



Manual of the Chemistry Honors Program (Bachelor)

January 20, 2022

This manual describes the contents and organization of the honors program (HP) for bachelor students of Chemistry at Utrecht University (UU).

The students (1) participate in research modules with scientific researchers at UU and have an introduction to chemistry in a broader context, (2) they participate in interdisciplinary activities together with honors students from other departments of the Science Faculty (Physics, Mathematics, Computer Sciences, Biology, Pharmaceutical Sciences...), (3) they work on honors assignments within regular academic courses and/or they participate in honors courses of the Descartes College, and (4) they prepare for the bachelor thesis by writing and defending a scientific research proposal. Compared to regular students, honors students are given additional challenges that deepen and broaden their knowledge as chemical scientists.

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1. Research modules, company module, excursions

Upon completion of the following Chemistry-related extra-curricular activities, 7.5 EC is registered under the course code SK-BHOPR15.

Research modules

In 4 modules, Chemistry honors students are introduced to scientific research in the Chemistry department at UU. 2 modules are performed in groups of the Debye Institute and 2 modules are in groups of the Bijvoet Institute. In each module, the students select a researcher and prepare an interview with this researcher by studying a few of the researcher's scientific publications. For each of the 4 research modules, an honors student is the contact person for the fellow students, communicating with the researcher to find a suitable date for an interview with the researcher. The modules are in principle in study year 2 and spread out across the academic year. Typically, the interview with a researcher will also lead to a tour of scientific research facilities and further discussions with students working in the research group. All the honors students are expected to participate in all 4 research modules.

In the research modules, the honors students learn how to read scientific publications, they get a picture of scientific research is carried out, and they start to consider in which research group they might want to carry out their individual research for the honors thesis in study year 3.

Chemistry context module

Besides the 4 research modules at UU, the students are expected to do at least one "chemistry context module". The students can organize this module themselves, with help of the honors coordinator. Recent modules include chemical research activities for paint company Baril Coatings and a role playing game with BASF, initiating students to the organizational structure of a chemical company. In 2020 and 2021, our honors students participated in the yearly national CHAINS conference organized by NWO (<https://nwochains.nl/>); it is usually not accessible to bachelor students, but it could now be attended by our students because it was online; it gave a broad overview of fundamental and applied chemical research in the Netherlands and beyond, including topics on sustainability and education.

Excursions to chemical companies

Honors students are encouraged to participate in excursions to chemical companies, and at least one such excursion should be prepared and reported on in the following way. Using the relevant standard form (provided on BlackBoard, SK-BHOPR15), the students should formulate educational goals before going on the excursion. After the excursion, the students should report on what they learned from the excursion. The students can organize their own excursions (for themselves and/or fellow honors students) or they can participate in an excursion prepared by others (for instance by Proton; in that case, they are encouraged to ask Proton whether it welcomes help with planning the excursion).

Excursions to chemical companies provide the opportunity to see that academic knowledge is not the sole thing that companies find important. Safety, environment, logistics, legal matters, and economic aspects also are key considerations. This is an important insight. Students should know about such matters, especially as they might later work in research and development of new products within a chemical company.

2. Interdisciplinary module

All Chemistry honors students participate in the interdisciplinary honors module. The activities are in English, in study years 2 and 3, coordinated by the Student Board of the Science Honors Academy. A professor is responsible for registration of 7.5 EC in Osiris upon completion of the module.

The interdisciplinary module is described in the text below, which is reproduced from:

<https://sciencehonours.sites.uu.nl/students/interdisciplinary-module/>.

The students from all the Science Faculty honours programmes, Biology, Chemistry, Computer Sciences, Mathematics, Pharmaceutical Sciences and Physics, participate together in the Interdisciplinary Module (Osiris BETA-B2HRI). This module consists of a set of extra-curricular activities aiming at providing added value skills and experiences on top of their disciplinary honours programme. In this interdisciplinary community you have the opportunity to organise in cooperation with your colleagues from other departments a broad spectrum of events ranging from symposia, an international trip, group projects and skills workshops. The objectives of these activities are as follows:

- To build a strong interdisciplinary community.
- To familiarise students with interdisciplinary approaches to scientific research.
- To prepare the students to cooperate and communicate at an academic level outside their own area of expertise.
- To stimulate global awareness and a deeper understanding on how science can contribute to tackle global societal challenges.
- To develop networking and leadership skills.
- To provide the students with international experience.

Requirements

The number of credits that you are required to complete in the Interdisciplinary Module is 7.5 ECTS. These credits are part of the 15 ECTS points that you are required to acquire in addition to the 180 ECTS in your regular bachelors programme. Most of the activities take place during the second and third year of the honours programme.

Activities

The objectives of this module are achieved through a wide set of activities. Together with your colleagues you will have relative freedom and responsibility (within certain parameters) in planning, participating and evaluating activities such as:

- Projects where students work in groups with students from different departments to learn about topical inter- and cross-disciplinary research subjects and approaches. Symposia in interdisciplinary themes to bring students in contact with leading researchers and science-based companies (e.g. energy solutions, water, data mining, food, nanotechnology, ..).
- An annual visit (if possible) to a leading international centres of research and technology elsewhere in Europe with an interdisciplinary focus (e.g Heidelberg, Cambridge, Oxford, CERN Geneva).
- Visits (if possible) of research institutes and science-based companies to integrate in the honours educational programme specialised topics on societal challenges in areas such as food, nutrition, energy, health and sustainability.

Further details on the interdisciplinary module can be found in the [Science Honours Academy Student Guide 2020/2021](#). Alternatively, click [here](#) for contacting details or download the [Interdisciplinary Honours Brochure](#) for a quick overview.

3. Honors within regular courses or at Descartes

15 EC must be obtained either by performing honors assignments within two regular courses of 7.5 EC or by following two courses of 7.5 EC at the Descartes College (another option is to do 1 honors assignment and 1 course at Descartes).

Honors assignments within 1 or 2 regular courses

Within each chemical course, students can ask whether the lecturer is willing to supervise an honors assignment, for an individual student or for a group. The work required should be about 40 hours, corresponding to 1.5 EC. An optional standard form is provided on BlackBoard (SK-BHOPR15), to stress a few issues that should be discussed before starting the assignment:

- (a) What makes the assignment an honors assignment?
It should be an intellectual challenge, and it should not be a subject that is already present in the regular curriculum. In principle, students will obtain their results via self-study.
- (b) What final product does the supervisor expect from the students?
- (c) What are the evaluation criteria?
- (d) When must the assignment be finished?

If the lecturer did not supervise an honors assignment before, the honors coordinator can help with further clarifications (b.h.erne@uu.nl). Various types of honors assignments have been performed in the past. In his 1st and 2nd year spectroscopy courses, Prof. Meijerink has given separate honors lectures, tutorials, and an exam. Prof. Killian has asked students to develop a video animation, and Prof. Gros has asked students to develop new teaching materials on the basis of recent scientific literature. Honors assignments have also been given in the level 2 courses on organic chemistry and physical chemistry and in the level 3 course on nanomaterials.

Once the honors assignment is finished, it is evaluated with “pass” or “fail”. In the case of “pass”, the honors coordinator should be informed, and the regular course level 1, 2, or 3 will be replaced by the corresponding honors level HB in the Osiris dossier of the student.

Participation in 1 or 2 courses at the Descartes College

Honors courses at the Descartes College can be followed as a part of the “profileringsruimte” of the bachelor program of Chemistry. The courses typically examine the place of science in society, via lectures, group discussions, and study of reading materials. Participants are from all faculties of the university, see <http://www.uu.nl/bachelors/descartes-college>, where the following text can be found:

“Het Descartes College biedt interdisciplinaire honours cursussen aan voor gemotiveerde bachelorstudenten van de Universiteit Utrecht. Het Descartes College brengt studenten uit alle opleidingen van de universiteit en de beste wetenschappers bij elkaar. Het doel is een unieke, interdisciplinaire honourscommunity van academici uit diverse vakgebieden: samen nadenken over brede vraagstukken die verschillende wetenschappers en wetenschappen aangaan.”

4. Research proposal for the bachelor thesis

Before starting to work on their bachelor thesis (SK-BTHESIS), Chemistry honors students have to write and to defend a research proposal, describing the work that they plan to perform. In this way, the regular bachelor thesis becomes an “honors thesis”, and its 15 EC are registered as a curricular honors activity. Usually, the student proceeds as follows:

- (1) At the end of study year 2 or at the beginning of study year 3, a student looks around for a research group, supervisor, and thesis subject.
- (2) A thesis contract is filled in together with the supervisor, the same form that is also used for regular students. Besides the main supervisor (a permanent staff member) and possibly a separate daily supervisor (a PhD student), the contract should name a second staff member who will determine the final grade together with the first supervisor. For the form, see: <https://students.uu.nl/beta/scheikunde/onderwijs/studieprogramma/bachelorthesis>
- (3) The thesis contract is handed in to the student office (science.chem.ba@uu.nl) and the honors coordinator (b.h.erne@uu.nl).
- (4) The student studies the scientific literature and writes a research proposal, using the standard form provided on BlackBoard (SK-BHOPR15). The student is encouraged to ask for feedback from the supervisor.
- (5) The student presents the proposal orally in the presence of honors students and supervisors. At least one of the student’s own supervisors should be present, for instance the daily supervisor. Typically, the presentation will be about 10 minutes, followed by a discussion of also about 10 minutes.
- (6) The student performs the work for the thesis, in about 10 weeks, just as a regular student. Most often, the work is done in full time in period 4, but other options are possible too.
- (7) Since the honors student is already introduced to the subject, it is possible to obtain more results than an average regular student might realize. Nevertheless, the honors student will be evaluated in the same way as a regular student, without additional severity or leniency.
- (8) The final evaluation is signed by both permanent staff supervisors and sent to the student office (science.chem.ba@uu.nl) and the honors coordinator (b.h.erne@uu.nl). The evaluation form is the same as for regular students: 15 EC, 60% for practical work, 30% for the thesis, and 10% for the presentation, see: <https://students.uu.nl/beta/scheikunde/onderwijs/studieprogramma/bachelorthesis>

It is noted that if the honors coordinator is not informed of the completion of the thesis, its 15 EC will not directly be recorded in the framework of completed honors activities. This is not a big problem, but it may delay the administration leading up to the graduation of the student.

5. Admission requirements, honors certificate

Honors students are recruited among students with a relatively high average grade. Part of the underlying thinking is that the honors program is for students who study with relative ease, who have sufficient time for honors activities, and whose results within the regular bachelor program will not suffer from participation in the honors program.

Recruitment

Admission occurs in the 2nd half of study year 1, and the honors program starts at the beginning of study year 2:

1. In study year 1, at the end of period 2, the honors program is mentioned at the *studieloopbaan bijeenkomst*. In 2022, this is on Thursday January 20. A recording of the presentation may be accessible on the MS Teams channel **SK-BSLB21**.
2. Once the grades obtained in period 2 are known, students who passed all courses with an average at least 7.5 out of 10 are mailed by the honors coordinator at the end of February. Students who do not receive this mail can also contact the honors coordinator, then or later.
3. The Science Honors Academy organizes an event for invited students in March or April. Information is provided about interdisciplinary honors activities, the Chemistry honors program, and the possibility to follow courses at the Descartes College.
4. In April/May 2022 (teaching block 4), an optional pre-honors research module will be given on the topic of magnetic density separation of plastics using ferrofluids, a new recycling technology. The students will read scientific publications, attend a scientific presentation, and there will be a group discussion.
5. Interested students are invited to apply for admission to the honors program by sending a **letter of motivation** (attachment or e-mail text) to the honors coordinator (b.h.erne@uu.nl). A **curriculum vitae** should be included as an attachment. Students should also indicate a few dates and times when they are available for an interview, preferably before the deadline.
 - **Deadline 1: June 5.** A first group of new honours students will be selected directly after this first deadline.
 - **Deadline 2: August 31.** This leaves almost no time to plan an interview. Students who decide to apply after finishing their first year of study should preferably do so by **August 22.**

Honors certificate

To graduate with honors, students should “study nominally” (earn 15 EC per study period), not fail on more than 1 course in a study year, participate actively in honors activities, and still have an average grade of 7.5 or more after study year 2 and at the end of the final study year. For official rules, see the OER 2021-2022, linked at <https://students.uu.nl/beta/scheikunde/praktische-zaken/regelingen-en-procedures>. Exceptions are possible, and ultimately, it is the director of education of the Chemistry department who decides which students are admitted to the program, whether they remain in the program at the end of study year 2, and whether they graduate with honors.

Upon completion of the honors program, students receive an honors certificate and a mention in the international diploma supplement. Internationally, this is a valuable mention. In countries where all top students earn an A or a grade point average of 4.0, educators may expect that top Dutch students should all have an average grade close to 10, not realizing that this is nearly unattainable to the vast majority of even our very best students. If a student has graduated with honors, however, the foreign educator knows that the student was a top student, recruited among the top 10 to 20 percent of students. The certificate itself is handed out at a festive yearly honors ceremony.

6. Required amount of time, Osiris administration

The honors program corresponds to 45 EC, but compared to a regular bachelor student, the additional study time required of an honors student corresponds to only about 15 EC. How can this be?

30 EC are for activities within the regular bachelor program (or Descartes), activities that are registered at honors level thanks to a moderate amount of extra work, see items 3 and 4 on pages 4 and 5.

The remaining 15 EC of the honors program are for extra-curricular activities (items 1 and 2 on pages 2 and 3). This adds up to about 10 weeks of extra study time spread across 2 years of study. For some students, this might be too much, since the Chemistry curriculum is already difficult without honors components. However, most students who join the program are able to graduate with honors. If you are concerned about the amount of time required for honors activities, you are encouraged to talk to an enrolled honors student (the honors coordinator can bring you into contact with such a student).

Table 1. Overview of course credits (EC) obtained within the bachelor honors program of Chemistry

Activity	Description	EC	Status	Osiris code / level
Honors thesis	bachelor thesis performed after writing and defending a proposal	15	curricular	SK-BTHESIS / HB
Free choice	<ul style="list-style-type: none"> ■ assignment within 0, 1, or 2 regular chemistry courses ■ 0, 1, or 2 courses at Descartes 	15	curricular	Regular code / HB (HB replaces regular course level n=1-3)
Interdisciplinary activities (SHA)	symposia, workshops, excursions, projects, committees	7.5	extra-curricular	BETA-B2HRI / HB
Chemistry honors activities	<ul style="list-style-type: none"> ■ research modules ■ intro to chemical companies 	7.5	extra-curricular	SK-BHOPR15 / HB
	Total	45		

To graduate, a regular chemistry student requires 180 EC (1 EC corresponds to 28 hours of study, and the academic year consists of 4 blocks of 10 weeks, with two courses of 7.5 EC in each block). Of these 180 EC within the regular curriculum, an honors student must obtain 30 EC at honors level (rather than at normal course levels 1, 2, or 3). On top of this, an honors student must obtain an additional 15 EC via “extra-curricular” activities that are only available to honors students, leading to a total of 195 EC upon graduation.

Half of the 30 EC for curricular honors activities is earned by spending a bit more time than regular students on the bachelor thesis in study year 3 (15 EC). Before starting with the research work (10 weeks of work, as for any student), an honors student must write a scientific research proposal and must defend it orally. The other half of the 30 EC for curricular honors activities can be obtained in a few different ways. One way is to perform additional honors assignments within two regular chemistry courses. Another way is to follow two courses at Descartes, courses that are open only to honors students. Yet another option is one honors assignment and one course at Descartes. The remaining 15 EC for extra-curricular honors activities consist of 7.5 EC for the research modules at UU and interaction with chemical companies and 7.5 EC for the interdisciplinary activities.

The registration of honors credits in the official administrative database (Osiris) does not always occur rapidly. The students administration office must receive a message from the relevant lecturer or from the honors coordinator, stating that a(n) (extra-)curricular activity has been completed at honors level. Honors students should please contact the honors coordinator if they notice that the administration of their honors results is not up to date.

Honors credits for extra-curricular honors courses (BETA-B2HRI or SK-BHOPR15) are not transferable to the regular bachelor program. If a student stops with the honors program, the ECs obtained for these extra-curricular honors courses cannot count as part of the “profielingsruimte” within the normal curriculum of 180 EC. The board of examiners of Chemistry communicated its ruling on this issue on Dec. 4, 2019. The situation is different for courses at Descartes, which are curricular and can therefore be part of the “profielingsruimte”.

7. Contact, extra information

Contact person for questions about the Chemistry honors program

- Dr. Ben Ern , coordinator of the Chemistry honors program
- B.H.Erne@uu.nl
- Phone: 030 253 2934
- Visiting address: Kruytgebouw, 7^e floor, North wing, room N702

Contact for questions about the interdisciplinary module (the contact person is a student)

- Science.sha.secretary@uu.nl

Web pages with general information about honors at UU

- <https://www.uu.nl/bachelors/scheikunde/honoursonderwijs>
- <https://sciencehonours.sites.uu.nl/students/>
- <https://sciencehonours.sites.uu.nl/students/chemistry/>
- <https://www.uu.nl/bachelors/descartes-college>

Information for Chemistry honors students

Documents are available to Chemistry honors students via BlackBoard (SK-BHOPR15):

- This manual
- Standard forms including that relating to “Honoursopdrachten binnen reguliere cursussen”
- Documents relating to the honors thesis:
 - The thesis contract
 - Information for supervisors of an honors thesis
 - Proposal format