

# Double Degree in Physics and Liberal Arts & Sciences (DDL P)

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## 1. Introduction

The Double Degree in Physics and Liberal Arts and Sciences (DDL P) is a unique programme that integrates the liberal arts educational approach, pioneered in the Netherlands by University College Utrecht (UCU) with the traditional physics training offered by the internationally recognised Department of Physics of University Utrecht (UUDP). More specifically, it offers an innovative model to train physicists combining sound disciplinary knowledge in physics with broader communication competences and interdisciplinary perspectives. The broad range of disciplines on offer at UCU provides ideal conditions to stimulate students to cross disciplinary borders and explore interdisciplinary approaches.

After completion of this programme students have two fully accredited bachelor degrees\*, one in LA & S and one in Physics, and are well prepared for application to all master's programmes in physics at UU, elsewhere in the Netherlands, or abroad. Pursuing both degrees simultaneously students optimise time, facilitate planning for a prospective MSc in physics, and avoid paying the higher institutional tuition fees for a second bachelor degree. The time needed to complete the DDL P is three and a half to four years. This means that in addition to the three regular years at UCU the extra time needed is half a year to one year.

Section 2 of this document presents the degree requirements for DDL P. Section 3 provides a year-by-year description of the milestones and prerequisites for completing DDL P. Finally, the Appendix provides an example of a possible four-year timeline for this programme.

For further queries about this double degree please contact the programme coordinator Filipe Freire, Science Department, UCU, Tel: 030 253 9825, Email: [f.freire@uu.nl](mailto:f.freire@uu.nl)

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\* 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 DDLP requirements

The total number of credits in physics and mathematics courses and modules, both at UCU and UU, including the graduation thesis required to complete DDLP is 125 EC.

In their first year, students at UCU need to complete 30 EC general first year requirements (including a level 1 course in science), while students at UUDP have to complete 45 EC in physics and maths topics. As these two requirements cannot be fulfilled simultaneously, DDLP students need more than one year to complete the first year UUDP requirements. For this reason, at least three and half years are necessary to complete the DDLP. Four years should be the preferred choice for students aiming at exploiting what the UCU liberal education and exchange abroad opportunities offers. Students starting UCU in the Spring could complete DDLP in three and a half years. All courses at UCU and UUDP are 7.5 EC, the bachelor's thesis 15 EC, and each UCU science laboratory module 2.5 EC. The graduation requirements for the DDLP are as follows:

### At UCU

- Earn at least 30 EC each semester
- Complete UCACCACA11 Research in context (in the first year)
- Complete the UCU breadth requirement (in the first year)
- Complete the UCU language and culture requirement by the 4<sup>th</sup> semester
- Complete 3 courses at level-3 totalling at least 22.5 EC in the major at UCU, excluding the bachelor's thesis, and including at least two tracks within the major
- Complete the following compulsory courses in physics and mathematics:
  - UCU level-1 UCSCIPHY12, UCSCIPHY14<sup>†</sup> (new 2018-2019) and UCSCIMAT11;
  - UCU level-2 UCSCIPHY21, UCSCIPHY25 (new 2018-2019) and UCSCIMAT21;
  - UCU level-3 UCSCIPHY31;
- Complete the following physics and mathematics laboratory modules (six in total):
  - UCSCIPHYL8, UCSCIPHYL# Statistical Mechanics (new 2019-2020) and UCSCIMATL2;
  - UCSCIMATL3 Group Theory, UCSCIMATL5 Dynamical Systems (new 2018-2019) and UCSCIMATL6 Complex Analysis (new 2018-2019)

**NB:** codes for the new maths modules in ARR § 3.22.4.3 as in 2018-19 are not correct
- Complete the following exercise modules associated to UCSCIPHY21 and UCSCIPHY25:
  - UCACCPHY2A and UCACCPHY2B;
- At least 90 EC, including the bachelor's thesis, must be earned at UCU Science Dept.
- Students can take a maximum of two or three off-campus courses if respectively they go or not go on exchange. For this purpose the five required physics courses at UUDP, see below, do not count as off-campus (ARR § 3.22.6 as in 2018-19).

### At UUDP

- Specific course requirements in physics and mathematics are:
  - Complete one of the two UUDP level-2 courses, NS-265B or NS-266B
  - Complete at least four level-3 courses in physics at UUDP
- Earn 90 EC in physics courses (including graduation thesis but excluding science lab modules) and 22.5 EC in mathematics courses. [This is satisfied by all of the above.]

At both UCU and UUDP students must attain the minimum academic standards, and complete a 15 EC bachelor thesis during the 4<sup>th</sup> year of the programme, fulfilling both degrees requirements as deliberated by the UUDP Board of Examiners and UCU Physics Fellow.

The recommended semester for exchange abroad is the 6<sup>th</sup> semester (Spring) during which an

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<sup>†</sup> UCSCIPHY14 is the enhanced format of UCSCIPHY13.

equivalent course to NS-265B or NS-266B must be completed. Finding suitable replacements for one of these courses should not be difficult as they are standard intermediate courses on most physics undergraduate degrees. In any case, this requires advanced planning, contact DDLP coordinator, to ensure that a suitable course is found. In addition, a request to the Exam Board must be filed to allow an exchange after the 5<sup>th</sup> semester. On fulfilling these requirements students have 30 to 45 EC free for electives, which can for example be used to complete a Minor.

### 3. Milestones of the DDLP

In this section the main year-by-year milestones and prerequisites of DDLP are presented. In the Appendix a table illustrating a possible DDLP course choice is given.

*Year 1 (complete 3 x 7.5 EC + 3 x 2.5 EC for DDLP)*

- Complete 30 EC general UCU first year requirements: UCACCACCA11 *Research in Context* plus and the breadth requirements which means that students need to take a level 1 course in each of the three departments Humanities, Social Science and Science
- Complete language and culture requirement – this can also be done in Year 2
- Complete the DDLP compulsory courses **UCSCIPHY12**, **UCSCIPHY13** and **UCSCIMAT11**
- Complete **three science lab modules**, **UCSCIPHYL8** (requires UCSCIPHY13/4), **UCSCIMATL2**, **UCSCIMATL3** or **UCSCIMATL5**.
- Submit UCU Science major declaration and pre-registration to the double degree at the end of the 2<sup>nd</sup> semester. Students are eligible for the pre-registration if their major declaration is in Science, and fulfil the requirements in ARR § 3.22.8 as in 2018-2019, average GPA of at least 3.0 in DDLP compulsory courses.

*Year 2 (complete 3 x 7.5 EC + 4 x 2.5 EC for DDLP)*

- Complete the level-2 courses **UCSCIPHY21**, **UCSCIPHY25** and **UCSCIMAT21**, plus the exercise modules **UCACCPHY2A** and **2B** associated with the two physics courses.
- Complete **two science lab modules**. One of those mentioned in *Year 1* and **UCSCIMATL6**.
- Admission to DDLP at the end of the Spring semester provided the requirements in ARR § 3.22.9 as in 2018-2019 are fulfilled, overall GPA average of at least 3.0 and an average of at least 3.3 in DDLP mandatory courses.

With these requirements students still have the freedom of choice of three or four course during Year 2. Possible recommended courses for DDLP students during this year or Year 3 are UCSCIMAT22 and UCSCIEAR21.

*Year 3 (complete 2 x 7.5 EC + 1 x 2.5 EC for DDLP)*

- Complete the level-3 course **UCSCIPHY31**
  - Complete **UCSCIPHYL# Statistical Mechanics** during part of block 1 which is offered in parallel with the practicum of the UUDP course NS-204B.
  - Complete at least one of the UUDP courses, **NS-265B Fluid Dynamics & Transport Phenomena**, and **NS-266B Structure of Matter**, both offered in block 3.
  - Complete any of the remaining required lab module outside regular semesters
- For exchange possibilities read discussion at end of Section 2.

*Year 4 (complete 4 x 7.5 EC + 1 x 15 EC for DDLP)*

- Complete at least **four level-3 physics courses at UUDP**.
- Complete a **graduation thesis** that satisfies both the UCU and UUDP graduation requirement.

With these choices students have the freedom to take two additional courses during Year 4. In the next page a table illustrates how this four-year timeline might look like.

## A possible Double Degree Timeline Table

The choice of courses shown in the table below is an optimal one for students starting in Fall, but deviations from this plan are possible. One example is to take UCSCIPHY12 in the 2<sup>nd</sup> year if UCSCIPHY14 and UCSCIMAT11 are completed in the 1<sup>st</sup> year. For students starting in Spring it is better to complete both UCSCIPHY14 and UCSCIMAT11 in their 1<sup>st</sup> semester.

### Table colour scheme

salmon: UCU DDLP required courses

blue: courses offered by UUDP

grey: UCU breadth requirement courses

### Year 1

Sem 1 Sep-Dec	Research in context Level-1	HUM req. Level-1	<b>Class. &amp; Rel. Mechanics</b> UCSCIPHY12	<b>Maths Calculus</b> UCSCIMAT11 (also in Spring)
Winter	<b>UCSCIMATL5</b>			
Sem 2 Feb-May	SSC req. Level-1	Language + Culture req.	<b>Wave Phenomena in Nature</b> UCSCIPHY14 *	Course X
Summer	<b>UCSCIMATL2</b>	<b>UCSCIPHYL8</b>		

End Year 1 students do pre-registration for DDLP

### Year 2

Sem 3 Sep-Dec	<b>Electrodynamics</b> UCSCIPHY21	UCACC PHY2A †	<b>Maths Methods</b> UCSCIMAT21	Course X	Course X
Winter	<b>UCSCIMATL3</b>				
Sem 4 Feb-May	<b>Stat Mech &amp; Quant</b> UCSCIPHY25	UCACC PHY2B †	Course X	Course X	Course X
Summer	<b>UCSCIMATL6</b>				

End Year 2 admission to the DDLP

### Year 3

Sem 5 Sep-Dec	<b>Advanced Physics</b> UCSCIPHY31	Stat Phys SCIPHYL# in B1	Course X	Course X	Course X
Winter					
Sem 6 ‡ Feb-May	Course X	Course X		<b>NS-265B or NS-266B in B3</b>	Course X
Summer	SCI Lab X	SCI Lab X			

End Year 3 students expected to leave UCU residence

### Year 4

Sem 7 Sep-Dec	<b>NS-3XXB in B1</b>	<b>NS-3XXB in B1</b>		
	<b>NS-3XXB in B2</b>	<b>NS-3XXB in B2</b>		
Sem 8 Feb-May	<b>Graduation Thesis</b> (15 EC) in B3 and B4	Course X	Course X	

\* enhanced format of UCSCIPHY13

† to be included in associated course (likely 2019-20)

‡ recommended semester for exchange abroad