

Policy about course outlines can be found in Section 23.4 (2) of the University Calendar

University of Alberta

PHYS 590 Particle Physics II Section B01 Winter Term 2009

Instructor: Prof. Doug Gingrich
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Office Hours: 2:00-3:00 Tuesdays and 3:30-4:00 Wednesday; or by appointment; or take a chance and drop-in if my door is open (do not knock if closed)

Lecture Room & Time: CEB 5-36, 9:00-10:20 Tuesdays and Thursdays

Course Description: Field theory and symmetries; gauge theories; spontaneous symmetry breaking; electroweak interactions of quarks and leptons; quantum chromodynamics; unified theories.

Course Objectives: Know how to apply advanced quantum mechanics to particle physics problems; have a full exposure to the Standard Model in a basic form; have a feeling for what it might be like to do research in particle physics.

Key to Success: Attend classes; do problem sets; read textbook.

Lecture Schedule & Assigned Readings: Please read Chapter 1 and Appendix A on your own.

Week	Dates	Topic	Readings
1	6 Jan	Lorentz Transformations	Chapter 2
1	8 Jan	Groups of the Standard Model	Appendix B
2	13 Jan	Groups of the Standard Model	Appendix B
2	15 Jan	Lagrangian Formulation	Chapter 3
3	20 Jan	Lagrangian Formulation	Chapter 3
3	22 Jan	Classical Electromagnetism	Chapter 4
4	27 Jan	Classical Electromagnetism	Chapter 4
4	29 Jan	Dirac Equation	Chapter 5
5	3 Feb	Dirac Equation	Chapter 5
5	5 Feb	Free Space Solutions	Chapter 6
6	10 Feb	Free Space Solutions	Chapter 6
6	12 Feb	Electrodynamics	Chapter 7
7	17 Feb	<i>Reading Week</i>	
7	19 Feb	<i>Reading Week</i>	

8	24 Feb	Electrodynamics	Chapter 7
8	26 Feb	Quantising Fields: QED	Chapter 8
9	3 Mar	Quantising Fields: QED	Chapter 8
9	5 Mar	Symmetry Breaking	Chapter 10
10	10 Mar	Massive Gauge Fields	Chapter 11
10	12 Mar	Massive Gauge Fields	Chapter 11
11	17 Mar	Electroweak Theory for Leptons	Chapter 12
11	19 Mar	Electroweak Theory for Leptons	Chapter 12
12	24 Mar	Interactions of Quarks	Chapter 14
12	26 Mar	Interactions of Quarks	Chapter 14
13	31 Mar	QCD	Chapter 16
13	2 Apr	Neutrino Masses and Misinbg	Chapter 19
14	7 Apr	Majorana Neutrinos	Chapter 21

Required Textbook: “An Introduction to the Standard Model of Particle Physics”, W.N Cottingham and D.A. Greenwood, Cambridge, ISBN-13 978-0-521-85249-4 (note: second edition is required)

Recommended or Optional Learning Resources: See course website.

Grade Evaluation: A distribution system will be used; the grades will be scaled following the University recommended distribution of grades.

<u>EXAMS</u>	<u>WEIGHTING</u>	<u>DATE</u>
Problem Sets	100%	

Assigned Problems Sets: Reasonable due dates will be set at the time the problems are assigned. Late submissions will not be accepted Please put them in the box that is marked PHYS 590 in the entrance to the Centre for Particle Physics (CEB 4-45) or hand them to me in class.

Missed Assignments: A student who cannot complete a term assignment because of an incapacitating illness, severe domestic affliction or other compelling reasons can apply for extension of time to complete an assignment. Applications for a deferral of term work worth greater than 20% of the final grade must be made to the professor within 48 hours of the missed exam or assignment due date and must be supported by a completed University of Alberta Medical Statement Form or other appropriate documentation (Calendar section 23.4[3]). Deferred of term work is a privilege and not a right; there is no guarantee that a deferral will be granted. Misrepresentation of Facts to gain a deferral is a serious breach of the *Code of Student Behaviour*.

Student Responsibilities:

ACADEMIC INTEGRITY: *The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at*

www.ualberta.ca/secretariat/appeals.htm) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

All forms of dishonesty are unacceptable at the University. Cheating, plagiarism and misrepresentation of facts are serious offenses. Anyone who engages in these practices will receive at minimum a grade of zero for the exam or paper in question and no opportunity will be given to replace the grade or redistribute the weights. Any offense will be reported to the Senior Associate Dean of Science who will determine the disciplinary action to be taken. Typical sanctions for serious violations of the Code have included disciplinary grade reductions, disciplinary failing grades, suspension or permanent expulsion from the University.

CELL PHONES: Cell phones are to be turned off during lectures.

STUDENTS WITH DISABILITIES: Students who require accommodation in this course due to a disability are advised to discuss their needs with Specialized Support & Disability Services (2-800 Students' Union Building).

ACADEMIC SUPPORT CENTRE: Students who require additional help in developing strategies for better time management, study skills or examination skills should contact the Academic Support Centre (2-703 Students' Union Building).

Policy about course outlines can be found in section 23.4(2) of the University Calendar. **Disclaimer:** Any typographical errors in this Course Outline are subject to change and will be announced in class. The date of the final examination is set by the Registrar and takes precedence over the final examination date reported in this syllabus.

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