00 -12.30 p.m.
F: 12:30-2:00 p.m.
or by appointment

Prerequisite(s): Phys. 2220 and Math. 1720.

Recommended:

Phys. 2700: Linear Algebra and Vector Geometry
Phys. 3410 Differential Equations I

Text: *Essential Mathematical Methods for Physicists*, Hans J. Weber and George B. Arfken, Elsevier, Academic Press, 2004, ISBN: 0-12-059877-9

Recommended Books:

- *Mathematical Methods in the Physical Sciences*, Mary L. Boas, John Wiley & Sons
- *Introduction to Electrodynamics*, David J. Griffiths, 3^{rd} Edition, Prentice Hall.
- *Mathematical Methods for Physics and Engineering*, A comprehensive guide, K. F. Riley, M. P. Hobson and S. J. Bence, Cambridge University Press.
- *Mathematical Methods for Physicists*, George B. Arfken and Hans. J. Weber, 6^{th} Edition, Elsevier, Academic Press.
- *Mathematical Methods for Physicists*, George B. Arfken and Hans. J. Weber, 6^{th} Edition, Elsevier, Academic Press.
- *Mathematics for Physical Science and Engineering, Symbolic Computing Applications in Maple and Mathematica*, Franck E. Harris, Elsevier,2014, ISBN: 978-0-12-8010000-6

Background reading for Vector Analysis:

- *Vector Analysis*, Murray R. Spiegel, Schaum's Outline Series, McGraw-Hill, Inc. New York, St. Louis, San Francisco, Auckland, Bogotá, Caracas, Lisbon, London, Madrid, Mexico City, Milan, Montreal, New Delhi, San Juan, Singapore, Sydney, Tokyo, Toronto, 29th printing, 1993.
- *Vector Analysis for Mathematicians, Scientists and Engineers*, S. Simons, 2^{nd} Edition, Pergamon Press.
- *Vector and Tensor Analysis with Applications*, A. I. Borisenko and I. E. Tarapov, Revised English Edition, Translated and Edited by Richard A. Silverman, Dover Publications, Inc., New York, 1968.
- *Introduction to Vector Analysis*, J. C. Tallack, Cambridge University Press, Cambridge, London, New York, New Rochelle, Melbourne, Sydney, 1970.

Mathematical Reference Books:

- *NIST Handbook of Mathematical Functions*, Cambridge University Press, Academic and Professional Books, Edited by: Frank W. J. Olver, Daniel W. Lozier, Ronald F. Boisvert, Charles Clark. http://dlmf.nist.gov/
- *Tables on Integrals and Other Mathematical Data*, H. R. Dwight, MacMillan Publishing Co., Inc., New York.
- *Tables of Integrals, Series, and Products*, I. S. Gradshteyn and I. M. Ryzhik, Academic Press, New York, London, Toronto, Sydney, San Francisco, 1980.
- *Mathematical Handbook of formulas and tables*, Murray R. Spiegel, Schaum's Outline Series, McGraw-Hill Book Compant, New York, St. Louis, San Francisco, Toronto, Sydney, 1968.

Course Content: 3 hours Application of advanced mathematical techniques to the solution of problems in physics. Vector spaces, complex analysis, matrices, linear transformations, vector calculus, Fourier series and integrals, the Laplace transformation, and special functions.

Course Objectives: To learn from this course, and other mathematics courses, mathematical tools that are needed in the upper-division physics courses. To learn techniques for orthogonal polynomials.

Exams: There are three term exams and one final exam. Exams will be based on the text readings, any other assigned readings, class lectures, homework and any additional material given. The plan is to give the term exams on Mondays during the class and recitation periods. Exams are given during class periods. Closed book exams. Calculators can not be used in exams. No make-up exams given in general.

Homework: In general, homework is given weekly. No-late homework accepted unless permission given by instructor under special circumstances as determined by the instructor. For homework assignments, please see blackboard.

Blackboard: Please check blackboard daily M-F for possible handouts and announcements.

Reading: Read appropriate sections of the book before class. Read from additional material when and if suggested.

Quizzes: Quizzes may be given in recitation.

Attendance: Required.

Grading:

Three unit exam average	60%	A: 90-100
Homework	15%	B: 80-89
Comprehensive final	25%	C: 70-79
	100%	D 60 -69
		F: < 60

Additional Policies and Procedures:
Cell Phones: Please remember to turn off phones prior to class and recitation, other than when taking SPOT evaluations if done in class or recitation.
Extra Help: If you are having trouble with this class, please come by my office during office hours or make an appointment to see me. I am also available by email at squintanilla@unt.edu.

UNTs policy on Academic Dishonesty can be found at:
http://www.vpaa.unt.edu/academic-integrity.htm

Drop information is available in the schedule of classes at:
http://essc.unt.edu/registrar/schedule/scheduleclass.html

The Student Perceptions of Teaching (SPOT) is a requirement for organized classes at UNT. This survey should be made available to you on-line at the end of the semester and should provide you with an opportunity to provide feedback to your course instructor. For the Fall 2016 semester you should receive an email on November 21st from "UNT SPOT Course Evaluations via IASystem Notification" (no-reply@iasystem.org) with the survey link. Please look for the email in your UNT email inbox.
Fall 2016 SPOT Administration Dates: November 21 - December 8
Please see the webpage https://spot.unt.edu/

Addendum to Course Syllabus (Adapted)
The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time, however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information see the Office of Disability Accommodation website at http://www.unt.edu/oda. You may also contact them by phone at 940.565.4323.

In attachment of an email by the Physics Dept. Main Office.
The University of North Texas is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112 The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act (ADA), pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

1-1	M	Aug. 28	Chp. 1	Vector Analysis
1-2	W	Aug. 30	Chp. 1	Vector Analysis
1-3	F	Sept. 1	Chp. 1	Vector Analysis
2	M	Sept. 4		Labor Day
2-4	W	Sept. 6	Chp. 1	Vector Analysis
2-5	F	Sept. 8	Chp. 1	Vector Analysis
3-6	M	Sept. 11	Ch. 1	Vector Analyis
3-7	W	Sept. 13	Chp. 1	Vector Analysis
3-8	F	Sept. 15	Chp. 1	Vector Analysis
4-9	M	Sept. 18	Chp. 1	Vector Analysis
4-10	W	Sept. 20	Chp. 1	Vector Analysis
4-11	F	Sept. 22	Chp. 2	Vector Analysis in Curved Coordinates
5-12	M	Sept. 25	Chp. 2	Vector Analysis in Curved Coordinates
5-13	W	Sept. 27	Chp. 2	Vector Analysis in Curved Coordinates
5-14	F	Sept. 29	Chp. 2	Vector Analysis in Curved Coordinates
6-15	M	Oct. 2	**Exam I**	Chps. 1 &2
6-16	W	Oct. 4	Chp. 2	Vector Analysis in Curved Coordinates
6-17	F	Oct. 6	Chp. 2	Vector Analysis in Curved Coordinates
7-18	M	Oct. 9	Chp. 2	Vector Analysis in Curved Coordinates
7-19	W	Oct. 11	Chp. 2	Vector Analysis in Curved Coordinates
7-20	F	Oct. 13	Chp. 3	Determinants and Matrices
8-21	M	Oct. 16	Chp. 3	Determinants and Matrices
8-22	W	Oct. 18	Chp. 3	Determinants and Matrices
8-23	F	Oct. 20	Chp. 3	Determinants and Matrices
9-24	M	Oct. 23	Chp. 3	Determinants and Matrices
9-25	W	Oct. 25	Chp. 3	Determinants and Matrices
9-26	F	Oct. 27	Chp. 14	Fourier Series

10-26	M	Oct. 30	Chp. 14	Fourier Series
10-27	W	Nov. 1	Chp. 14	Fourier Series
10-28	F	Nov. 3	Chp. 14	Fourier Series
11-29	M	Nov. 6	**Exam II**	Chps. 2, 3 & 14
11-30	W	Nov. 8	Chp. 14	Fourier Series
11-31	F	Nov. 10	Chp. 14	Legendre Polynomials
12-32	M	Nov. 13	Chp. 11	Legendre Polynomials
12-33	W	Nov. 15	Chp. 11	Legendre Polynomials
12-34	F	Nov. 17	Chp. 11	Legendre Polynomials
13-35	M	Nov. 20	Chp. 11	Legendre Polynomials
13-36	W	Nov. 22	Chp. 15	Integral Tranforms
13	F	Nov. 24	Thanksgiving Break	
14-37	M	Nov. 27	**Exam III**	Chps. 11 & 15
14-38	W	Nov. 29	Chp. 15	Integral Transforms
14-39	F	Dec. 1	Chp. 15	Integral Transforms
15-40	M	Dec 4	Chp. 6	Functions of Complex Variables I
15-41	W	Dec. 6	Review	
	M	Dec. 11	Final exam	10:30 a.m - 12:30 p.m.