SYLLABUS

COLLEGE NAME: SCIENCE AND MATHEMATICS
SCHOOL OR DEPARTMENT: PHYSICS
PHYS 3110: COURSE TITLE: DIRECTED METHODS
ACADEMIC TERM: SPRING 2020

Course Information

Class meeting time: Friday, 11:30AM-12:30PM
Modality and Location: Face to Face course; Kennesaw Campus, Room 363, 3rd floor Science Bldg.
Syllabus is posted in D2L

Instructor Information

Name: Marco Guzzi, Ph.D.
Email: mguzzi@kennesaw.edu
Office Location: Kennesaw Campus, Room SC436 (4th floor Science Bldg).
Office phone: +1 470 578 4783
Office Hours: by appointment
Preferred method of communication: email

Course Description

1 Class Hours, 1 Credit Hours
Prerequisite: Grades of "C" or better in PHYS 2211 and PHYS 2211L and permission of instructor.
This course will introduce students to elementary particles and their interactions.
Students will learn about particle reactions and basics of hadron collider phenomenology.
In particular, they will familiarize with the Physics of the Standard Model of elementary particles and learn about the quantum theory of electrodynamics, quantum theory of the strong and weak interactions. Students will be exposed to research methodologies through direct involvement in a faculty-led research project.

Course Materials

Textbook: ``Introduction to Elementary particles'', Author: David Griffiths, Editor: WILEY-VCH
All directed method/research course materials will be provided by the instructor.

Learning Outcomes

After completing PHYS 3110, Directed Methods, students will be able to:
- Describe fundamental interactions between particles quantitatively
- Represent and calculate physical processes using Feynman diagrams.
- Explain the particle content of the Standard Model of Particle Physics.
- Calculate basic reactions at particle colliders.

Course Requirements and Assignments

Reading and homework problems will be assigned by the instructor on a weekly basis. Students will carry out a research project directly connected to the faculty-led research.

All students will give an oral presentation in which they will present their undergraduate research work.

Evaluation and Grading Policies

Students must maintain a logbook of activities. The final grade for this class is made up of the following components:

- Accomplishment of at least 70% of the assigned reading and homework.
- Accomplishment of the research project.

Grading Scale
S-Satisfactory >70%
U-Unsatisfactory <70%

Course Policies

Students are expected to attend all lectures, finish all the assignments by the established due date, and accomplish the research project.

Students are expected to follow the academic honesty guidelines given below which is provided by KSU. Students should familiarize with these rules especially plagiarism and cheating and destruction of library materials. Failure to follow these guidelines at a minimum will result in a failing grade for the course.

Institutional Policies

Federal, BOR, & KSU Course Syllabus Policies:
http://curriculum.kennesaw.edu/resources/federal_bor_ksu_student_policies.php

Student Resources:
http://curriculum.kennesaw.edu/resources/ksu_student_resources_for_course_syllabus.php

Academic Integrity Statement:
http://scai.kennesaw.edu/codes.php

KSU Student Resources

This link contains information on help and resources available to students:
https://curriculum.kennesaw.edu/resources/ksu_student_resources_for_course_syllabus.php

Tentative Course Schedule

Week 1: Overview of elementary particles and reactions
Week 2: Elementary particle dynamics
Week 3: Relativistic kinematic
Week 4: Symmetries
Week 5: bound states
Week 6: Feynman calculus
Week 7: Quantum Electrodynamics
Week 8: Quantum Chromodynamics
Week 9: Weak Interactions
Week 10: Gauge theories
Week 11: Neutrino oscillations
Week 12: Cross section calculation for elementary processes
Week 13: The Higgs boson
Week 14-15: Higgs production at hadron colliders