

# SVF 8054 – THEORY OF SCIENCE

Autumn, 2019/2020 Academic year

## *Course Handbook*

### **I. Introduction**

The course aims to introduce doctoral students enrolled in the HSL Faculty into the theory of science. The course is designed to be offered to students with varied backgrounds and does not presuppose prior knowledge of philosophy.

The course consists of two parts. The first part contains common lectures and supervision within specialization groups (in humanities, linguistics and social science). The second part consists of lectures in specialization groups, student presentation and discussions.

For further information on the formal aspects of the course, see the [official course description on the UiT website](#).

The timetable for the course can be found [here](#). (The link is also available through the official course description.)

The course has its own [Canvas room](#). All students should make sure that *they are registered on Canvas for the course* since this is going to be the primary platform of communication between students and teachers. If you have problems, please write to Nina for help (see here contact details in the next section).

### **II. Course personnel**

The course is taught in collaboration by the Institute of Philosophy and First Semester Studies (IFF) and other parts of the HSL Faculty.

Administration:

[Nina Norum Anda](#) ([nina.n.anda@uit.no](mailto:nina.n.anda@uit.no))

Course leader:

[Attila Tanyi](#) ([attila.tanyi@uit.no](mailto:attila.tanyi@uit.no))

IFF staff:

[Jan Harald Alnes](#) ([jan.harald.ernes@uit.no](mailto:jan.harald.ernes@uit.no))

[Michael Morreau](#) ([michael.morreau@uit.no](mailto:michael.morreau@uit.no))

[Fredrik Nyseth](#) ([fredrik.nyseth@uit.no](mailto:fredrik.nyseth@uit.no))

Specialization:

[Anniken Greve](#) ([anniken.greve@uit.no](mailto:anniken.greve@uit.no))

[Marit Aure](#) ([marit.aure@uit.no](mailto:marit.aure@uit.no))

[Gillian C. Ramchand](mailto:gillian.ramchand@uit.no) ([gillian.ramchand@uit.no](mailto:gillian.ramchand@uit.no))

### **III. Important dates**

There aren't many dates to keep in mind in this course, but some do exist. Here are they:

1. *September 9*. Submission deadline for the first (pre-course) assignment. Submission will be through WiseFlow.
2. *September 24 (TBC)*. Kick-off event with pizza: this is intended as an entirely informal meeting where students can meet each other as well as the staff.
3. *Varying deadline (in October/November)*: In between the two halves of the course (the common lectures and the specialist teaching), you will have to submit a draft of your final essay. This deadline will be set by your respective specialist seminar leader. Submission will be through Canvas.
4. *November 26*. Submission deadline for final (second) assignment. Submission will be through WiseFlow.

IT IS VERY IMPORTANT THAT YOU KEEP THE DEADLINES!!!!

### **IV. Language**

The language of instruction in the course is English but in the specialization seminars, if all students and the teacher prefer it, Norwegian can also be used.

## **COURSE SYLLABUS (INCLUDING READING LIST)**

All students are required to attend the common lectures, after which they will be divided into groups depending on their specialization. On the following pages you can read in more detail about the different parts of the course. Should you have any questions contact the teachers of the relevant part of the course or the course leader. With administrative inquiries, please turn to Nina.

All the required readings (highlighted in red) are available through the course's [Canvas room](#) as a pdf file or through an internet link. The course also has its [Leganto pensum list](#) that you can reach via the Library website. This list contains both the required readings and some of the recommended readings; however, only the books and edited volumes are included, journal articles are available only through Canvas.

### IFF COMMON LECTURES, DAY 1 (SEPTEMBER 25)

Length and distribution: 6 hours, 3 hours morning session, 3 hours afternoon session.

Teacher: [Jan Harald Alnes](#) (IFF)

*Theme:* informal logic.

The seminar focuses on interpretation, argumentation and writings.

*Topics covered (among others):*

- The Principle of Charity- interpretation, reading and writing
- Argumentation and disagreement - real and apparent
- Argumentation pro et contra
- Semantics, illustrated by Ogden's triangle
- The form and significance of definitions
- Informal fallacies
- Rhetoric

*No required reading.*

Recommended reading:

Douglas Walton, *Informal Logic-- A Pragmatic Approach*, second edition, Cambridge: Cambridge University Press (2008) (347 pages).

The book is a useful source and guide through the field; to have a look is highly recommended.

### IFF COMMON LECTURES, DAY 2 (SEPTEMBER 26)

Length and distribution: 6 hours, 3 hours morning session, 3 hours afternoon session

Teacher: [Michael Morreau](#) (IFF)

*Theme:* philosophy of science

*Topics covered:*

Part I: Reality and Representation

This first lecture introduces the idea that to have knowledge is to have a certain kind of representation of some separate domain or field. It makes the basic distinction between questions of ontology, or what there is, and questions of epistemology, or how we can find out what there is and what it is like. There will be examples from social sciences such as linguistics, political science and archeology.

*No required Reading.*

Additional Reading:

Frigg, Roman and Nguyen, James, "Scientific Representation", *The Stanford Encyclopedia of Philosophy* (Winter 2018 Edition), Edward N. Zalta (ed.), URL = <<https://plato.stanford.edu/archives/win2018/entries/scientific-representation/>>.

Discussion questions: (1) To what extent is there in your chosen field of study a reality that exists independently of (a) human beings and (b) the activities of researchers in this field? Give examples that illustrate your answers. (2) Are notions of truth and falsity available also in literature? For instance, is it true that Sherlock Holmes smokes a pipe? Is it true that he smokes cigarettes? What makes these things true or false, as the case may be?

Part II: What do scientists produce?

This part is an introduction to different kinds of theoretical artifacts that scientists produce: hypotheses, theories, models, data (both quantitative and qualitative), predictions, explanations and so on. There will be lots of examples of the different ones from different fields.

*Required Reading:*

Tal, Eran, "Measurement in Science", *The Stanford Encyclopedia of Philosophy* (Fall 2017 Edition), Edward N. Zalta (ed.), URL = <<https://plato.stanford.edu/archives/fall2017/entries/measurement-science/>>. See especially sections 1-5.

Frigg, Roman and Hartmann, Stephan, "Models in Science", *The Stanford Encyclopedia of Philosophy* (Summer 2018 Edition), Edward N. Zalta (ed.), URL = <<https://plato.stanford.edu/archives/sum2018/entries/models-science/>>. See especially sections 1 and 5.

Discussion questions: (1) What kinds of theoretical artifacts are there in your own field of study? (2) Do we even need theories any more, in a time of "big data", when we can have accurate predictions and control over the world without having simple theories.

Part III: What's the difference between science and other domains of knowledge, belief or superstition: technology, philosophy, ... or astrology?

This part is about scientific criticism. We'll have the basic distinction between induction (or learning theory) and deduction, pertaining to hypotheses and theories. Criticism of models and explanations will center on theoretical values and model selection criteria, such as accuracy (or fit-to-data), simplicity (ontological and computational perspectives), theoretical scope and so on.

*Required Reading:*

Hansson, Sven Ove, "Science and Pseudo-Science", *The Stanford Encyclopedia of Philosophy* (Summer 2017 Edition), Edward N. Zalta (ed.), URL = <<https://plato.stanford.edu/archives/sum2017/entries/pseudo-science/>>.

Additional Reading:

Thomas S. Kuhn, "Objectivity, Value Judgment, and Theory Choice," in Kuhn, *The Essential Tension* (Chicago: University of Chicago Press, 1977) pp. 320-39. Available online: <http://shamiller.net/phi031/readings.d/kuhn.pdf>

Discussion questions: (1) Which critical methods are used in your field? Give precise examples (2) Is it possible in your field to find clear cases of scientific progress? To what extent is the nature of this progress revealed by the matters dealt with in the lectures?

Part IV: Science in society

Some models of scientific criticism (such as the hypothetico-deductive model) leave people entirely out of the picture. But science is done by individuals, often working in groups. What consequences does this have for how we approach scientific questions and the nature of scientific rationality? Central topics will be Kuhn's distinction between normal and revolutionary science, and the societal conditions that are conducive to progress in science, such as the presence of a range of different competing approaches.

Required Reading:

Bird, Alexander, "Thomas Kuhn", *The Stanford Encyclopedia of Philosophy* (Winter 2018 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/win2018/entries/thomas-kuhn/>.

Additional Reading:

Lu Hong and Scott E. Page, "Groups of diverse problem solvers can outperform groups of high-ability problem solvers," *Proc Natl Acad Sci U S A*. 2004 Nov 16; 101(46): 16385–16389. Available online: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC528939/>

Discussion questions: (1) Is it possible to distinguish different scientific paradigms in your field? Have there been scientific revolutions? (2) To what extent is there diversity of approaches in your field? Do people think of it as helpful or as a hindrance?

IFF COMMON LECTURES, DAY 3 (SEPTEMBER 27)

Length and distribution: half-day session, in the morning.

Teacher: [Fredrik Nyseth](#) (IFF)

Theme: The Mind and the Human Sciences

Topics covered:

One of the central questions in the philosophy of the human sciences (including linguistics) is whether these disciplines require a fundamentally different methodology than the natural sciences. One influential line of argument holds that since the human sciences study beings with minds and mental states (such as beliefs, desires and intentions) – and attempt to understand them as such – the framework of the natural sciences is inappropriate.

In this part of the course, we will consider whether this is true, and, if so, what the implications are. We will consider questions such as: Is it appropriate to require that theories in the human sciences provide accurate *predictions*? Can the human sciences discover *laws*? Can explanations of intentional actions in terms of *reasons* be regarded as *causal* explanations?

We will also consider two different positions one might take if one thinks that the framework of the natural sciences is inapplicable as long as we are dealing with mental notions: i) the behaviourist position which tries to manage without any references to mental states; ii) the interpretivist position which abandons the framework of the natural sciences in favour of a hermeneutic approach.

*Required reading:*

- Crane, T., *The Mechanical Mind*, 3rd edition (London: Routledge 2016), ch. 4
- Dray, W., *Laws and Explanation in History* (Oxford University Press, 1957), selections from ch. 5, pp. 118-134
- Romanos, G. D., 'Reflexive Predictions', *Philosophy of Science*, vol. 40, no.1 (1973), pp. 97-109
- Rosenberg, A., *Philosophy of Social Science*, 5th edition (Boulder, CO: Westview Press, 2016), chs. 3-5
- Salmon, M. H., 'Philosophy of the Social Sciences' in *Introduction to the Philosophy of Science*, ed. M. H. Salmon, J. Earman, C. Glymour, J. G. Lennox, P. Machamer, J. E. McGuire, J. D. Norton, W. C. Salmon and K. F. Schaffner (Indianapolis, IN: Hackett, 1999), pp. 404-425

SPECIALIST SEMINARS: *SOCIAL SCIENCES* SPECIALIZATION (SEPTEMBER 27, OCTOBER 28-9)

Length and distribution: half-day session (September 27), in the afternoon; two day sessions some weeks later (October 28-9).

Teacher: [Marit Aure](#) (ISV)

The specialization in social sciences deals with the relationship between everyday understanding and social science understanding and the role of theory and concept formation in social research. We look at different types of theory and concepts, theories at different levels and the role of theory and concepts within different traditions. The function of theories and concepts in research practices will be in focus. The specialization discusses different consequences these approaches may have for methodologies and the choice of methods and the role of the researchers. We will also spend time in the specialization sessions to develop and discuss suitable research questions for student papers and how relevant themes and issues brought up in the common part of the course related to social science disciplines and research themes.

These discussions will be organized around three themes:

- central features in the methodology and practices of the social sciences (such as concept formation, development and use of theory)
- issues on knowledge production: traditional models, critical models and democratization of science. The consequences for the role as researcher. Discussion of ethical issues following different positions. selected current challenges within the philosophies of social sciences relevant to students project
- selected current challenges within the philosophies of social sciences relevant to students project

For your curriculum, choose approximately **400 pages** literature in Philosophy of ***Social*** Science in addition to approximately 400 pages Philosophy of ***Science***. The curriculum should be specified and submitted together with your final paper. (The curriculum is not to be confused with the paper's literature list, which is the literature you have referred to).

Please read: Benton, Ted and Ian Craib (2011): *Philosophy of Social Science. The Philosophical Foundations of Social Thought*. London and New York; Palgrave Macmillan, before the course start and before you prepare your first assignment. (This gives you background to choose three chapters later.) Please make sure you are familiar with philosophy of science, especially if you lack background in this field. You can use this book or other introductory books. We also expect you to prepare for the course work by looking through the recommended literature or suggesting literature relevant to your paper.

**Required reading: Introduction to Philosophy of Social Science (choose at least three chapters)**

**Benton, Ted and Ian Craib (2011): *Philosophy of Social Science. The Philosophical Foundations of Social Thought*. London and New York; Palgrave Macmillan**

**Required reading: The role as researcher (choose at least two texts)**

- Burawoy, Michael (2005): "2004 American Sociological Association Presidential Address: For public sociology", *The British Journal of Sociology* 56 (2), pp. 259-294.



- Cahill, Caitlin (2007): "The Personal is Political: Developing new subjectivities through participatory action research" in *Gender, Place and Culture*, vol. 14, no 3, pp 267-292.
- Eriksen, Thomas Hylland (2006): "Farewell to the gift economy?" english translation of "Farvel til gaveøkonomien" in Bjerk Hagen, Erik and Ander Johansen (red): *Hva skal vi med vitenskap?* Oslo; Universitetsforlaget.
- Johnson, Greg (2014): "Off the stage, on the page: on the relationship between advocacy and scholarship" in *Religion*, vol 44, no 2, pp 289-302.
- Kalleberg, Ragnvald (2010): "The Ethos of Science and the Ethos of Democracy" in Craig Calhoun (Ed.): *Robert K. Merton: Sociology of Science and Sociology as Science*. Columbia University Press pp 182-213.
- Knorr-Cetina, Karin (1981): "The Scientist as Practical Reasoner: Introduction to Constructivist and Contextual Theory of Knowledge" in Knorr-Cetina, Karin: *The Manufacture of Knowledge*. Oxford; Pergamon Press.
- Merton, Robert K (1942/1973): "The Normative Structure of Science" in Merton, R.K and Norman W. Storer: *The Sociology of Science, Theoretical and Empirical Investigations*. Chicago: The University of Chicago Press. Reprinted in different collections.
- Mirowsky, Philip (2011): "Has Science been 'harmed' by the commercial regime?" in Mirowski, Philip: *Science-Mart. Privatizing American Science*. Cambridge, Mass and London; Harvard University Press, ch 6 from p 259.
- Nowotny, Helga et al (2003): "Model 2' Revisited: The New Production of Knowledge" in *Minerva*, vol. 41, pp 179-194.
- Weber, M. (1958). Science as a Vocation. *Daedalus*, 87(1), 111-134.

**Recommended Literature** (the candidate can choose freely from the list; students can also suggest literature relevant to their own research but these texts must be approved)

- Anderson, Elizabeth (2000/2011): "Feminist Epistemology and Philosophy of Science". *The Stanford Encyclopedia of Philosophy* (Fall 2012 Edition), Edward N. Zalta (ed.)
- Asdal, Kristin (2005): "Returning the Kingdom to the King: A Post-Constructivist Response to the Critique of Positivism" in *Acta Sociologica*, vol 48, no. 3, pp 253-261
- Baert, Patrick (2005): *Philosophy of the Social Sciences: Towards Pragmatism*. Cambridge; Polity Press
- Coole, Diana and Samantha Frost eds (2010): *"New materialisms. Ontology, agency and politics."* Durham; Duke University Press
- Haraway, Donna (1988): "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspectives" in *Feminist Studies*, vol. 14, no. 3, pp 575-599
- Hastrup, Kirsten (2004): "Getting it Right. Knowledge and Evidence in Anthropology" in *Anthropological Theory*, vol. 4, no. 4, pp 455-472
- Larsen, Tord (2012): "Acts of Entification: The Emergence of Thinghood in Social Life" in Rapport, Nigel Eds: *Human Nature as Capacity: Transcending Discourse and Classification*. (pp 154-177)
- Mjøset, Lars (2009): "The Contextualist Approach to Social Science Methodology" in Byrne, D. & C. C. Ragin Eds: *Handbook of Case-Based Methods*. London; Sage
- Mol, Annemarie (2010): "Actor-Network Theory: Sensitive Terms and Enduring Tensions" in *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, vol 50, no 1, pp 253-269

- Porpora, Douglas V. (2015): *Reconstructing Sociology. The Critical Realist Approach*. Cambridge; Cambridge University Press
- Steel, Daniel & Francesco Guala Eds (2011): *The Philosophy of Social Science Reader*. London; Routledge
- Swedberg, Richard (2012): "Theorizing in sociology and social science: turning to the context of discovery" in *Theory and Society*, vol 41, pp 1-40
- Verran, Helen & Michael Christie (2014): "Postcolonial Databasing? Subverting Old Appropriations, Developing New Associations" in Leach, J & L. Wilson (2014): *Subversion, Conversion, Development: Cross-cultural Knowledge Exchange and the Politics of Design*. MIT press
- Verran, Helen (2014): "Extending the Cosmopolitical Right to non-Humans" in *Valuation Studies* 2 (1) 2014:65-70
- Wendt, Alexander (2015): *Quantum mind and social science. Unifying physical and social ontology*. Cambridge; Cambridge University Press

SPECIALIST SEMINARS: *LINGUISTICS* SPECIALIZATION (SEPTEMBER 27, OCTOBER 31, NOVEMBER 1)

Length and distribution: half-day session (September 27), in the afternoon; one half-day and one full-day session some weeks later (October 31-November 1).

Teacher: [Gillian C. Ramchand](#) (ISK)

*Theme and topics:*

The specialization part in linguistics deals with: What are the challenges linguists face in the information age? How do these challenges inform our theoretical ideas, our methodologies and the data we choose to test our hypotheses against? We will discuss these questions against a historical background, and see how the language sciences have changed in the twentieth century, with special focus on:

- European and American structuralism
- the Chomskyan revolution
- the socio-linguistic turn in the seventies
- the renewed interest in language as a cognitive system towards the end of the twentieth century
- the quantitative turn in the beginning of the twenty-first century

With these historical events in mind we will ask how linguistics can find its place as a science between the humanities, the hard sciences and the social sciences

The following list is the required reading for the course. You must do all the readings in advance of the specialist sessions on October 31<sup>st</sup>/Nov 1 .

*Required Reading:*

1. Popper, Karl. 1959. *The Logic of Scientific Discovery*. Routledge 1992 (first published in 1934). Part I, Part II chapters 3, 4 and 5
2. Chomsky, Noam. 1986. *Knowledge of Language*. New York: Praeger. Chaps. 1 and 2
3. Marr, David. 1982. Vision. reprinted in Robert Cummins and Denise Dellarosa Cummins (eds). *Minds, Brains and Computers: The Foundations of Cognitive Science*.
4. Thomas Kuhn: The Structure of Scientific Revolutions; 'The route to normal science', 'The nature of normal science' and 'Normal science as puzzle-solving'. Chicago: University of Chicago Press 1996: pp. 10-42.
5. Labov, William. 1972. *Sociolinguistic Patterns*. Chapter 8. The Study of Language in its Social Context. Philadelphia: University of Pennsylvania Press.
6. Manning, Christopher. 2002. Probabilistic Syntax, in Bod, Hay and Jannedy (eds) *Probabilistic Linguistics*. MIT press.
7. Sprouse, Jon and Diego Almeida. In press. Setting the empirical record straight. Acceptability judgements appear to be reliable, robust and replicable. <http://sprouse.uconn.edu/papers/BBS.sprouse.almeida.pdf>
8. Kent Johnson. 2004. 'Gold's Theorem and Cognitive Science' *Philosophy of Science*. Vol 71. pp 571-592

9. Peter Norvig. 'On Chomsky and the Two Cultures of Statistical Learning'.  
<http://norvig.com/chomsky.html>

## Detailed Programme

### Friday September 27

Place: E 1004

12.15-16 What is the Object of Inquiry? (We will get to know each other and discuss your first assignment and research goals.)

### Thursday October 31

Place: A 3012

12:15-16:00 (i) Defining the Object of Inquiry in Linguistics  
(ii) What Counts as a Theory?

Readings 1- 4

### Friday November 1

Place: E 1004

9.15-12:00 (i) How do we get our Data? (Corpora and Variation)  
(ii) Big data, psycholinguistics, probability.

Readings 5-9

13:00-1600 Special Topics to be negotiated:  
(i) The relationship of Linguistics to other fields  
(ii) The Relationship between Applied and Theoretical Linguistics;  
(iii) The Impact of Ideology on Science

SPECIALIST SEMINARS: *HUMANITIES* SPECIALIZATION (SEPTEMBER 27, NOVEMBER 4, 5)

Length and distribution: half-day session (September 27), in the afternoon; one half-day and one full-day session some weeks later (November 4, 5).

Teacher: [Anniken Greve](#) (ISK)

*Theme and topics:*

The specialization in the humanities will look at concepts and issues that bring out the tension between the natural sciences and the humanities, so as to help us reflect on the specific nature and character of research acts within the humanities.

The discussion will be organized around three concepts/themes:

1. *The notions of rationality and reason, as viewed from the humanities.*  
Being one of the fundamental notions of philosophy underpinning the scientific enterprise, rationality is a contested concept, often looked upon with great suspicion in the humanities: Claims to rationality are seen as covering up political and ideological biases. We will approach such issues through Stephen Toulmin's *Return to Reason* (see reading list), letting our discussion be informed by his historical account of the development of the notions of rationality and reason.
2. *The notion of theory, viewed from the humanities.*  
Theory plays a central, but not altogether clear role in the humanities. In the course we will try to illuminate its role through a set of questions. If theories in the humanities are not subject to testing, what are their functions? How should we understand the plurality of theories within our fields of research? Is Kuhn's notion of paradigm transferable to the humanities? How should we understand the relation between theory and method in humanistic research? In this part of the course Kuhn's *The Structure of Scientific Revolutions* (see reading list) will be an important starting point.
3. *Hermeneutics, philosophically and methodologically considered.*  
Starting off from the distinction between interpretation and explanation (or to use Windelband's terms: between idiographic and nomothetic acts of research), we will consider the characteristics of interpretive acts of research, particularly the historical character of interpretive efforts, the relation between interpretation and prejudice, and the role of method in acts of interpretation. In this part of the course Heidegger and Gadamer (see reading list) will play a seminal role, but also aspects of Kuhn's philosophy of science will guide our discussion. Hopefully our treatment of this issue will help us recognize the connection between interpretive method and *ethics*.

*Required Reading:*

- Stephen Toulmin: *Return to Reason*. Cambridge, Massachusetts, London, England 2002: Harvard University Press
- Martin Heidegger: *Being and Time*. Oxford UK, Cambridge US 1962: Basil Blackwell. §§ 31-32, pp. 182-195.
- Hans-Georg Gadamer: *Truth and Method*. Second Edition. London 1979: Sheed and Ward, Part II.I, pp. 235–274

- Thomas Kuhn: *The Structure of Scientific Revolutions*; 'The route to normal science', 'The nature of normal science' and 'Normal science as puzzle-solving'. Chicago: University of Chicago Press 1996: pp. 10-42.