

<http://www.dur.ac.uk/r.m.potvliege/12computing>

1. Format of the course and assessment

The aim of the course is to introduce you to the development of computer software and to provide you with a working knowledge of Fortran 95.

The approach adopted is open learning: The course is based on a set of printed notes intended for self study. You are invited to progress through them at the pace which suits you best, working when most convenient for you. The course is complemented by three lectures. The lectures will provide both a very simple introduction to Fortran 95, addressed primarily to those who have never programmed before, and a tutorial on the pitfalls of numerical computation and on developing programs.

The course will not be examined formally. However, your proficiency in Fortran 95 will be assessed through various programming exercises. The mark for the course amounts to 20% of the total mark of Module PHYS2551, "Laboratory Skills and Practice". The course mark will be the sum of the marks obtained for a mini-project and two multiple-choice assignments (6% of the course mark), for a programming test (38%), and for a long programming project (56%). You will receive detailed feedback on your mini-project shortly after the deadline for submission. More information about this will be announced in due time. The test will take place at 11 am on Friday November 23. The long project will be set towards the middle of the term. It is due by 5.15 pm on Monday December 10.

The printed notes and accompanying documents can be obtained at the lectures or from the level 2 Lab Technician (room 224).

The course is in six parts:

1. Fortran basics. Examples of simple programs using INTEGER and REAL variables. Integer division. Conversion between variable types. Hierarchy of arithmetic operations. Intrinsic functions. Simple input and output.
2. More advanced input and output.
3. Program control. DO loops and IF statements. Logical operator hierarchy.
4. Arrays. Implied DO loops. Data initialisation.
5. Functions and subroutines.
6. The DO WHILE, CASE, STOP and GO TO statements; internal and external subprograms; modules; complex numbers; kinds; the IOSTAT specifier.

While you are free to study this course at your own pace, it would be a poor idea to wait until the end of the term to start. We suggest that you aim at finishing Parts 1, 2 and 3 and Section 5.1 by the 7th of November and Parts 1 to 5 by the 22nd of November.

You can do the programming exercises proposed in the course using either the University Networked PC Service, the University Unix or Linux Service, or your own computer, at your discretion. The notes contain an introduction to the use of the Salford Fortran package, which is available on the Networked PC Service.

To support you in your study of Fortran, and to complement the printed notes, Dr Potvliege will give three introductory lectures (on the 12th, 19th and 26th of October). The lectures will be devoted both to specific features of Fortran 95 and to general aspects of computer programming and scientific computing. A Fortran Help Desk will be manned in the Physics Department PC Classroom (room 140) from 13.15 to 14.15 on Mondays and from 11.00 to 13.00 on Wednesdays, in weeks 3 to 9. (The Help Desk will be closed in week 6.) Demonstrators present during these times will be happy to answer your questions and help you with debugging your programs. In addition, students experiencing serious difficulties with the course are invited to attend small group tutorials from 11.00 to 12.00 on the 2nd and 16th of November. Appointments with a demonstrator can be made, and places for the tutorials can be booked, via DUO.

Model solutions of the problems proposed in the notes are posted on the web page of the course.

Further information about Fortran and related topics can be found from a variety of sources. For example:

- You can get information sheets from the helpdesk of the IT Services. Of particular relevance to the course are the guides 1 ("An Introduction to Unix", of interest if you wish to learn some Unix — which is entirely optional), 100 ("Using Fortran on the Networked PC service") and 138 ("An introduction to programming in Fortran 90").
- The Salford package contains a help system giving a short description of the features of the languages. To access it, logon on the Networked PC service and click on Start > Programs > Programming Languages > Salford Software > Fortran > FTN95 Help.
- Links to relevant sites and other resources can be found on the web page of the course.

3. The self-study C++ course

Besides the Fortran course, the accompanying worksheets and a quick reference sheet, the course package will also give you a self-study course in C++. Taking this course is entirely voluntary. It will not be assessed and will not be required by any of the Level 3 or 4 Physics modules. The mark for Level 2 computing will be based only on your knowledge of Fortran 95. If you are keen on programming, we encourage you to study C++ once you have finished the Fortran course. (However, the C++ course is self contained and does not assume any experience of Fortran.) A C++ page is linked to the web page of the course.

4. Any suggestions?

Dr Potvliege (R.M.Potvliege@durham.ac.uk) will be very happy to receive suggestions for improving the Fortran course and/or the C++ course.