Undergraduate Seminar

Physics (PHY) 3/4930 (1 credit)
Time and Location TBA

Course Web Site TBA

Instructor

TBA

Thishis course is designed to help undergraduate physics majors develop research and professional skills they will need for careers either inside or outside academia. This semester's course will focus on professional development, especially resumé writing and the application process for jobs and/or graduate schools, as well basic scientific computing skills. It will also feature several presentations of ongoing research by members of the faculty of the Department of Physics. A detailed list of topics to be covered is included below.

Prerequisites and Curricular Information

This course is intended primarily for third- and fourth-year undergraduate physics majors who have begun upper-division coursework. The prerequisites are the most advanced lower-division physics and math courses required in the degree program, namely General Physics II (PHY 2049) and Calculus with Analytic Geometry III (MAC 2313). Students in other programs are welcome to enroll if they meet these criteria.

The course is offered in two variants, PHY 3930 and PHY 4930, which are intended for third-year and fourth-year majors, respectively. Students in the fourth-year variant are expected to work with and guide third-year students on in-class collaborative assignments.

Course Schedule

Note: This is a draft syllabus. It be finalized when particular faculty are assigned to teach the course. The assigned instructor will choose the subject of the unit on scientific computing; two alternatives are presented here, only one of which would actually be covered in any given year. The assigned instructor will also finalize the order in which these units is covered, and schedule specific faculty presentations of undergraduate research opportunities.

The course consists of fifteen one-hour seminar-style meetings. Each will be followed immediately by an additional hour of time to work on in-class and other course assignments. A brief schedule and outline of the course is as follows:

- Introduction to the LaTeX Typesetting System (3 weeks)
  - ‣ Week 1: Setting up LaTeX and creating documents
  - ‣ Week 2: Mathematical formulae in LaTeX
  - ‣ Week 3: Figures, tables, and customization
- Preparing a Resumé and the Application Process (3 weeks)
  - ‣ Week 1: Components of a resumé
  - ‣ Week 2: Identifying and applying for positions
  - ‣ Week 3: Resumé workshop

- Elements of Scientific Computing[1]   Getting Started in Numerical Methods (5 weeks)
    - ‣ Week 1: Setting up a compiler
    - ‣ Week 2: Creating and compiling programs
    - ‣ Week 3: Elementary programming methods
    - ‣ Week 4: Numerical solution of simple problems
    - ‣ Week 5: Analysis and visualization of numerical output
- (Alternate) Elements of Scientific Computing   MatLab for Physicists (5 weeks)
    - ‣ Week 1: MatLab as a programming language
    - ‣ Week 2: Creating graphics with MatLab
    - ‣ Week 3: Systems of algebraic and ordinary differential equations
    - ‣ Week 4: Partial differential equations
    - ‣ Week 5: Advanced graphics
- Faculty Research Presentations (4 weeks)
    - ‣ Exact titles and schedule to be announced.

Course Objectives and Outcomes

Students enrolled in this course will develop some basic understanding of how to

- prepare a scientific manuscript using the LaTeX typesetting system,
- find and apply for scientific internships, graduate schools, or jobs after graduation,
- apply simple numerical methods to physics problems, and
- identify interesting undergraduate research opportunities within the Department.

Obviously, a course this length cannot treat all of these topics exhaustively. Accordingly, the goal of the course is to offer a brief introduction to each. The idea is to overcome any initial hurdles, so that students will feel comfortable developing his or her expertise further in whichever directions are most pertinent to them individually.

Recommended Reading

There is no required reading for this course. Please see the course web site for a complete list of recommended resources for each topic we will cover.

Note: The course web site has not been posted yet. It will include links to online resources for each topic covered in the course, electronic slides from professors' research presentations, and recommendations of resources for further study.

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[1] The specific subject of this portion of the course will vary from year to year, depending on the faculty assigned to teach the course. This preliminary draft syllabus presents two possible units on scientific computing, one on the basics of C coding and another on MatLab.

Grading and Related Policies

Students' overall performance in this course will be graded either Satisfactory or Unsatisfactory. Grades will be based on the following criteria, each of which carries roughly equal weight:

- Each student must complete **all** in-class assignments. These will be short, requiring roughly one hour per week of time outside the normal class period.
- Each student will prepare a draft resume or CV, which will be graded satisfactory or unsatisfactory by the course instructor.
- Each student will prepare a simple numerical code and demonstrate how to compile and execute it. The instructor will grade this satisfactory or unsatisfactory.
- The instructor will assess each student's participation in the course and, for students in PHY 4930, engagement in mentoring students in PHY 3930. This assessment will be based, in part, on self- and peer-evaluation forms completed by the students themselves near the end of the semester.

Overall grades in this course are Boolean (*i.e.*, Satisfactory or Unsatisfactory), so it seems appropriate to set certain minimum standards necessary to pass. The four specific policies seem a little harsh when written up like this, but really they just come down to: do your own work, don't copy, turn it in on time, and be nice. That's simple enough, no?

Late and Incomplete Assignment Policies

Failure to complete more than 30% of the in-class assignments will result in an Unsatisfactory grade for the course overall. In-class assignments submitted more than two weeks after they were assigned will be considered incomplete.

Failure to produce either a draft resumé or a sample numerical code will result in an Unsatisfactory grade for the course overall. The due dates for these major assignments are listed below in the Important Dates section of this Syllabus. Late work will not be accepted.

No Extra Credit or Make-Up Policy

No additional credit will be offered to make up for incomplete or otherwise insufficient work on either in-class or major assignments.

Classroom Etiquette Policy

This is a seminar course, and maintaining an open and intellectually vigorous dialog among all involved is essential to its success. Needless to say, disruptive or demeaning behavior will not be tolerated. Any student who chooses to engage in such behavior will be asked to leave the class, and of course this will adversely affect his or her overall grade. Any *repetition* of such behavior will result in an automatic Unsatisfactory grade for the course overall.

Collaboration on Assigned Coursework

FAU's Code of Academic Integrity defined plagiarism as any of the following:

- The presentation of words from any other source or another person as one's own without proper quotation and citation.
- Putting someone else's ideas or facts into your own words (paraphrasing) without proper citation.
- Turning in someone else's work as one's own, including the buying and selling of term papers or assignments.

Plagiarism is not allowed in this course. While students are certainly allowed, and indeed encouraged, to discuss course assignments with one another, each student is expected to prepare the final version of his or her own work for submission. Any evidence of copying whether from present or past students in this course or from other sources will result in a grade of Unsatisfactory for **all** students involved, as well as possible formal action within the University.

Important Dates

- TBA   Draft Resumé Due
- TBA   Working Code Sample Due
- TBA   In-Class Self-, Peer-, and Instructor-Evaluation

Students with Disabilities

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in

Boca Raton — SU 133 (561.297.3880), in
Davie — MOD I (954.236.1222), in
Jupiter — SR 117 (561.799.8585), or at the
Treasure Coast — CO 128 (772-873-3305),

and follow all OSD procedures.

Honor Code

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see the Code of Academic Integrity in the University Regulations at

http://www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf.