Double Degree in Physics and Liberal Arts & Sciences

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1. Introduction
The Double Degree in Physics and Liberal Arts and Sciences (DDLP) is a unique programme that integrates the liberal arts educational approach, pioneered in the Netherlands by University College Utrecht (UCU) with the classic physics training offered by the internationally recognised Department of Physics and Astronomy of University Utrecht (UU). More specifically, it offers an innovative model to train physicists combining sound disciplinary knowledge in physics with broader communication competences and interdisciplinary perspectives. With the broad range of disciplines on offer at UCU, students have the ideal conditions and stimuli to cross-disciplinary borders not only within other natural sciences but also to the social sciences and humanities. Furthermore, students will benefit from small class sizes, participation in group projects and campus life.

After completion of this programme students have two fully accredited Bachelor degrees\(^1\), one in LA&S and one in Physics, and are qualified to apply to all master’s programmes in physics at UU and elsewhere in the Netherlands or abroad. By doing both degrees simultaneously students optimise time, facilitate their curriculum planning, and avoid paying the high institutional tuition fee for a second bachelor degree programme. The extra time needed to complete DDLP will be at most one extra year of undergraduate studies.

In Section 2, the graduation requirements from both UCU and UU Department of Physics are listed. In Section 3, a year-by-year set of milestones and requisites to complete the double degree programme are presented. The Appendix shows an example of a four-year timeline for this programme.

For further queries about this double degree please contact the programme coordinator Filipe Freire, Science Department, UCU, Tcl: 030 253-9825, Email: f.freire@uu.nl

\(^1\) Note that a one-year pre-master’s programme in physics does not accredit a diploma and might be tailored for a specific master’s programme.
2. The double degree requirements

The DDLP comprises a minimum of 225 EC, which amounts to 45 EC on top of 180 EC for a regular three years UCU Bachelor. All courses at UCU and UU Department of Physics are 7.5 EC, the extended bachelor’s thesis 15 EC, and each UCU science laboratory module 2.5 EC.

The graduation requirements for the double degree are as follows:

At UCU
- Earn at least 30 EC each semester
- Complete all UCU breadth requirements
- Complete courses at level-3 totaling at least 22.5 EC, excluding the bachelor’s thesis. At least one of the level-3 courses should not be in physics or mathematics
- Complete the following compulsory courses in physics and mathematics:
  - UCU level-1 UCSCIPHY12, UCSCIMAT11, UCSCIMAT14;
  - UCU level-2 UCSCIPHY21, UCSCIPHY22/CHE22, UCSCIPHY23, UCSCIMAT21;
  - UCU level-3 UCSCIPHY31, UCSCIMAT31;
- Complete six science laboratory modules of 2.5 EC each. There are four compulsory modules, namely, the existing module UCSCIPHYL8 Wave and Optics, and the new two modules associated to the UCU level-2 courses in the previous requirement, and a new module on experimental Statistical Physics.
- At least 120 EC, including the bachelor’s thesis, must be earned at UCU Science Department.
- Students can take a maximum of two or three off-campus courses if respectively they go or not go on exchange. The five required courses at UU Department of Physics, see below, do not count as off-campus for the purpose of the UCU degree.

At UU Department of Physics
- Specific course requirements in physics and mathematics are:
  - Complete one of the following UU Department of Physics level-2 courses, NS-265B or NS-266B
  - Complete at least four level-3 courses at UU Department of Physics (cannot count for UCU tracks)
- Earn 97.5 EC in physics courses (including extended graduation thesis but excluding science lab modules) and 22.5 EC in mathematics courses.

At both UCU and UU Department of Physics
- Attain the minimum standards of academic.
- Complete an extended bachelor thesis worth 15 EC, during the forth year of the programme, fulfilling both degrees requirements as deliberated by the Board of Examiners of UU Department of Physics and UCU Physics Fellow.

The above fulfils both UCU and UU Department of Physics graduation requirements and still leaves 37.5 EC, which provides students the flexibility to complete a Minor in Humanities or Social Science, or obtain an Interdepartmental or Double Major. In addition, students have the possibility to go on an exchange semester abroad.

Students completing this programme are qualified to apply for MSc programmes in Physics at UU, as well as other universities in the Netherlands and abroad.
3. Milestones and learning outcomes of the double degree

In this section the main milestones and pre-requisites of DDLP are presented. An expanded and schematic version is given in the Appendix.

Year 1: Students who are considering entering DDLP have to complete the UCU physics level-1 course and the mathematics level-1 course in Calculus. The UCU major declaration must be submitted at the end of the first year and students wishing to join the double degree programme have to submit a pre-registration to DDLP alongside their major declaration. Students are eligible to the pre-registration at the end of Year 1 if they have an overall GPA average of at least 3.0 and a GPA average of at least 3.3 in the DDLP required courses.

Year 2: Pre-registered DDLP students have to complete four required UCU level-2 courses. In addition, they have to complete the two science laboratory modules associated with these compulsory courses, which will equip them with the practical problem solving skills for level-3 courses at UU Department of Physics and the module UCSCIPHYL8 Wave and Optics. At the end of Year 2, DDLP students would have learned the core physics content and skills offered by the compulsory physics and mathematics courses at UU Department of Physics. Students completing Year 2 with at least an overall GPA average of 3.0, and 3.3 in physics and mathematics courses, are eligible for an interview to join DDLP. The outcome of the interview is an advice or recommendation for each student based on a set of motivation criteria and academic performance.

Year 3: Complete the two required UCU level-3 courses, the module in Statistical Physics, and at least one of the following courses, Fluid Dynamics and Transport Phenomena or Structure of Matter, both offered in period p3 at UU Department of Physics. With these requirements students have the freedom to choose five additional courses during Year 3, which allow them to work towards a minor, an interdepartmental major or a double major. Alternatively a student aiming at completing DDLP in three-and-a-half years can complete some level-3 physics courses at UU Department of Physics.

Year 4: Students have to complete four level-3 physics courses at UU Department of Physics and carry out the 15 EC extended graduation thesis.

More detailed information on required courses and an example of a possible timeline for DDLP could be found in the Appendix.
Appendix: double degree timeline

DDLP can be completed in three-and-a-half or four years. In this appendix we show how a typical four years timeline would look like year by year.

Year 1
- Complete four UCU wide requirements: *Research in Context* plus one level-100 course in each of the three UCU academic departments (4 x 7.5 EC)
- Language requirement (7.5 EC) – this requirement can also be completed in Year 2
- Complete UCSCIPHY12 (7.5 EC)
- Complete UCSCIMAT11 (7.5 EC)
- Three science laboratory modules (3 x 2.5 EC) – often outside regular semesters
- Submit UCU major declaration and pre-registration to the double degree at the end of the 2nd semester. Students are eligible for the pre-registration if their major declaration is in Science, or is an interdepartmental/double major which includes Science, and complete the level-1 courses in physics and calculus with at least a B.

With these requirements students still have the freedom of choice of one or two courses during Year 1. A recommended choice is to take the DDLP required maths level-1 course UCSCIMAT14.

Year 2
- Complete four level-2 courses: UCSCIPHY21, UCSCIPHY22/ CHE22, UCSCIPHY23 and UCSCIMAT21 (4 x 7.5 EC)
- Three additional science laboratory modules (3 x 2.5 EC)
- Oral interview for admission to DDLP – required overall average of GPA 3.0, and for physics and mathematics courses a GPA 3.3. The outcome of the interview is an advice or recommendation for each student based on a set of motivation criteria and academic performance.

With these requirements students still have the freedom of choice of three or four course during Year 2. Additional recommended courses for DDLP in this year are the level-2 courses *Mathematical Modelling: Networks and Atmosphere and Climate*.

Year 3
- Complete two level-3 courses UCSCIPHY31 and UCSCIMAT31 (2 x 7.5 EC)
- Complete at least one of the two UU Department of Physics courses, NS-265B *Fluid Dynamics* and NS-266B *Transport Phenomena or Structure of Matter, both* offered in period p3.

With these requirements students have the freedom to choose five additional courses during Year 3, which allow them to work towards a minor, an interdepartmental major or even a double major. Additional recommended course is the level-300 *The Structure of the Universe*.

Year 4
- Complete at least four level-3 courses at UU Department of Physics (4 x 7.5 EC)
- Complete an extended graduation thesis that satisfies both the UCU and UU Department of Physics graduation requirements (15 EC)

With these requirements students have the freedom to choose two additional courses during Year 4.