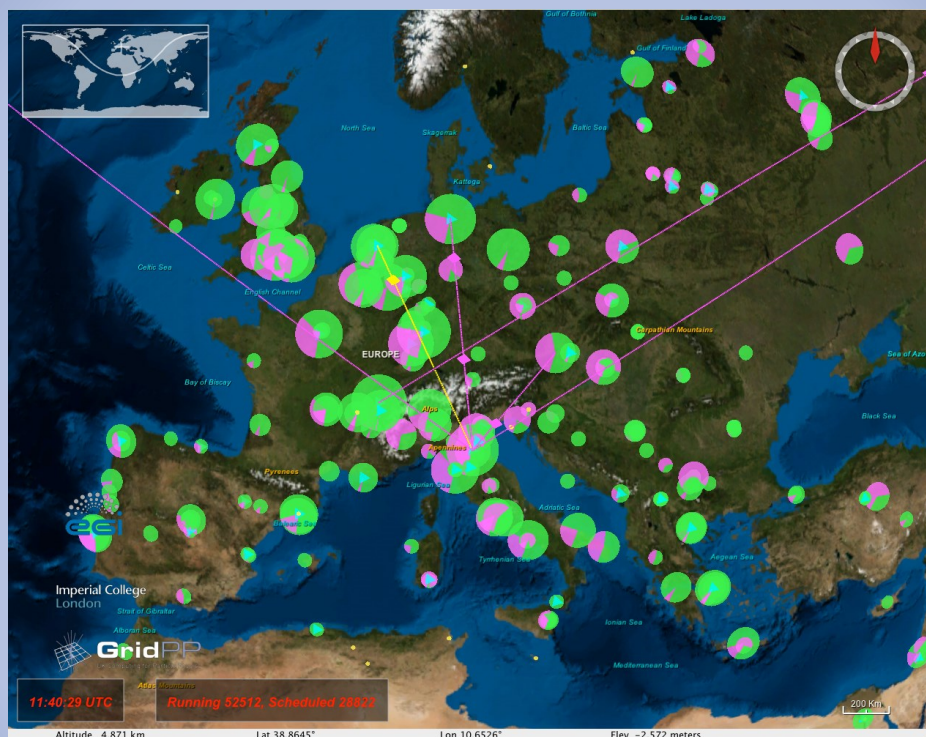




University of Glasgow | School of Physics & Astronomy



P2T C Programming under Linux PHYS2003

Course Information Guide 2023–24

An introduction to C Programming and the Linux Operating System

1 Welcome statement from the Head of School

As the Head of School of Physics and Astronomy, I would like to welcome you to your new class. The School prides itself in providing an excellent and supportive learning and teaching environment that is fully integrated with our research; you will have the opportunity to interact with world-leading researchers working at the cutting edge of a wide range of fields of physics and astronomy, who are tackling some of the biggest contemporary challenges in science and technology.

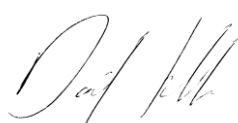
During the pandemic, our staff developed new ways of delivering high quality learning and teaching, and have been working to combine these with our traditional approaches. This is an ongoing process of development, and I ask that you engage with us through any of the available communication channels in letting us know what works and what does not.

One thing that will not change is the School's firm commitment to supporting equally the careers and development of all its students and staff, as exemplified by our receipt of an Athena Swan Silver award. We value the diversity of our student body and recognise that this diversity improves the quality of our work by bringing a wide range of skills and viewpoints. We therefore expect that all staff and students will work productively and professionally together in an atmosphere of mutual respect.

To support this, all our staff and graduate students undertake equality and diversity training, our lab guides include a code of conduct for students, supplementing the University code¹, and we support the University's Dignity at Work and Study policy². You can be assured that any instances of bullying, harassment, or offensive language or behaviour will be both taken seriously by the School and treated with sensitivity. Points of support for students are your adviser of studies, your Class Head and Lab Head, and in addition the School has two appointed Equality and Diversity offices, to whom students may speak in confidence.

I wish you success with your current and future studies

Best wishes



Professor David Ireland
Head of School

¹ <https://www.gla.ac.uk/myglasgow/senateoffice/studentcodes/studentconductstaff/>

² <https://www.gla.ac.uk/myglasgow/humanresources/equalitydiversity/dignityworkstudyover/>

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2 General information and timetable

Fast Facts	
Course title	P2T: C Programming under Linux
Course Credits	10 Credits
Semesters taught	Semester 2
Essential Prerequisites	40 credits at Level 1 with grade point average of at least 10
Co-requisites	None
Important dates	Introduction lecture: Tuesday 9 th January at 2 pm
Lectures	Tuesdays and Thursdays at 2 pm, starting Tuesday 9th January No lectures during mid-course break (13 th and 15 th February)
Laboratories	Monday, Wednesday or Friday, 2 pm – 5 pm, beginning Wednesday of week 2 (17th January)
Q&A Sessions	Q&A sessions will be held during the lecture slots on 15 th February and 21 st March
Exam Workshop	Work-through of a previous year's exam on 14 th March
Class Exam	Mandatory 1-hour practical test on 19 th March Mandatory 1-hour written exam paper in April / May
Key Personnel	
Class head and C lecturer	Prof. David Britton (David.Britton AT glasgow.ac.uk)
Linux lecturer	Dr. Gordon Stewart (Gordon.Stewart AT glasgow.ac.uk)
Lab head	Dr. Sam Skipsey (Samuel.Skipsey AT glasgow.ac.uk)
Lab Demonstrators	To be determined

Week Starting	Teaching Week	Monday	Tuesday	Wednesday	Thursday	Friday
08 Jan	S2W1	Term Starts	Intro Lecture		Linux 1	
15 Jan	S2W2		C Lecture 1	Lab 0	Linux 2	Lab 0
22 Jan	S2W3	Lab 0	C Lecture 2	Lab 1	Linux 3	Lab 1
29 Jan	S2W4	Lab 1	C Lecture 3	Lab 2	Linux 4	Lab 2
05 Feb	S2W5	Lab 2 (Lab 1 deadline)	C Lecture 4	Lab 3	Linux 5	Lab 3
12 Feb	S2W6	Break			Q&A Session	
19 Feb	S2W7	Lab 3 (Lab 2 deadline)	C Lecture 5	Lab 4	Linux 6	Lab 4
26 Feb	S2W8	Lab 4 (Lab 3 deadline)	C Lecture 6	Lab 5	Linux 7	Lab 5
04 Mar	S2W9	Lab 5 (Lab 4 deadline)	C Lecture 7	Lab 6	Linux 8	Lab 6
11 Mar	S2W10	Lab 6 (Lab 5 deadline)	C Lecture 8		Worked Exam	
18 Mar	S2W11	(Lab 6 deadline)	Practical Test		Q&A Session	Term Ends

3 Course description

The aims of the course are to introduce students to simple procedural programming in the C programming language, and to introduce basic use of the Linux operating system, including the use of tools to support programming. No prior programming experience in any language is required, although it may be useful.

3.1 Intended Learning Outcomes

Students should become competent working in a Linux environment, able to carry out many routine tasks on a Linux machine. Students should attain the ability to write short programs in C, using standard structured programming techniques. The programs should be divided into separate functions and follow good programming practice. Students should also be able to use typical tools used for C programming under Linux.

3.2 Content delivery

The course comprises two parallel series of lectures: one on Linux and tools to support programming, and one on the C programming language. Additional lecture slots are used to introduce the course, and to assist you in preparation for the exams. The lectures are complemented by six practical programming labs, providing you with the opportunity to practice material with active feedback.

Practical labs are held in **Room 320** of the Kelvin Building on Monday, Wednesday or Friday afternoons between 2 pm and 5 pm. You will be assigned a specific demonstrator and lab work will be submitted to this demonstrator via Moodle. Your demonstrators will be available during lab hours.

Additional content may be provided via pre-recorded videos and other media, co-ordinated via the course Moodle page.

There is a one-week break in the middle of the course where normal lectures and lab sessions are not scheduled. This is to allow you time to practice what you have learned so far, and to allow you extra time to ensure you keep up-to-date with lab work. A Q&A session will be held during the Thursday lecture slot to allow you the opportunity to ask questions or get feedback from teaching staff; informal lab sessions may also be held during this week.

3.3 Assessment

Assessment consists of three components:

- 25% from laboratory work submitted to the demonstrators.
- 25% from the practical test.
- 50% from the written exam.

All course work must be submitted on time, as outlined in the course calendar. Late submission will be graded in accordance with the penalties for late submission of coursework described within University's Code of Assessment:

<https://www.gla.ac.uk/myglasgow/apg/policies/uniregs/regulations2022-23/feesandgeneral/assessmentandacademicappeals/reg16/>

In summary, work submitted not more than five working days after the deadline will be assessed in the usual way, but the primary grade and secondary band will be reduced by two secondary bands for each working day (or part of a working day) the work was submitted late. Grade H will be awarded where work is submitted more than five working days after the deadline.

3.4 Re-assessment

An opportunity for re-assessment will be provided **only** for the P2T written examination paper. For all other assessment components of P2T (i.e. lab work and the practical test) there will be no re-assessment opportunity available, due to the impracticality of making such provision. This policy has been adopted with the approval of the Head of School and following the recommendation of the Physics and Astronomy Learning and Teaching Committee.

3.5 Minimum requirements to avoid CR

To avoid a grade of CR (Credit Refused):

- A minimum of 50% of the laboratory projects must be submitted.
- The practical test must be taken.
- The written exam must be taken.

3.6 Course materials

No specific textbook is required or indeed necessary. The use of online resources is part of the course and these provide excellent and readily-available help.

If you think a textbook would be useful for reference, you may wish to look at *Modern C* by Jens Gustedt, which includes introductory material similar to that covered in P2T, as well as a lot more advanced content. Further information, including a free download of an earlier edition, may be found online:

<https://gustedt.gitlabpages.inria.fr/modern-c/>

3.7 How to get the best from your studies

The **only** way to learn how to program is to try it out! You are strongly encouraged to engage fully with the practical work in the labs in order to develop your skills. Labs provide an excellent opportunity to discuss your work, including any problems you may be facing, with your demonstrator and other course staff. Your demonstrator will also be able to discuss any feedback you may have received for previous lab exercises, should anything be unclear.

Some students use laptops during or after lectures to try running snippets of code as the lecturer demonstrates examples.

4 Course component details

4.1 Linux

Introduction: Linux, the kernel and multi-user environments

The Command Line

- Files, processes and the shell
- Finding help (**man...**)

Navigating the filesystem

- Navigation basics (**cd, ls...**)
- Searching for files

Working with files

- File tools (**cat, grep, head, tail...**)
- Permissions

Working with processes

- Operating system commands (**top, ps...**)
- Standard input, output and error
- Pipes and redirection

Shell Scripting

- Shell variables
- Control flow

Building Software

- Compilation
- Gnu Make
- Revision control

4.2 C Programming

The **main()** function: a basic C program

#include and **#define** directives

Variables and types

Operators and expressions

Structured programming: control flow (**do ... while, for, if ... else, switch...**)

Procedural programming: function calls

Structured data: arrays and structs

Input and output to files

Compilation, libraries and header files

Good programming practice: layout and comments

5 Adverse circumstances

Students are expected to attend all lectures and communicate with their lab demonstrators once a week during the lab sessions. If you miss an examination or an assessment deadline, or if you believe your assessment performance has been affected by adverse circumstances, you should submit a **Good Cause Claim**, and this must be via MyCampus. Full guidance can be found here:

<https://www.gla.ac.uk/myglasgow/apg/policies/assessment/codeofassessment/goodcausereportingguidance>

Submission of a Good Cause Claim allows your circumstances to be considered by the Board of Examiners. All Good Cause Claims must be submitted within **one week** of the affected assessment.

Students should note that the University's Code of Assessment allows grades to be awarded only on the basis of demonstrated work. So, if you feel that some piece of assessed work has been affected by adverse circumstances, and if staff agree, then the only course of action available is for the grade for that piece of work to be set aside (in the case of continuously assessed work and Class Tests) or to allow a resit (in the case of Degree Exams) – marks cannot be adjusted.

To submit a Good Cause Claim on MyCampus:

1. Go to the 'Student Centre' and select *My Good Cause* from the Academics menu.
2. Select the relevant course(s).
3. Complete the report in MyCampus (there is provision for sensitive information to be provided separately, outwith the system, but a claim report must still be entered into MyCampus).
4. Add supporting evidence by uploading documents. It is the responsibility of the student to keep all original documentation and submit it to the Class Head on request.

If you encounter any difficulties with this process, please contact the Class Head immediately to let him or her know you have a problem with your Good Cause Claim.

What will happen to your Good Cause Claim

The Course Administrator and / or Class Head will ensure that your claim is considered in accordance with the section of the Code of Assessment which covers incomplete assessment and good cause (paragraphs 16.45 to 16.53). The outcome of your claim will be posted to the Approval Information section on your Good Cause Claim in MyCampus. If it is accepted that your assessment was affected by good cause, the work in question will be set aside and you will (as far as is practicable) be given another opportunity to take the assessment with the affected attempt discounted.

For absences that are significant but for which a good cause claim is not being filed, students must complete a **MyCampus absence report**, details of which may be found on the Student Support site:

<https://www.gla.ac.uk/myglasgow/apg/policies/studentssupport/absencepolicy/>

A significant absence is defined to be:

- an absence of **more than seven consecutive days** during working periods.
- an absence of **any duration** if it prevents a student from attending an examination or fulfilling any minimum requirement for the award of credit.

All potentially significant absences should be reported as soon as is practical, by completing part 1 of the MyCampus absence report. Part 2 of the MyCampus absence report should be completed on return to university. The normal submission deadline for the completed absence report is 7 days after return to university. Documentary evidence is required when reporting any significant absence.

6 Getting help and advice

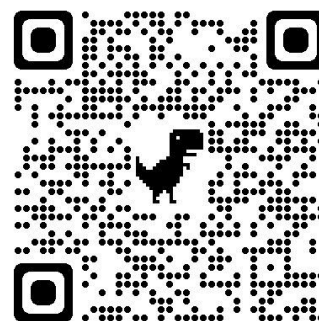
Your adviser of studies, class and lab heads, lecturers and demonstrators are all here to help you and you should feel free to approach them for help and advice during the year. Particularly if you are getting into difficulties, it is very important that you talk to someone at an early stage.

6.1 University of Glasgow Counselling Service

The University of Glasgow Counselling Service supports students to manage their mental health and to build strategies that will help them successfully complete their course of studies. The Service also offers a series of Wellbeing Masterclasses on topics such as managing stress and overcoming procrastination.

You can find further information, and self-refer, online:

<https://www.gla.ac.uk/myglasgow/counselling/>



6.2 University of Glasgow Disability Service

The University of Glasgow Disability Service supports students with disabilities, long-term health and mental health conditions or learning differences, such as dyslexia, to reach their academic potential and experience in full all that the University has to offer.

You can find further information, and self-refer, online:

<https://www.gla.ac.uk/myglasgow/disability/>



6.3 Student Learning and Development

Student Learning Development offers advice and support with study skills and peer learning generally, as well as on specific topics such as maths or academic writing. They also provide some guidance on the subject of plagiarism. If you would like help developing good study habits or improving your academic skills, you can find more information online:

<https://www.gla.ac.uk/myglasgow/sld/>

7 If things go wrong...

We hope you will be happy in your studies here but if things are not going well, then please raise issues of any kind that are affecting your studies. Talk to teaching staff or your adviser as early as you can so that we can help.

The University is committed to providing an excellent experience for our students. However, if you are in the situation of having a complaint, then the University has a Complaints Procedure in line with the Scottish Public Services Ombudsman requirements. If you have a formal complaint, then in the first instance please raise it with a member of staff in the area concerned. We aim to provide a response to the complaint within five working days. This is Stage 1.

If you are not satisfied with the response provided at Stage 1 you may take the complaint to Stage 2 of the procedure. Similarly, if your complaint is complex, you may choose to go straight to Stage 2. At this stage the University will undertake a detailed investigation of the complaint, aiming to provide a final response within 20 working days.

You can raise a Stage 2 complaint in the following ways:

- By e-mail: complaints@glasgow.ac.uk
- By phone: 0141 330 2506
- By post: The Senate Office, The University of Glasgow, Glasgow, G12 8QQ
- In person: The Senate Office, Gilbert Scott Building, The University of Glasgow

Complaints do not have to be made in writing, but you are encouraged to submit the completed Complaint Form whether it is at Stage 1 or Stage 2. This will help to clarify the nature of the complaint and the remedy that you are seeking:

<http://www.gla.ac.uk/services/senateoffice/studentcodes/students/complaints/>

Remember that the SRC Advice Centre (Students' Representative Council) is available to provide advice and assistance if you are considering making a complaint:

- Phone: 0141 339 8541
- E-mail: advice@src.gla.ac.uk