

Introduction to Programming and Computing for Scientists

Introductory meeting

DIVISION OF PARTICLE PHYSICS (www.hep.lu.se)

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Introductory meeting outline

1. Learning outcomes
2. Required knowledge
3. Course plan and schedule
4. Assessment (projects)
5. Course literature
6. Conclusion

1. Learning outcomes

- Knowledge of computing and programming is **essential** in physics, astronomy and other sciences
- Acquired knowledge and understanding:
 - Understanding and use of the concept of program libraries
 - Knowledge of processing, analysing and modelling scientific data using custom software
 - Basic understanding of code optimisation issues, implications of machine accuracy
 - Awareness of frameworks that use programmatic interface
- Acquired skills and abilities:
 - Ability to work in UNIX-based operating systems, particularly Linux
 - Ability to write computer programs using C++
 - Ability to compile from source, build and debug computing programs
 - Ability to develop and document program code in a collaborative environment

2. Required knowledge

- The course is aimed towards **beginners** who have little or no knowledge of computers
 - For those who already know programming some parts will still be interesting
- Some essential knowledge is still required:
 - Good knowledge of mathematics, including basic calculus
 - Basic knowledge of statistics is a bonus
 - Good knowledge of English

3. Course plan and schedule

- The course consists of theoretical lectures, practical tutorials and homework
 - Lectures every Wednesday (K262)
 - Tutorials on Thursdays and Fridays, in the “big” computer class (H321)
 - Homework feed-back hours
 - **MAKE SURE** that you have **login** for the computers! (Check with the student administration)
- In total, 7 lectures and 14 tutorials
 - Presented by 5 teachers (best experts!)
 - Plus one week of homework feed-back sessions
- It is important not to miss the tutorials!
- Practical homework will complement the tutorials
 - We will use Lunarc Training Portal <https://training.lunarc.lu.se>

4. Assessment

- Projects will be assigned in order to assess the knowledge at the end of the course
 - Will consist of programming tasks, similar to those performed during the course
 - A project is a team work of 2-3 students
- Students will have to hand in projects in November
- The projects will be evaluated and graded by the course teachers

5. Course literature

- Main material: hand-outs and references therein
 - Referred manuals are available on-line for free
- Official textbook: *“Problem solving with C++”*, W. Savitch, any edition
 - Covers ~50% of the course

6. Conclusion

- The course is still evolving, suggestions for improvements are welcomed!
- We brought our best experts to teach you
- The best result is achieved if you try what you learn at home!
 - Daring students are welcomed to use their notebooks for the tutorials