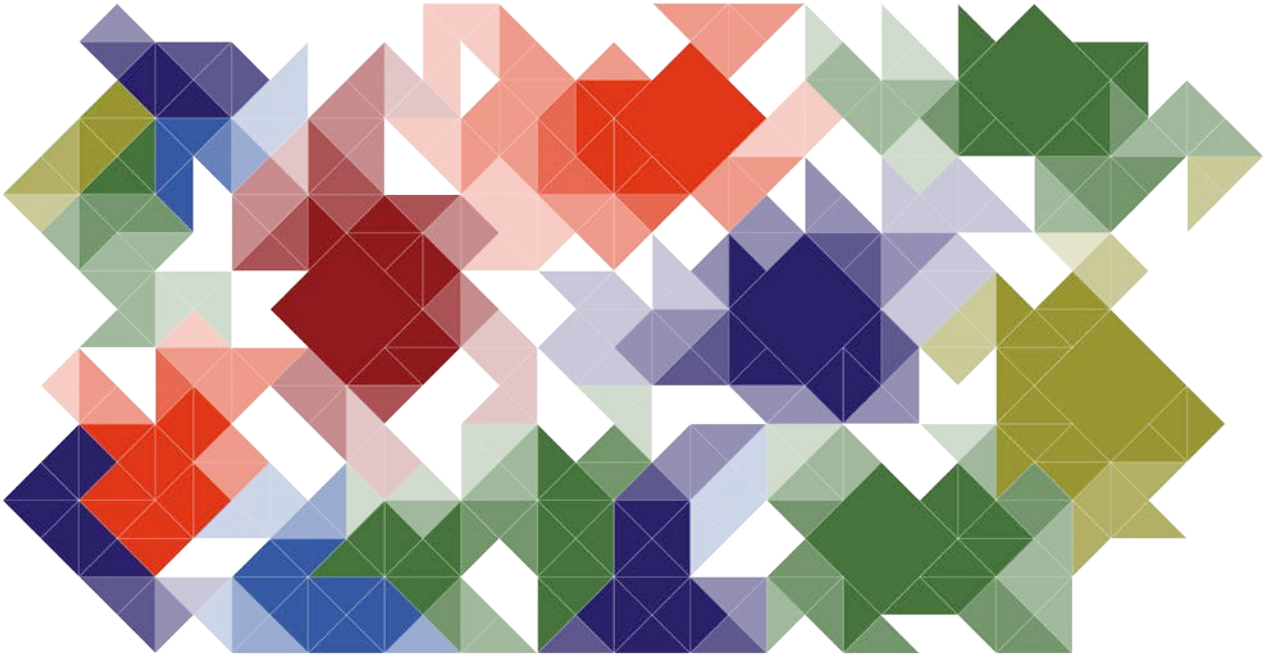
UNIVERSITY OF COPENHAGEN

Fagets Videnskabsteori?

Tracking Interdisciplinarity in the Mandatory Philosophy of Science Course at the University of Copenhagen



Publications from Interdisciplinary Education at UCPH

Katrine Meldgaard Kjær, 2014

Faget Videnskabsteori?

Tracking Interdisciplinarity in the Mandatory Philosophy of Science Course at the University of Copenhagen

This mapping of 13 courses of “Fagets videnskabsteori” shows that the approaches to the courses in the philosophy of science at UCPH are both many and multi-faceted. Hopefully future planners of courses of “Fagets videnskabsteori” can use the mapping in relation to what to consider when seeking to integrate an element of reflection on interdisciplinary issues and/or interdisciplinarity into a given course.

"Interdisciplinary Education at the University of Copenhagen" is a three year project (2014-2016) within the UCPH 2016-programme.

Details about the project can be found at the website http://www.ind.ku.dk/interdisciplinarity.

The project focuses on strengthening interdisciplinary teaching and education at UCPH. The project pinpoints the challenges and opportunities in interdisciplinary teaching as seen from the perspective of both educators, students and the organisation. To boost the interdisciplinary teaching and education, didactic tools, courses, and consultancy services will be developed throughout the project.

The material relevant for publication developed as part of the project – reports, course design, literature reviews, articles etc. - will be published in this series.

The series is edited by Jens Dolin and Christine Holm,
Department of Science Education, University of Copenhagen

Publications from Interdisciplinary Education at UCPH

Download from the project website: http://www.ind.ku.dk/interdisciplinarity

Fagets Videnskabsteori? Tracking Interdisciplinarity in the Mandatory Philosophy of Science Course at the University of Copenhagen

Katrine Meldgaard Kjær, Faculty of Law, 2014.

In October 2013, the cross-faculty 3-year research project "Interdisciplinary Education" was launched. The project is funded by the University of Copenhagen (UCPH) as a part of the so-called 2016-strategy to support interfaculty cooperation and education, and focuses on strengthening interdisciplinary education at the UCPH. It aims to shed light on both what hinders and supports interdisciplinarity at UCPH, and what can be done to strengthen it further in the future.[1] In order to achieve this goal, however, we have to know what we're actually working with - an initial investigation of the status quo of interdisciplinary education at UCPH is necessary. This report is a part of this initial investigation. It attempts to map the mandatory philosophy of science courses at UCPH as a gateway into understanding how (if?) each program at UCPH approaches disciplinarity and interdisciplinarity.

A mapping of the mandatory philosophy of science course is key in the examination of the state of interdisciplinarity at UCPH for two central reasons: first and foremost, as will be outlined below, one of the explicitly stated aims with the introduction of a mandatory course for all Danish university students on the philosophy of science - or *Fagets Videnskabsteori*, as it is called in Danish - was to foster cross-disciplinary understanding and outlook, and to provide BA students with a broader perspective on their respective disciplines. However, at the same time, the course was also required to be based from this discipline, hence the course name ***Fagets*** *Videnskabsteori* (the *discipline's* philosophy of science). With the former aim in mind, this course can thus potentially work as a kind of ground zero for interdisciplinary education at UCPH, a space where students can be introduced to and guided in interdisciplinary work and research, and, not least, how this works together with

[1] Read more about the project here: http://www.ind.ku.dk/tvaerfag/

disciplinary work and research. But how are these courses actually navigating between disciplinarity and interdisciplinairty? What kinds of perspectives are they passing on to students? And what kinds (if any) of tools are these courses providing the students with regarding interdisciplinary work and research? Second, as this is the only course that is obligatory for all Bachelor's programs at Danish universities, it represents a unique chance to compare and contrast how the different departments are approaching the question of how disciplinary and interdisciplinary work interact.

Re-thinking Filosofikum: Fagets Videnskabsteori

Two contexts are important to outline before proceeding: the background for the establishment of the mandatory course on the philosophy of science, and the background for the structure of my examination of the courses. Assuming that potential readers of this report will have at least some extent of familiarity with both these backgrounds, I will keep this section as brief as possible, merely outlining the most important points necessary for contextualizing the following mapping of the courses.

In 2000, an agreement between the Danish minister of science and the Danish Conference of Rectors decided that a course on the philosophy of science (*fagets videnskabsteori*) was to be a mandatory part of all Bachelor's programs at Danish universities by 2005. This decision came in the wake of a renewed interest in and public debate about the long-since out-phased *filosofikum* course, a basic philosophy course that all university students – regardless of discipline – were required to take - and pass - their first year of studies. Until it was made non-compulsory in 1971, the course was the single longest running course in Danish university history. But it was also criticized for failing to make itself relevant to the masses of students who were not at the university to work directly with philosophy or within the humanities, and ultimately fell victim to the winds of change that were sweeping the campus grounds in the wake of the student protests in 1968. The course was made non-compulsory and quickly vanished altogether, with seemingly little protest. 30 years later, however, a movement – headlined by a series of prominent philosophers and scientists – in favor of a re-

introduction of a *filosofikum* course began to take form and gain recognition.[2] The new millennium version of *filosofikum* being argued for, however, was not to be a copy of the old course; significantly, this course was, unlike the old *filosofikum*, to be anchored in the individual departments and take its point of departure in the respective disciplines here, thus relating the philosophy of science taught in the course to the academic areas the students were engaging in, whether this was chemistry, odontology, economics or French. The name given to this new course, *Fagets Videnskabsteori* (the discipline's philosophy of science), reflected this. At the same time, the course was also envisioned to provide the students with a more overall philosophical understanding of their field in a broader societal and scientific context, so that the students were better equipped to be able to look beyond the limits of their own discipline (or, at least be able to understand that those limits existed). This goal was, of course, related to the increased interest in interdisciplinarity as a necessary tool in solving complex societal issues around this time. The new *filosofikum* would thus ideally provide students with the tools to better understand their discipline and the science being conducted within it, as well as locate their discipline within a broader societal and academic framework.

These goals were reflected in the 10-point guideline for the course penned as a part of the 2000 agreement between the minister of science and the Conference of Rectors on the introduction of *Fagets Videnskabsteori* as a mandatory course in all Bachelor's programs at Danish universities. They read:

1. Formålet med studieelementet er, at de studerende får lejlighed til at kvalificere deres faglige specialisering ved at se den i et større, alment perspektiv. (The course's purpose it to provide students with the opportunity to qualify their disciplinary specialization by putting it into a broader, more general perspective.)
2. Studienævnet for den enkelte uddannelse får ansvaret for udviklingen af den bedst egnede filosofikummodel for det pågældende fags studerende. (It is the study board at each individual program's responsibility to develop the *Filosofikum*-inspired model best suited for their specific students.)

[2] See, for example, Claus Emmeche, Simo Køppe and Frederik Stjernfelt's article "*Filosofikums nødvendighed*" (On the Necessity of Filosofikum), published in Politiken in Febuary 2000.

3. Undervisningen skal være forskningsbaseret, og den skal baseres i uddannelsens/fagets forskning. (Teaching must be research-based, and be based in the discipline/program's research.)
4. Indholdet af studieelementet må svare til formålet, dvs. at forbinde faglige spørgsmål med interessante og relevante spørgsmål af mere almen art. (The content of the course must correspond to the purpose, that is, to connect disciplinary questions or issues with interesting and relevant question of a more general kind.)
5. Navnet på studieelementet er fagets videnskabsteori (the name of the course is *Fagets Videnskabsteori.*)
6. Placeres på bacheloruddannelsen normalt efter 1. studieår. (The course is normally scheduled after the first year of study.)
7. Omfanget af studieelementet er normalt minimum 1/8 årsværk [dvs. 7,5 ECTS] (The course will normally be rewarded at least 7,5 ECTS, corresponding to 1/8 of a full year's workload.)
8. Studieelementet afsluttes med eksamen, og som udgangspunkt med ekstern censur, men eksamensformen er iøvrigt studienævnets afgørelse. (The course will be concluded with an exam and will normally be assessed with the help of an external censor. However, beyond this, the study board decides the form of the exam.)
9. Studieelementet indføres i de respektive uddannelser, således at det hører til det normale studieforløb. (The course will be scheduled into the program so that it falls within the normal course of study.)
10. Der arbejdes på at indføre studieelementet i alle universitetsuddannelser, dvs. at det søges indarbejdet i de enkelte uddannelsers studieordninger indenfor en 3-årig periode. Det betyder, at studieelementet forventes at indgå i alle universitetsuddannelser senest fra 1. september 2004. (The aim is that the course will be incorporated into all university degree programs by being written into the individual programs' curricula within a three-year period. This means that the course will be expected to be incorporated into all university degree

programs by September 1st, 2004 at the latest.)[3]

Although the course was made mandatory, none of these guidelines have been formalized by law. Today, the only aspect of the course on the philosophy of science mentioned in the order on the matter from the ministry of education is that it should exist at all; here, it is here stated that Bachelor's programs should include at least 90 ECTS points worth of constituent courses, wherefrom a course on the philosophy of science should be one. Unlike in the list of principles, no indication is given as to how many ECTS points this course should take up, the criteria for evaluation of exams or at what point in the program the course should be placed.[4] The vagueness of these guidelines and the non-existent formalization of the design of the course has meant that the planning of the course has been left completely up to the individual departments, which in turn has provided the present attempt to map them with some challenges. These challenges and how I have attempted to solve them – or at least address them – will be discussed in the following section.

Categorizing Curricula: A Note on Structure and Method

I have collected information about the design and content of the courses from two sources. I have primarily gathered this information from the curricula (*Studieordning*) that all BA programs have, and which outline the content, structure and regulations of the individual programs overall as well as the specific courses that constitute the given program. While all BA (and MA) programs are required to have such a curriculum and revise it regularly, the level of detail, specificity and length of these varies greatly from program to program. This, of course, also means that the descriptions of the course on the philosophy of science in the curricula also varied greatly from program to program. In addition to the curricula, I also consulted the often more detailed descriptions of the individual courses published online (http://kurser.ku.dk) and the course plans handed out at the beginning of the semester to the students detailing which texts to read for

[3] As there is no official English translation of these guidelines, I have chosen to list them in the original Danish here, with my own English translation in parentheses. Source: http://www.nbi.dk/~natphil/FVT/i_Alment.html

[4] Source: https://www.retsinformation.dk/Forms/R0710.aspx?id=132698#K4

each week etc., which I acquired by contacting the course responsibles for each of the courses.[5] The curricula and the course descriptions and plans differ in that the curricula lay down the ground rules for the given course or module, often consisting of a short summary of the themes and learning goals of the course in addition to rules regarding exam-types and other requirements for the completion of the course, while the course descriptions and plans are more specific about the actual content and concrete formation of the courses at that given time. The curricula are absolute, so that the rules outlined here always apply to the course (until revised by the study board); the course descriptions and plans are subject to changes or modifications as the professors in charge or the course see fit. As such, the curricula act as a kind of constitution of the program, while the course descriptions and the course plans are the more concrete day-to-day implementations of this constitution. It should be noted that because my examination of the courses is based on these three elements – the curricula, course descriptions and course plans – it is also inevitably limited; I have not conducted any participant observations or interviews with professors or students in the courses, but have instead based by mapping purely on textual analysis of how the course is laid out in my three different sources. This means that my mapping can tell us something about the *ambitions, conceptions* and *ideas* about what a philosophy of science course *should* or *could* look like. It will not, however, be able to assess how the courses in question have actually taken form in practice in the classrooms; in order to address this, further research is needed. What my mapping can do, however, is provide a foundation for embarking on this further research; more than anything else, perhaps, it can point to *attitudes* and *positionings* regarding what elements the course should contain – not least regarding the interpretations of what constitutes a "broader perspective", one of the only content-oriented guidelines for the course.

Indeed, the diversity in the design of the courses is perhaps unsurprising when taking into considering the vagueness of the official guidelines for the course. As is evident from the above-cited guidelines, no instructions are given regarding the actual content of the course other than the vague "The course's purpose it to provide students with the opportunity to qualify their disciplinary specialization by putting it into a broader, more general perspective" and "the content of the course must correspond to

[5] All curricula, course descriptions and course plans referenced can be found in the appendix.

the purpose, that is, to connect disciplinary questions or issues with interesting and relevant question of a more general kind", leaving the study boards in charge of the course in the different programs relatively free to decide what this should entail in their specific case. There are currently 83 BA programs spread out over six faculties at UCPH. This means that there are 83 individual courses on the philosophy of science. The relative freedom to design the course is certainly reflected in the way the actually 83 courses are described by the departments; they vary from program to program not only in content, but also in the amount of ECTS points awarded for the completion of the course, at what point in the program the students are required to take the course, types of exams, the way the course is taught and, not least, in the stated learning goals for the course.

As the overall purpose of the project is to strengthen interdisciplinary and interfaculty education at UCPH and shed light on the didactic and philosophy of science-related issues and challenges linked to interdisciplinary education via a systematic study of already existing and forthcoming interdisciplinary programs and initiatives,[6] I have chosen to divide the courses into two initial categories: those taking place in interdisciplinary programs (such as Nano Science or Medicine and Technology Studies) and those taking place in established disciplinary-based programs (such as Economics or Geology). From these two, I have chosen 12 courses in all which together represent the wide range of ways the "broader perspective" in terms of both disciplinarity and interdisciplinarity has been interpreted - from one end of the scale to the other and in between, from the courses that focus on the discipline at hand to those wherein interdisciplinary is the pivotal point of the course. Although the original project description focuses on interdisciplinary programs, because the comparative is a key point here, I have included a discussion of both interdisciplinary- and disciplinary-based programs. I have done this for two main reasons. Firstly, inter*disciplinarity* cannot be understood without disciplinarity, which the established disciplinary programs can help provide insight into. Secondly, I found it to be an interesting point with food for thought that in several cases, discipline-based programs placed emphasis on interdisciplinarity in their philosophy of science course, while several of the

[6] See the entire project plan here: http://www.ind.ku.dk/tvaerfag/projektplan/Tv_rfaglighed_-_Samlet_Projektplan.pdf

interdisciplinary programs' courses leaned towards a more disciplinary-grounded approach in their interpretation of the course. Including both interdisciplinary- and disciplinary-based programs thus enables a comparative analysis of the philosophy of science course that can shed light on the challenges that might be faced in the interdisciplinary programs, and, not least, how these are currently being addressed compared to their more established traditionally disciplinary counterparts.

Klein, Luttaca and Schmidt: a Very Short Note on Theoretical Inspiration

Given the above-outlined guideline's focus on the relationship between the discipline and the "broader perspective", more solid theoretical foundation for understanding how disciplinarity and interdisciplinary interact, and, not least, how we can identify interdisciplinarity and what characterizes this way of structuring knowledge may be helpful. In this aim, I found three scholars' work on three different aspects of interdisciplinarity especially helpful: Julie Thompson Klein's conception of boundary work, Lisa Luttaca's observations of interdisciplinary teaching in higher education and Jan C Schmidt's attempt to categorize and classify different types of interdisciplinarty. Below is a short outline of the usefulness of these three texts when dealing with interdisciplinarity in the philosophy of science courses. While Klein, Luttacca and Schmidt have certainly informed and inspired my mapping of the courses, I will not be directly applying them as analytical tools in the following, as I will instead be focused on attempting to provide a mapping of the courses on their own terms via textual analysis and close readings of materials from the courses. The below outline is meant to showcase my point of departure in my understanding of interdisciplinarity, and also provide a guide to three hopefully useful texts for any prospective readers who might be interested a theoretical basis for who to approach interdisciplinarity – perhaps in the planning of a philosophy of science course.

Although interdisciplinarity has been a buzzword in relation to higher education since OECD published the seminal report *Interdisciplinarity Problems of Teaching and Research in Universities* in 1972, relatively little research has been conducted on what interdisciplinarity actually *is,* how it can be defined, and, not least, how interdisciplinarity can be taught in a fruitful manner to the students expected to engage in this interdisciplinarity. One notable exception is the work of Julie Thompson Klein,

who has since her first monograph on the subject *Interdisciplinarity: History, Theory, and Practice* from 1990 worked extensively with mapping the distinction and interaction between disciplinarity and interdisciplinary and identifying differences in kinds of interdisciplinarity, providing a seminal and oft-cited taxonomy in the process. In this and later work, Klein understands the relationship between disciplinarity and interdisciplinarity as being more complicated than being merely oppositional forces, and argues that previous studies of the two have unproductively subscribed to standard models which "posit a uniformity of disciplines that is belied by the heterogeneity of practices and disputes of what constitutes the discipline "proper" (…)".[7] Because of increasing cross-fertilization and exchanges in the contemporary moment between traditional disciplines, Klein argues that this supposed uniformity of disciplines – and, following, interdisciplines and interdisciplinarity – is in fact considerably more murky, as "interdisciplinary activities compose a complex and contradictory set of practices located along shifting coordinates", where "multiple boundaries [are] being crossed".[8] Indeed, precisely boundaries and how and when disciplinary boundaries are crossed are key in Klein's work on the tension between disciplinarity/interdisciplinarity. Especially interesting is her notion of *boundary work.* Lifting the concept from Donald Fisker's introduction of it in the early 1990s,[9] Klein defines boundary work as "the composite set of claims, activities, and institutional structures that define and protect knowledge practices", and notes that the agents of boundary work are both people and places in that "people work directly and through institutions to create, maintain, break down, and reformulate boundaries between units".[10] Whereas the earlier work on the concept of boundary work has focused on its role in new disciplinary formations, Klein notes that boundary work occurs in all knowledge fields as a continual process far beyond simply the developmental stage, and that boundary work and boundary crossing should as such rather be viewed as an ongoing and universal phenomenon.

This way of understanding the dynamic between disciplinarity and interdisciplinarity, of course, enviably makes a mapping of interdisciplinarity based on clear-cut categories challenging. In dialogue with this point, philosopher Jan C. Schmidt

[7] Klein 1996, p. 4 .
[8] Ibid.
[9] See Fisker 1990.
[10] Klein 1996, p. 1

notes that there is "not one type of ID [interdisciplinarity], but various coexisting types"[11] and takes up the challenge of offering a preliminary framework for the classification of these coexisting types of interdisciplinary work via a "minimal philosophy of science".[12] This minimal philosophy of science makes use of already-established positions in the philosophy of science to consider different dimensions of interdisciplinary work, so that he divides interdisciplinary work into four main types: those that have to do with *objects* (ontologically focused), *knowledge/theories* (epistemologically focused), *methods/practices* (methodologically focused) and/or *problem perception/problem solving*. As such, this model speaks to Klein's points about the diversity of interdisciplinary work and provides a framework wherein to consider the arenas boundary work can occur, as well as echoing Dezure (1999) point that "the term *interdisciplinarity* is used variably as a concept, a methodology, a process, a way of knowing, and even a philosophy" (emphasis original).[13]

In her work with tracking interdisciplinary teaching and research in an academic setting, Lisa Lattuca (2001) observes that the "numerous, often competing schemes for classifying interdisciplinarty" in the existing literature did not adequately match her informants' understandings of interdisciplinarity, who were instead much more intuitively driven by their research questions and what they wanted to know, so that "different kinds of questions led to different kinds of interdisciplinarity".[14] This observation also rings true for the courses on the philosophy of science I am working with - both in general and specifically in relation to the interdisciplinary aspects and the interpretation of the element of the "broader perspective"; different courses have different students, disciplinary outlooks, criteria for relevance and points of departure, and accordingly ask different questions and seek different answers. As such, in the following, more than dividing each course up and categorizing them into each one of Schmidt's four dimensions, I have lifted Schmidt and Lattuca's observations concerning the inconvenience of a too-strictly or narrowly defined model for interdisciplinarity when dealing with a varied landscape of interdisciplinarity - which to boot is sometimes born out of individual and institutional choices that I do not have insight into - to inform

[11] Schmidt 2010, p. 39
[12] Schmidt 2008 , p. 66
[13] Dezure as quoted in Chettiparamb 2007, p. 31
[14] Lattuca 2001, p. 79

my mapping with an understanding that interdisciplinarity – and disciplinarity - comes in different forms and with different approaches.

Discipline-based Programs

I have chosen seven courses on the philosophy of science from five out of the six of faculties at the UCPH (two from the Faculty of Social Sciences, two from the Humanities, one from Health- and Medical Sciences, one from the Faculty of Science, and the single course from the Faculty of Theology) to illustrate how the course has been imagined in disciplinary-based established programs. These cases should not be thought of as being representative of the courses at each given faculty as a whole, but rather as an insight into the diversity of the ways these courses are perceived and imagined, and, subsequently, how this can shed light on different conceptions of the before-mentioned "broader perspective" in disciplines that are not necessarily interdisciplinary in conception.

Sociology, Geology and Economics: Three Ways of Understanding the Discipline

In the course description of the philosophy of science in the Sociology department, the discipline of Sociology takes center stage. Here, the course is outlined as being "an introduction to central philosophy of science issues relevant to the sociological discipline", "a presentation of the central philosophy of science- and moral philosophical problems in sociology", which will enable the students to "reflect upon the sociological relevance of philosophy of science's concepts, theories and methods". It thus seems that the philosophy of science at the department of Sociology is taught on *sociology's* terms, where, because the point of departure is being taken in sociology, the discipline becomes a benchmark for what is considered relevant. However, when reading the latest version of the course plan for the course from fall 2013 (the course is only taught in the fall), a quite different picture presents itself. Here, there is a focus on a more generic philosophy of science that does not prioritize the discipline of sociology;

instead, the students are walked through positivism, critical rationalism, critical theory, feminist philosophy of science, critical realism and moral philosophy as non-sociology-specific concepts. When the course plan is made more specific, it is by referencing not Sociology, but rather the field of social science, so that the students are introduced to "the social sciences in context", "paradigms in the social sciences" and "dualisms in the social sciences". In fact, in contrast to the course description, the word "sociology" is not mentioned at all in the course plan for the semester. While this discrepancy may initially seem puzzling, the reason behind it points to something quite central about the philosophy of science course and the turbulent life it leads in the different departments across the university: the professor who is currently acting as course responsible at Sociology, from whom I acquired the course plan itself, pointed out that in the aftermath of the former course responsible retiring, the course is going through a thorough restructuring in the aim of making it more rooted in Sociology as a discipline in order to, in his own words, strengthen the applicability of the course. The course plan is thus a product of the thoughts that went into the "old" course, while the course description is a product of the "new" course to be taught in the fall of 2014. The content of the course and how it is oriented according to interdisciplinarity, disciplines or fields is thus subject to some fairly significant changes according to who is planning the course and what kind of philosophy of science they deem relevant or, as is the case here, applicable.[15]

If we turn out attention to the Faculty of (natural) Science, in the department of Geology, the course plan and the course description match to a much higher degree than in Sociology. Here, the discipline is in focus, witnessed by how practically every concept introduced in the course description is explicitly put in relation to the discipline of geology. As such, according to the course description, the students will be studying "*geology's* philosophy of science", "the history of the *geological* science" and "the scientific methodological foundation of *geology*" (emphasis added). In addition, the more generic aspects of the course, such as the introduction of Kuhn's work on paradigms, are also put in relation to the specific field ("Kuhn's concept of paradigm in

[15] This, of course, also means that the mapping that this report can provide is a snapshot of what the courses look like right now, in spring 2014, and is not to be understood as an attempt to outline the be-all and end-all of the state of the philosophy of science courses.

relation to geology"). Other than Kuhn, the only scientist specifically named is Nicolas Steno, a Danish geologist, and other than paradigms, the concepts named – evolution, plate tectonics and ice age theory - are discipline-specific, not least when seen in the context of the rest of the course description. However, in a look to the broader field, the course description also states that one learning goal for the course is that the student should be able to "explain the basic concepts in geology's philosophy of science compared to other natural sciences". While what this learning goal entails is not further developed in the course description, hints to how this is approached are found in the course plan. Here, one out of eight lessons – titled "What is Natural Science?" - is devoted to this aspect of other natural sciences. This lesson raises questions such as "what is nature" "what is scientific argumentation" and "how do the natural sciences differ from other sciences" and outlines concepts such as demarcation, hypothesis, theory and paradigm. The remaining seven lessons, which deal with topics such as the future of geology, geology as science, geology vs. geoscience and paradigms in geology, however, do witness an interpretation of the discipline's philosophy of science course that takes it point of departure in giving the students a thorough introduction to precisely the *discipline.*

Finally, returning to the Faculty of Social Sciences, in the Economics department, the course on the philosophy of science showcases a similar disciplinary learning, but has also, quite interestingly, changed form slightly as I have been writing this report. Initially, I had analyzed the course from the course plan from February 2014. Here, the focus of the course was on "the basic methodology of economics" and how economics "*differs from* other disciplines" (emphasis added) at the faculty. Indeed, this use of "differs from" as opposed to, for example, "interacts" or "can work together with" was interesting, and provided a clue as to how the conceptualization aspect of the course was interpreted here as something that was done by looking from the inside of the discipline and out rather that the other way around - an interpretation that the stated learning goal that the students upon completion of the course are "expected to understand that present day economics describes western economics, and that *other economies* and *other economics* theories are possible" (emphasis added) also spoke to. At a more specific level, the course description listed equilibrium, profit maximizing

hypothesis and the role of assumptions in economics modeling as the theories and concepts that students were introduced to in the course, in addition to the "classical methodologies" of induction, deduction, falsification in the Popperian sense and the Duhel-Quine thesis. Notably, the students were expected to use their newly acquired knowledge in the aim of being "able to *contrast* these classical methodological issues with the rhetoric of economics and the Kuhn discussion of paradigms" (emphasis added), again using a verb which had connotations that stress the difference or un-similarity of a given entity to economics as an academic discipline, thereby also stressing its uniqueness.

The interpretation of economics as a more or less isolated discipline that this type of course plan points to is currently the subject of very public criticism from students in the discipline. In an open letter published in Politiken 5/5/14, these students oppose the "narrowing of the curriculum", the marginalizing of the courses – such as philosophy of science courses - that go beyond this narrow disciplinarity and suggest that pluralism and interdisciplinarity are the key elements in a necessary rethinking of the way the discipline is taught today.[16] And indeed, the course on the philosophy of science course in Economics has been restructured this spring, so that the course description now includes a focus on the relationship to other social sciences, stating in regard to the content of the course – albeit somewhat unenthusiastically - that "In practice, almost all economists will come to work with other social scientists, so the relation to neighboring branches of science will be discussed". Here, some the very explicitly discipline-specific concepts such as profit maximizing hypothesis have been erased from the course description, and have been replaced by a focus on "the concept of public choice and the distinction between market failure and political failure" and "welfare theory and the theory of happiness". Still, the course remains a course based on increasing students' knowledge of *economic* methodology, given the courses' description that "the intention is to provide the student with the background to reflect on the methods and results that are obtained in the economic science" and the learning goal that "the student should be able to present the most important methodological

[16] Read the open letter here: http://www.isipe.net/open-letter/ and the Danish version here: http://politiken.dk/debat/ECE2280397/undervisningen-i-oekonomi-er-i-krise/

problems of the econometric method". The use of the word *problems* here, however, hints at a larger degree of openness to a problematizing of the discipline that remained relatively unscrutinized in the older version of the course description.

Pharmacy and Law: Degrees of Critical Reflection and Multiple Perspectives

First and foremost, the philosophy of science course in the department of Pharmacy sets itself apart from the rest via its surprisingly unique focus on the aim that the knowledge acquired in this course should "be applied in the subsequent courses in the course of the program" - this is one of the only courses out of the entire lot that explicitly states this future ambition.[17] Furthermore, the course itself is a space for "increasing disciplinary consciousness and critical reflection" where "reflection and discussions – more so than apparent answers – are central", and aims to provide its students with the understanding that "preconceived notions and interpretation are not only something that is relevant to the humanist sciences". The course is thus apparently quite ambitious regarding providing the students with a broader perspective and a critical reflection about their own disciplinarity – a critical reflection that they are expected to take with them and actively use in future, non-philosophy of science courses. The course consists of six lectures, wherefrom "four of these deals with central themes in the philosophy of science, the last two deal with pharmaceutical relevant issues within the philosophy of science"; the *relevant* being here again specified, as is seen in many of the courses in the established single-discipline-based programs. However, when looking to the course plan, these two dimensions of the *generic* and the *relevant* philosophy of science are more integrated that the course plan might make evident, and also include a looking to themes about knowledge constructions within the natural sciences and the discipline of biology. These elements are integrated via the course's focus on case-based learning, as the course is structured so that the students in addition to the six lectures have six seminar-lessons and six project lessons to work with cases. These cases focus on

[17] Here, it should of course be noted that there is a wide variation concerning at what point in the BA program the philosophy of science course is scheduled; some courses, such as the course in the Law department, are taught on the very last semester of the program. Being the last course of the program, of course, limits the extent to which it can be a goal that it be incorporated into other courses.

themes such as the conception of illness in psychiatry, paradigms in conceptions of mental illness and conceptions of homeopathy, and are according to the course plan intended to illustrate "that values and preconceptions are imbedded in scientific work", thus again showcasing an orientation towards the course being a space for thinking differently about the discipline – with the help of other disciplines and disciplinary traditions.

At the faculty of Law, case-based learning is also in focus.[18] Here, the course is structured so that in the ten-week duration of the course, three weeks are spent on lectures and seven on case-based teaching in seminars. For each case, students read four texts - two texts on legal philosophy and two texts on the sociology of law - and are asked to apply the basic concepts and conceptions in these to a case. Examples of these cases are the American Declaration of Independence, a 1958 debate between Lon Fuller and H.L.A Hart in the Harvard Law Review on morality and law post-WWII, an excerpt of a textbook from one of the students' previous courses and the criminal trial against Duško Tadić at the International Criminal Tribunal for the Former Yugoslavia in 1997. The cases are very much Law-based, and as a whole, the course focuses on contextualization and contextualizing the discipline by, as stated in the course description "giv[ing] students knowledge about legal philosophical and legal sociological theories and through this an insight into how legal practice interacts with politics and morality". As such, the course introduces students to the idea that the otherwise quite monodisciplinary field of Law actually centrally holds interdisciplinary aspects and issues, and that outside perspectives – here, from philosophy and sociology – can provide help to understand these. While the learning goals in the course description that the students should upon the completion of the course have the ability to "think more abstractly" about the discipline and "see the legal system both from the in- and outside" reflects this, the course does not, however, specifically or explicitly address the concept of interdisciplinarity or

[18] A note of full disclosure should be included here: this project on the philosophy of science course has been carried out at the department of Law in cooperation with Jakob v H. Holtermann, who is a part of both the planning and teaching group for the course in the Philosophy of Science at Law, and will be the course responsible from Fall 2014. I myself, however, have not been directly involved in the planning or teaching of the course, and thus feel confident in my ability to critically analyze the course's content, holding no shares in it myself - although I of course have a larger degree of insight into the nitty gritty of this specific course compared to the rest.

interdisciplinary work and the challenges this can present in a field such as Law. Instead, the focus is on Law, with (legal) sociology and (legal) philosophy helping in gaining the "broader perspective" on the discipline. With this, the course seeks to give students "a broad insight into legal theory" and "knowledge about Law as a closed system while simultaneously being just one of many social systems".

The five above courses thus reflect different ways of approaching the course in the philosophy of science and the element of the "broader perspective" in already-established disciplines. While Economics previously provided perspective on their interpretation of the discipline by encouraging students to consider how it compares to other Economic theories and traditions, it has now incorporated a short mention of other disciplines while simultaneously focusing to an even higher degree on the discipline's own methodology, Geology contextualizes Geology's philosophy of science by comparing it to the field of natural science, whereas Sociology remains within the discipline and does not introduce any outside contextualization - at least in the newest reincarnation of the course. Meanwhile, both Pharmacy and Law use discipline-specific cases that have clear societal, ethical and philosophical weight to incorporate non-discipline specific perspectives on legal and pharmaceutical problems. In the description of these courses and their use of cases, however, there is also a certain tension between the interdisciplinary-oriented goal of introducing students with an array of concepts and ideas from outside the discipline and the stressing of the disciplinary relevance of these interdisciplinary efforts - a tension that bears witness to the difficult balancing act that putting together these courses - which are supposed to be oriented *outside* of the discipline while also in the process being oriented toward a greater understanding of the discipline from the *inside* - undoubtedly is, not least for the already-established disciplines and fields that have not traditionally practiced this kind of reflexivity.

The Non-Courses: Philosophy and Theology

Before moving on to the interdisciplinary programs, a short consideration of a type of course in the philosophy of science found in the established disciplines, here illustrated

by the courses at the departments of Philosophy and Theology, is in order. I have called this type of course the *non-course*. In these programs, there is no course on the philosophy of the discipline in question's science. Rather, Philosophy and Theology approach the inclusion of an element of the philosophy of science by respectively including it in a non-discipline-specific general course on the philosophy of science as a discipline in itself, and by spreading the consideration of a discipline-specific philosophy of science out onto four different courses in the program.

In the BA program in Philosophy, the course on the philosophy of science is taught as a part of a module on theoretical philosophy on epistemology and the philosophy of science. This course is not discipline-specific, but rather introduces students to "the natural, social and humanistic sciences' theories of science and knowledge" and the "historical context for the fields' concepts, problems and methods". In a sense, this course is thus interdisciplinarily-oriented, in that it includes a consideration of different kinds of sciences and their epistemologies which seems to grant them equal esteem and value. However, this course does not include a consideration of the point of departure for the consideration of these disciplines – that is, the discipline of Philosophy itself. The course is thus apparently not used as a space to reflect on issues relating to one's own disciplinarity and how this is situated within a broader perspective of science and society. Rather, the student of philosophy is here articulated as an almost neutral medium who can objectively compare and contrast scientific traditions and disciplines, so that two central skills the student is expected to acquire during this module is the ability to "bring perspectives from different philosophical traditions into dialogue with each other" and "contextualize philosophy of science and epistemological problems within their historical and systematic setting". In these goals, Philosophy works as the tool that can be used to compare and contrast disciplines and traditions, but remains unproblematized or at least unexamined itself.

Another example of a non-course in the discipline's philosophy of science is found in the BA program in Theology. Here, there is no single course on the philosophy of science. Rather, the students are here introduced to the discipline's philosophy of science by spreading it out over several courses throughout the program. This spreading out seems to be a deliberate strategy; in the curricula, the BA program is outlined as follows: "In the course of the first semester of the BA program, the student

will follow courses on The Bible, General Philosophy, Ethics and the Philosophy of Religion and Church and Theological History and Method. Through these, the student will acquire a basic knowledge of the subject matters and the philosophy of science related questions that are relevant to Theology". In this program, it is thus the ambition to build knowledge of Theology's philosophy of science by touching on it in different courses and contexts, which the students then can hold together to collectively shed light on the issues relevant to consider in this light within the discipline. As such, the philosophy of science is dealt with in four separate courses: Old Testament Exegesis, New Testament Exegesis, Church and Theological History and Method and General Philosophy. In each course where issues relating to the philosophy of science are touched upon in Theology, the curricula states that it is a philosophy of science that is *relevant* for the *discipline*, also within more generically-focused courses such as the course on general philosophy. This, of course, sets Theology apart from the non-course in Philosophy, which, as outlined above, has no focus on the discipline/disciplinarity of Philosophy in the philosophy of science course. However, when consulting the individual course descriptions, only one of the four courses that touch upon the philosophy of science has an explicit learning goal that addresses how it expects to align itself with the official guidelines for the course, namely the course on New Testament Exegesis. Here, the students are upon completion of the course expected to have attained an "understanding of the elective courses' contribution to the attempt to reconstruct the past scope of understanding and to make the contemporary interpreter aware of the context-specific conditions for his/her own understanding and interests". The remaining courses that include a consideration of the (discipline's) philosophy of science do not detail how this is done, or what skills the students are expected to acquire from it. This, of course, makes it difficult in an examination/mapping such as this to assess how and if the philosophy of science is prioritized or taught in these courses, and thus also raises questions about the extent to which a model such as Theology's – which goes against the official guideline of having a single course focused on the philosophy of science in favor of spreading it out and incorporating it into a selection of courses during the program – can be assumed to actually provide the students with the basic knowledge of the philosophy of science outlined in the curricula. Indeed, to be able to draw a more decisive conclusion about this further investigation is

needed, not least in the form of observations of the courses as they are taught.

Interdisciplinary Programs

To shed light on the diversity in the ways the interdisciplinary programs at UCPH have chosen to interpret the philosophy of science course, I will below outline six different courses - three from Faculty of Science, one from the Faculty of Health Sciences, one from the Faculty of Humanities and one joint program between UCHP and the Technical University of Denmark.[19] I have structured my analysis of these into three sections each representing a different level in the way the interdisciplinarity of the program is conce addressed – if at all – in the course. First, I will analyze two examples of courses that pay minimal attention to the interdisciplinarity of their program, but instead chose to focus on an aspect of disciplinarity in their course. Secondly, I will examine a course that approaches the program on both a generic level and via a discipline-defined interdisciplinarity, and discuss what distinguishes this approach from others. Finally, I will discuss three different examples of courses that focus explicitly on interdisciplinarity both as a concept and a part of the program in question. All together, this will hopefully provide an outline of the full register of how interdisciplinary programs at UCPH are approaching and conceptualizing themselves and their interdisciplinarity in this type of course.

The Discipline and Field in Interdisciplinarity: Biomolecular Sciences and Technology and Nano Science

[19] The overrepresentation of courses from the Faculty of Science is due the fact that this faculty has far more interdisciplinary BA programs than the remaining faculties (the Faculties of Social Science, Theology and Law, for instance, do not offer any interdisciplinary BA programs). Additionally, the fact that the three courses from the Faculty of Science – from the programs in Biomolecular Sciences and Technology, Nano Science and Landscape Architecture and Urban Design - differ greatly in their approach to the course gives the comparative value as well, and again illustrates the diversity in the conception of what such a course should entail – not only across but certainly also within Faculty boundaries.

An example of a course on the philosophy of science in an interdisciplinary program that seems to pay very little explicit attention to questions relating to interdisciplinarty is seen in Biomolecular Sciences and Technology, where the philosophy of science course is incorporated into a course in experimental biology. While the philosophy of science does not have its own course here, it does differ from the above-outlined non-courses at Theology and Philosophy in that the Biomolecular Sciences and Technology program actually offers a course that intends to touch upon the discipline's philosophy of science – but here, an "introduction to basic concepts of ethics and philosophy of science" is according to the course description an "additional" although "integral" element in the thematic course on experimental molecular biology. Interestingly, the course expresses a clear interdisciplinary ambition, as it is a cross-departmental course in a cross-Faculty program - Biomolecular Sciences and Technology is a program offered in cooperation between the Faculty of Science and the Faculty of Health and Medical Sciences - where the students are expected to work in groups and carry out "small research projects in different research groups across different departments". In the reports these students produce, students are required to include two "separate sections" on the research "in the context of ethics and philosophy of science". However, the list of the concepts that the course introduces are first and foremost extremely discipline-specific and secondly, obviously related to the experiential part of the course: "extraction of DNA and RNA, PCR, RT-PCR, real-time PCR, in-situ hybridization, cloning, primer and vector design, transformation of prokaryotic and eukaryotic organisms, cultivations of cell cultures, heterologous gene expression, protein purification, immuno blotting, histochemical analyses, enzyme kinetics, bioimaging and bioinformatics. A wide-range of experimental organisms is employed including bacteria, yeast, fungi, plants and mammalian cells, with an emphasis that the methods and basic scientific principles taught have general relevance." While the course description does add "In parallel to experimental exercises, the students will be guided to acquire skills in critical examination of scientific data and interpretations through journal clubs and scientific writing through reports", it leaves the clear impression that the philosophy of science part of the course focuses mainly on methodology as opposed to a more general or generic introduction to the philosophy of science and critical thinking. However, in the course plan, the philosophy of science part of the course is outlined in more detail; here,

we see that over seven lectures in the course of two blocks (≈ one semester), the students are introduced to themes touching on ethics, good scientific practice, what can be characterized as science and the relationship between science and values. Especially interesting for our purposes is how these issues do not explicitly touch on the field's interdisciplinarity or the program's cross-institutional makeup and how this might present itself as a theoretical and/or practical challenge both in this field generally and the students' day-to-day work specifically. Rather, according to the course plan, these issues are explored from the vantage point of the field of biology, so that, for example, the "What is Science?" lecture lists "The place of systems biology and synthetic biology in the history of biology" as a main theme, and the "Science and Values" lecture lists "Risk and risk-benefit evaluations in biomedical research" as a main theme. This course on the philosophy of science is thus based on being anchored partly in a single (although broad) field and partly in practical exercises. Illustrative exercises, as we see in the course in the Law department or the Pharmacy program, are relatively often used in these courses, but what distinguishes the exercises in Biomolecular Sciences and Technology from others is that while Law and Pharmacy's cases were thematic and society- and problem-based, the exercises in Biomolecular Sciences and Technology are concept-based in a quite narrowly-defined discipline-specific way. The course plan leaves no question as to the prioritization of the practical exercises – students are expected to devote 140 hours to these compared to 35 hours to lectures and 4 hours to theoretical exercises – and in this, the course represent a quite unique interpretation of the content of the philosophy of science course, which is more often than not a course heavy in reading material and light in laboratory work.

Remaining in the realm of the interaction between the natural and technological sciences, the course on the philosophy of science in the Nano Science program is marked by its absence. Here, the program does not have its own course on the philosophy of science, but instead requires that its students take this mandatory course in two other departments: Chemistry or Physics. The students are free to choose either course and receive full credit for it as a part of their education in Nano Science. However, the two courses differ quite a bit in both content and outlook; while the course in Chemistry is focused very much on the field of natural sciences, being a self-proclaimed "incomplete introduction to the basic rules and structure of research in the

natural sciences", and structured into themes such as "the natural scientific methodology", "the natural scientific explanation", "misconduct in the natural sciences" and "the shifting norms of the natural sciences", the course in the Physics program focuses to a much higher degree on generic and what they term "classic philosophy of science", that is, concepts such as rationalism and empiricism, logical positivism and Karl Popper's theory of falsification. In addition, it also considers an array of other more of less connected themes, such as the debate on scientific realism, quantum philosophy, the university's history, and the university as an institution, research ethics and the sociology of science. As such, this course is much less narrowly discipline or field-oriented than the course in Chemistry, and incorporates theoretical framework from outside the discipline and field of natural science as central parts of the course. Here, the central learning goal for the course is the students acquire an "understanding of the distinctive character, strengths and weaknesses of physics, as well as the structure of the discipline and its status within the philosophy of science" in addition to having gained an "understanding of physics' relationship to other disciplines, such as mathematics and technology, as well as physics' interplay with society". In contrast, in the course in the Chemistry department, the field of natural sciences remains rather unproblematized; much like the older version of course on the philosophy of science in Economics described above, there is little mention of the potential limitations of the field and scientific approach laid out here. Here, the same section on learning goals reads that "after the course, the student's knowledge should include an overview of how chemical models are built, which conceptual framework they come from and how these models can be critically examined", thus remaining within the discipline, and using the discipline/field to look at itself to a higher degree that the course in Physics. Just as interesting as these differences - and the fact that the students at Nano Science will be introduced to two different interpretations of a philosophy of science course according to which course they choose - however, is the fact that students are asked to choose at all. Nano Science is often touted as a prime example of interdisciplinarity, a new discipline where the increasing need to work across disciplinary boundaries in the contemporary moment is met. But the discipline has no course of its own philosophy of science - the only mandatory course on a BA program –a space that could have been used to consider or reflect on the celebrated role of the new discipline, or to merge the

elements from the Chemistry and Physics courses, giving students of Nano Science a little of each. Interestingly, by contracting this course out, the interdisciplinary Nano Science is split up and put into already-established disciplinary boxes: *either* chemistry *or* physics.

Indeed, although both Nano Science and Biomelocular Sciences and Technology are inherently interdisciplinary disciplines, the courses in the philosophy of science here do not include a reflection about how students are in fact working interdisciplinarily, and what issues or conflicts this might entail; in Biomelocular Sciences and Technology because of a discipline- and concept-specific leaning in a course focused on combining practical exercises with lectures on the philosophy of science, and in Nano Science because of the lack of a space to consider Nano Science as an interdiscipline itself.

Communication and IT: From Generic to Specific Interdisciplinarity

A different approach is seen in the philosophy of science course in the Communication and IT program at the faculty of Humanities. Here, the course is, according to the course plan, divided into two halves; in the first part of the course's fourteen-week duration, students are introduced to a generically focused interpretation of a philosophy of science course. Non-discipline- and field specific concepts such as the demarcation problem, positivism and rationalism, methodological individualism and collectivism and critical realism are in focus here, as is training the students' ability to account for these different concepts and their meanings on a general level. In the later half of the course, the focus is on using this knowledge to shed light on the tensions at play in the program. Sessions here, for example, are devoted to the students being able to "account for how key concepts are defined differently across research traditions and discuss what this means for research in communication and IT", "account for how information technology can be understood as socio-materially constructed" and "discuss how design science and ANT approach 'intervention' as a framework differently". While answering these questions requires an interdisciplinary outlook and understanding – here, being oriented and sensitive toward basic concepts and traditions in both humanistic and IT-related research – they do not necessarily ask the student to reflect on what interdisciplinarity as a broader concept is; in this course, students are asked to reflect

upon their own specific brand of interdisciplinarity – without ever calling it that -via being able to compare and contrast the two main arenas influencing their program, humanities and IT. This is also reflected in the learning goals written into the course description, which state that students should be able to "account for the relationship between the humanistic sciences and the natural sciences, paying special attention to media sciences and computer sciences", and "describe different theoretical frameworks and empirical approaches within media science and computer sciences", thus outlining a clearly-defined frame within which the students are to consider interdisciplinarity. It is, however, notable that the specific focus stated in these goals on media science is not necessarily reproduced in the course plan, which instead tends to focus more broadly on the humanistic field.

Three Ways of Approaching Interdisciplinarity in Fagets Videnskabteori: Values and Vocabulary, Profession(?) and Problem/Case-based

The philosophy of science course in the joined/interdisciplinary programs Landscape Architecture and Urban Design, Medicine and Technology studies and Molecular Biomedicines each devote a substantial amount of time to explicitly deal with questions of interdisciplinarity and how to best deal with the challenges this presents. They do so in different ways, as each course takes a different point of departure to address interdisciplinarity and the fact of being an interdisciplinary discipline: Whereas the course in Landscape Architecture and Urban Design focuses on differences in values and vocabulary and the conflicts that can arise from this, the course in Medicine and Technology focuses on what kinds of interdisciplinary questions are raised in the medio-technical profession (or, that was at least the initial intention), while the course in Molecular Biomedicine approaches the themes covered from a case-based perspective that encourages reflection regarding how the discipline works together with other disciplines.

In the program on Landscape Architecture and Urban Design at the Faculty of Science, the course on the philosophy of science course is focused especially on the epistemological and methodological challenges being in an interdisciplinary program

can present students with. The course is articulated as a space where the students have the opportunity to reflect on and gain a deeper understanding of what these challenges can stem from: "Landscape Architecture and Urban Design employs, in addition to experience-based knowledge, an increasing set of scientific approaches, where the natural sciences are combined with social scientific understanding and creative disciplines. This can make it an area that fosters conflict between different traditions. The course provides an introduction to different understandings of science and scientific traditions." As a whole, the course is designed to be a space where "the meaning of different conceptions of different concepts of "landscape", "urban" and "nature"" are discussed and compared, and how "a difference in values can foster dilemmas and conflicts, and how issues relating to values can be handled". As such, the course works from the point of departure that disciplinarity creates not only different worldviews but also different vocabularies to go with it, and focuses on giving the students tools to deal with the issues that this raises in their particular (interdisciplinary) situation via an insight into these different vocabularies and values. In the course plan, these goals and outlines of content from the course description are concretized via lectures with titles such as "Natural science as a role model for the social and humanistic sciences?" and "Landscape Architecture and Urban Design – art, craft or science?", and with exercises dealing with issues such as "Interdisciplinarity – problem or necessity?" and "Differences and similarities in scientific approaches". In addition, the course description also outlines a focus on the practitioners themselves, as it "look[s] at the evolution of disciplinary self-perception" within the discipline – a focus that is echoed in the course plan, which has devoted one out of the eight themes the course is structured into to disciplinary self-perception and the discipline's interaction with society as a whole. Thus, as opposed to most of the courses in the philosophy of science outlined above, and perhaps especially the course in the Philosophy program, this course is also includes an explicit consideration of the significance of the students' own disciplinary identity and how these have developed, which is very much in tune with the course's overall focus on what the course description articulates as the "assumptions" that have shaped theories and methodologies within their discipline.

When looking at the course description of the course on the philosophy of science in the Medical Science and Technology studies program, self-perception and the

reflexive focus on the practitioner and his practices are also a key focus point; in fact, practitioner could easily be said to be *the* keyword, as the course according to the course description is to a large degree built around providing the students with an understanding of "civil engineering as an academic discipline and a *profession* in a broader perspective" (emphasis added). Including a consideration of the profession to the extent that this course does is unique to this program, and is interesting in that it is an example of how an introduction to interdisciplinarity in an interdisciplinary and cross-institutional - Medical Science and Technology studies is a joint program between UCPH and the Technical University of Denmark - program's course on the philosophy of science can been addressed in an alternative way. Indeed, the focus on the profession has allowed for a different way into issues of interdisciplinary than the perhaps more classic model of reading a series of seminal and representative texts on different disciplines and interdisciplinarity. Instead, as outlined in the course description, the course becomes more of a space of self-reflection where the "social, cultural and individual perspectives on medio-technical identity construction" is in focus, and which will in turn provide the students with knowledge about "the discipline's situation in a broader conceptual, cultural and social context in addition to the epistemological, economic, social, communicative and ethical issues one can be confronted with in contemporary medio-techinal engineering work". Especially interesting here is how the focus on the profession opens up for a consideration of the often-unconsidered – within these academic courses - aspect of economy, and how this influences the work of a medio-techinal engineer after graduation. Likewise, communication and communicative issues are rarely touched upon in these courses on the philosophy of science, but do nonetheless become relevant when focusing on the engineering profession.

This focus on the interdisciplinarity questions raised by the profession, however, seems to be lost when looking at the course plan for the most recent philosophy of science course in this program. Here, a more generic philosophy of science text-compilation with concepts such as scientific paradigms, induction, falsification and scientific models characterize this plan, and in the six listed goals of the course at the beginning of the course plan, the profession is not mentioned at all. Rather, these are to "reflect upon what natural science, technology and medicine are, and what makes them different from other types of knowledge", "demonstrate that scientific method is neither

simple nor singular", "show that natural science and technology are also products of social processes", "examine the complex relationship between natural science and technology", "discuss science communication and ethics" and "use history to better understand natural science and technology today". These are thus also goals that are clearly interdisciplinary and focus on critical reflection about and contextualization of the field and academic practice, and not least, the relationship between the different disciplines that make up Medical Science and Technology studies – but these goals are not the same as those listed in the course description. According to the current course responsible professor Karin Tybjerg, the discrepancy between the course description and the course plan is due to the form and content of the course having been changed several times after the course description was written, not least due to the difficulty in managing to fit all these lofty ambitions into a course that is only ascribed 2,5 ECTS points, and whose timeframe to boot has been modified from three weeks in the course description to a single week with four lessons and a review-session in the course plan. Given that there is no outline of the course in the curricula, which merely states that the course is a mandatory part of the program, the course is free to change form and content in this way. Like the course in Sociology, this is thus also a case that illustrates the conditions under which these courses live and take form, being influenced by both practical and administrative concerns as well as the academic preferences or convictions of the professors in charge.

Finally, an example of a way interdisciplinarity within an interdisciplinary program is addressed in more implicitly is seen in the Molecular Biomedicines program at the faculty of Medicine and Health Sciences. This philosophy of science course is characterized by its adoption of a problem/case-based approach. Here, one of the stated purposes of the course is to "make clear natural scientific research's conceptual framework and the following rules and limitation of this", which will in turn enable to student to "qualify their disciplinary specialization in molecular biomedicines by reflecting on the possibilities and limitations inherent to different scientific methods and approaches, and by viewing their discipline/field in a broader perspective". While there is a certain leaning, especially in the first quote from the course description, towards a field-based focus on the natural sciences, the inclusion of the word *limitations* in both quotes is key, as it indicates a focus – the likes of which is not seen in the courses

in the more discipline/field-based courses in, for example, Nano Science and Biomolecular Sciences and Technology - on what the field *cannot* do or what is beyond its scope. This is further supported by how the themes of the course are shed light on via cases that are portrayed as complex biomedical issues necessitating multifaceted approaches. Here, themes of causality, reductionism, paradigms for hereditability, naturalistic vs. normative notions of disease, ethics and argumentation, general bio- and research ethics are unpacked via cases such as HIV/AIDS diagnoses, infertility, stem cells and stem cell research, animal testing and drug testing in third-world countries. According to the course plan, the course is structured so that each of the seven lectures of the course that deal with a more overall aspect of the philosophy of science (such as "Science and Reality", "Science and Models" and "Research Ethics") are accompanied by a seminar class that deals with a selection of the above-listed cases. This is especially true of the seminars connected to the lectures on ethics, but the students are also given specific cases to work from in the more generic themes – such as the seminar/lecture series on causality, which uses mad cow disease as a case to reflect on animal testing, model development, experimentation and falsification as well as more discipline-specific concepts such as the Henle-Koch criteria in medical research. As such, by working problem/case-based, the students are in this course thus encouraged to think both within and beyond disciplinary (under)standing. This is thus a course that resembles the courses in Law and Pharmacy discussed above – and like these courses, while interdisciplinarity is clearly built into the foundation of the course, the concept of interdisciplinarity or interdisciplinary work is not explicitly addressed or discussed in the curricula, course descriptions or plans. This is of course interesting in a program that asks its students to be interdisciplinary to the degree a discipline like Molecular Biomedicines does – a fact that this course does not, unlike the courses in Landscape Architecture and Medical Science and Technology, touch upon.

Concluding Remarks and Perspectives

As the above outline of the 13 courses has hopefully illustrated, the approaches to the courses in the philosophy of science at UCPH are both many and multi-faceted. Some established disciplines, such as Pharmacy and Law, have structured courses that work as spaces to "branch out", while others, such as Economics, Sociology and Geology, use the course to mainly concentrate on their own discipline and its foundations. Meanwhile, in the interdisciplinary programs, courses in often-cited examples of interdisciplinary programs such as Nano Science actually have a very specific disciplinary learning in their course, and do not focus on questions of interdisciplinarity or a "broader perspective", while others, such as Landscape Architecture and Urban Design, use the course to focus on precisely interdisciplinarity and what being an interdisciplinary discipline entails. As such, one main conclusion that can be drawn from this is that above all else, diversity marks the up make of the mandatory course in the philosophy of science at UCPH today, certainly in terms of the interpretation of the "broader perspective" and the approach to disciplinarity/interdisciplinarity that we have been interested in uncovering, but also in relation to the more general structuring of the course, both in terms of administrative and academic aspects. This prompts questions as to whether the course, especially if the main ambition with making it mandatory is to ensure that students of a given program will have the opportunity to reflect of their own discipline and how it inscribes itself into this much-cited "broader perspective", might benefit from having guidelines that are less vague and more official. Less vague guidelines might also help steer away the course from going in the same direction as Filosofikum, which fell victim to precisely a lack of structuring and reflecting upon what the course could offer students that other courses in their program could not. On the other hand, a too strict controlling via a too narrow definition of what the course should entail could paradoxically also push the course into Filosofikum-territory, as the departments would then lose their prerogative to decide how to make the course relevant to their specific students – and given that the course as imagined right now is centrally focused on qualifying the individual student's disciplinarity, it

would be difficult and potentially turf-war-inducing to assess in a top-down manner how this might be done best across the very different and diverse departments of UCPH.

Indeed, even in its current conception, there is no getting around that the course comes with a distinct flavor of Filosofikum, a course that far from every department reminisces happily about, and a course that far from every department or student can necessarily see the relevance of. Filosofikum and the philosophy of science still lead rough-and-tumble lives in certain departments, often accused of being irrelevant and inapplicable to the type of work done in both the education and future careers of students. As such, one must not lose sight of how the planning of the philosophy of science courses is in many instances an exercise in the art of the possible, and that some departments are better positioned than others to have a more far-reaching interpretation of the extent to which a "broader perspective" necessarily involves a focus on other disciplines or fields than their own. Although our goal with looking into the philosophy of science courses – to look at whether, where and how interdisciplinarity is being addressed in the philosophy of science courses with the ultimate goal of strengthening interdisciplinarity at UCHP – makes a complete neutrality in the mapping of the courses something of an illusion and some degree of judgment of the courses inevitable, it is important to stress that not all courses or departments necessarily *need* to be interdisciplinary – and that some small degree of interdisciplinary orientation might be considered more than enough in an otherwise monodisciplinary program.

Finally, as noted above, this mapping will inevitably be a snapshot of how the courses look today and at this present moment. As the courses in Sociology and Medicine and Technology studies have shown, the philosophy of science course is subject to re-negotiation and change on account of multiple factors, both administrative and academic - and this is an important point in itself about the contested nature of the course on the philosophy of science. While this mapping can thus not account for the changes and shifts that occur within departments that might influence the structure of the course at almost any given point in time, what it can show is the wide range of interpretations of what a "broader perspective" can be, and give examples of how it can be structured into a course that focuses more or less on interdisciplinarty. It can also work to provide an overview of the lives of these courses across departments in UCPH –

something that currently does not exist. As such, I hope it can be read and used as an aide by prospective planners of a philosophy of science course, or, more broadly, as something that can provide food for thought in relation to what to consider when seeking to integrate an element of reflection on interdisciplinary issues and/or interdisciplinarity into a given course.

Bibliography

Websted for undervisere i fagets videnskabsteori. *Almen information om Fagets Videnskabsteori.* http://www.nbi.dk/~natphil/FVT/i_Alment.html

Becher, Tony (1990). 'The Counter-Culture of Specialization', European Journal of Education, Vol. 25 (3): 333-346.

Chettiparamb, Angelique (2007). Interdisciplinarity: A literature Review. The Interdisciplinary Teaching and Learning Group, Subject Centre for Languages, Linguistics and Area Studies, School of Humanities, University of Southampton. http://www.heacademy.ac.uk/assets/documents/sustainability/interdisciplinarity_literature_review.pdf

Claus Emmeche, Simo Køppe and Frederik Stjernfelt's article "*Filosofikums nødvendighed*" (On the Necessity of Filosofikum), published in Politiken in Febuary 2000

Christensen, Ole Ravn (2004). Exploring the Borderland : a study on Reflections in University Science Education. Department of Education and Learning : Aalborg Universitetsforlag.
http://vbn.aau.dk/files/84478/Phd_4_8790934989.pdf

Christensen, Ole Ravn (2005). 'Fagets Videnskabsteori – et større alment perspektiv'. MONA Matematik- og Naturfagdidaktik - et tidsskrift for undervisere, forskere og formidlere, Vol. 1: 44-55 http://www.ind.ku.dk/mona/2005-2006/MONA-2005-1-FagetsVidensskabsteori.pdf

Eisel, Ulrich and Heather Nicholas (1992). 'About Dealing With the Impossible: An account of Experience in Landscape Planning Courses', *European Journal of Education*, Vol. 27 (3): 239-255.

Finkenthal, Michael (2001). *Interdisciplinarity. Toward the Definition of a Metadiscipline?* New York: Peter Lang Publishing.

Fisher, Fonald (1990). 'Boundary Work and Science: The Relation between Power and Knowledge' in Cozzens, Susan and Thomas Gieryn (eds.) *Theories of Science in Society.* Bloomington: Indiana University Press.

Gamborg, Christian (2009). 'Pædagogiske udfordringer ved undervisning i (fagets) videnskabsteori' Improving University Science Teaching and Learning – Pedagogical Projects 2009, vol. 2 (2): pp. 97-108.

Haynes, Carolyn (ed.) (2002). *Innovations in Interdisciplinary Teaching.* Washington: American Council on Education / Oryx Press.

Institut for Naturfagenes Didatik (2014). *Projektplan for Tværfaglige og tværfakultære uddannelser.* http://www.ind.ku.dk/tvaerfag/projektplan/Tv_rfaglighed_-_Samlet_Projektplan.pdf

Institut for Naturfagenes Didatik (2014). *Tværfaglighedsprojektet.* http://www.ind.ku.dk/tvaerfag/

Klein, Julie Thompson (1990). *Interdisciplinarity. History, Theory, and Practice.* Detroit: Wayne State University.

Klein, Julie Thompson (1996). *Crossing Boundaries. Knowledge, Disciplines and Interdisciplinarities.* Charlottesville and London: University Press of Virignia

Lattuca, Lisa R. (2001). *Creating Interdisciplinarity. Interdisciplinary Research and Teaching among College and University Faculty.* Nashville: Vanderbilt University Press.

Ministeriet for Forskning, Innovation og Videregående Uddannelser (2010). *Bekendtgørelse om bachelor- og kandidatuddannelser ved universiteterne (uddannelsesbekendtgørelsen)* https://www.retsinformation.dk/Forms/R0710.aspx?id=132698#K4

Newell, William H. (1994). 'Designing Interdisciplinary Courses' New Directions for Teaching and learning, Vol. 58 (summer): 35-51.

OECD (1972). *Interdisciplinarity Problems of Teaching and Research in Universities*. Washington D.C.: OECD Publications Center.

Petrie, Hugh G. (1976). 'Do You See What I See? The Epistemology of Interdisciplinary Inquiry', *Journal of Aesthetic Education*, Vol. 10 (1): 29-4

Petrie, Hugh G. (1992). 'Interdisciplinary Education: Are We Faced with Insurmountable Opportunities?' *Review of Research in Education*, Vol 18: 299-233.

Rasmussen, Kjeld and Arler, Finn (2013). 'Interdisciplinarity and the Human-Environment interface' Danish Journal of Geography, Vol. 110 (1): 37-45.

Ravn, Ole (2005). 'Fagets Videnskabsteori – et større alment perspektiv'. MONA Matematik- og Naturfagdidaktik - et tidsskrift for undervisere, forskere og formidlere, Vol. 1: 44-55

Ravn, Ole and Patrik Kjærsdam Telléus (2010). *Fagets videnskabsteori og argumentationsteori – en redegørelse for et praksis- og problemorienteret undervisningsforløb*. Arbejdspapirer on læring og filosofi, Institut for Uddannelse, Læring og Filosofi, Aalborg Universitet.

Schmidt, Jan C. (2008). 'Towards a Philosophy of Interdisciplinarity. An Attempt to Provide a Classification and Clarification', *Poiesis Prax,* Vol. 5: 53–69.

Stober, Spencer S. and Donna Yarri (2012). Interdisciplinary Teaching: Confessions of a "Biologian". The International Journal of Science in Society, Vol. 3 (1): 117-129.

Strathern, Marilyn (2005) 'Anthropology and Interdisciplinarity' Art & Humanities in Higher Education Vol 4 (2): 125-135.

The International Student Initiative for Pluralism in Economics (2014). *An international student call for pluralism in economics.* http://www.isipe.net/open-letter/

The International Student Initiative for Pluralism in Economics (2014). *Undervisningen i økonomi er i krise.* http://politiken.dk/debat/ECE2280397/undervisningen-i-oekonomi-er-i-krise/

Vestager, Margrethe (2001). Forskning og uddannelse – interview med undervisningsminister Margrethe Vestager i Uddannelse; no. 3, marts