



Theory and Methodology of Science

AK2036 - Natural Science - 7,5 ECTS

Syllabus, Period 3 2019

COURSE INFO

The course provides an introduction to the theory and methodology of science (abbreviated as TaMoS). One aim is to supply the basic concepts needed for placing the techniques and knowledge acquired in the student's other courses in the wider context of the natural sciences. Another aim is to provide the basic intellectual tools that allow for a reasoned and critical assessment of results and methods from the wide variety of disciplines that the student is likely to encounter during his or her continued career in research and/or in professional life. More information can be found in the course plan at www.kth.se and on Canvas <https://kth.instructure.com/courses/16456>.

REGISTRATION

You register to the course on-line. By making a course registration you declare that you intend to follow the course. A course registration is necessary for grades to be reported and in order to be able to sign up for the exam. You will not access the canvas page before you have registered. Before the start of a course you have to register via the web. You find the web registration function via Manage my studies under Services in the personal menu at the top of the entire kth.se website. If you cannot find any courses to register for it might be because you have not been admitted to the course - contact your master program coordinator. The web registration is open at the beginning of the period. After that you need to contact kurser.tamos@abe.kth.se. Provide your name, personal number and which course you wish to register for.

SCHEDULES AND INFORMATION

The complete and correct schedule for the course is provided on the Course administration and information (including the schedules) are managed through the Canvas system at kth.instructure.com. To get access to the event Theory and Methodology of Science you need to be admitted and registered to the course in the central grade and course system (Ladok). Once you have access to the Canvas page look at the Home section for a course overview. The schedules on the student web and KTH Social are incomplete; the Canvas event has the exact schedules. You also find more detailed course information at the Canvas page.

Note that there are different versions of TaMoS at the master level, both natural and technological science (AK2030, AK2036, AK2050), computational science (DA2205, AK2034, AK2040) and social science (AK2032, AK2038). Some of the lectures, seminars and project parts are shared by all versions while some are not; more information is available on Canvas. Versions of TaMoS are also given to PhD students. All master level courses share the same Canvas page. *NOTE:* Since you take the course with several other course codes, by joining a seminar group, a project group or an essay group in Canvas you allow students taking one of our other TaMoS-courses in this period to see your full name. If this for any reason is problematic for you, please contact the course administration.

LECTURES

There are 6 campus lectures, 5 video lectures and 2 flipped classrooms. These are shared with students taking other versions of the course (other course codes). None of the lectures are mandatory, but attendance is strongly recommended. Much of the course content is provided in the lectures, and we believe it would be very difficult to pass the course without taking part in the lectures, taking notes and revising the material afterwards.

To prepare for the campus lectures you can read a preparation text. These texts help you get a deeper understanding of the material presented in the lecture, and is an opportunity to learn even more. There is no text for the first lecture.

During the campus lectures, there will be questions asked by the lecturer. You answer them by logging in to Canvas on your mobile phone or on your portable computer. If you do not have a portable device, you can submit your answers on paper - mark it with your name, personal number, lecture date and time.

Five of the lectures are given as video lectures. You can watch them whenever you want, but there is time allocated in the schedule. Each such lecture consists of about 5-7 approximately 10 minute videos. For each of the five video lectures there is a quiz on Canvas. These will show you what you remember from the video and what you might need to revise. The videos are the topic of the flipped classrooms and to attend those lectures, you should have watched the respective

videos before and done the quizzes.

Two of the lectures are "flipped classrooms" or "inverted classrooms". Instead of a lecturer talking for two hours, the lecture is based around a "workshop"-style interaction between the students and the lecturer. Before the lectures you need to have watched the related video lectures and done the quizzes (see below). The flipped-classroom lectures are divided in two parts. In the first part, the lecturer will bring up questions you have sent in, answering them or opening the floor for a discussion where you are teaching each other. In the second part you will work with you peers on an assignment given in the lecture.

During the course there are opportunities for continuous examination - you can earn bonus points which are added to a passing score on the exam. You earn these bonus points by completing quizzes about the preparation text, by answering the questions asked during the lectures, by completing the video quizzes and by submitting questions before the flipped classroom and the assignment during the flipped classroom. The amount of bonus points given for each activity is specified on the Canvas page. Note that there are deadlines for the quizzes and that it is up to you to submit in time.

The natural, social and the computational science versions. When the natural and computational science versions take "Philosophy of Technology", the social science versions take "Philosophy of Economics" instead. The computational science-versions (only given in certain periods) also take "Numbers, truth and knowledge". All other lectures are shared with all course codes.

COURSE REQUIREMENTS

SEMINARS (1,5 ECTS) - GRADE SCALE P/F

There are four seminars, one each week, all of which are mandatory. Here is some brief information, more information can be found on Canvas.

Seminar 1 Definitions, operationalizations and hypotheses.

Seminar 2 Experimental design

Seminar 3 Evidence, interpretation and analysis (AK2030/AK2034/ AK2036/ AK2040/DA2205/ FAK3014/FAK3024/F1N5113 - natural & computational science)

Seminar 3 Philosophy of the social sciences (AK2032/AK2038/F1N5112/F1N5114 - social science)

Seminar 4 Research ethics

To pass the seminar you need to prepare before by first reading the assigned texts carefully. When you are familiar with the texts, do the Seminar Preparation Quiz to test your knowledge. You need at least half of the correct answers to be allowed to participate in the seminar, however may take the quiz multiple

times. The quiz closes Monday 15:15 of each seminar week: make sure to note the deadlines on Canvas. During the seminar you should both be able to give sufficient answers during the seminar if asked questions regarding the topics and also participate actively in the seminars. Make sure that you sign the attendance sheet handed out at the end of each seminar.

If you fail a seminar (by not preparing or by not participating actively) or if you are unable to attend a seminar, you are allowed to go to the seminar of another group for that week if there is room. If you are unable to do this, you may either take that seminar the next period or attend the Compensation Seminar. All four seminars are given once more, at the end of the period. Registration for these seminars open the week after the last seminar and have a limited number of spaces. In very special circumstances, a written compensation assignment may be given.

For more information about the seminars, see the seminar page on Canvas. Information about seminar groups will be announced later.

PROJECT MEETINGS (3 ECTS) - GRADE SCALE P/F

The project part varies a bit between different master programs, but for the majority of students the project part consists of a written group assignment. You will first practice on your own by submitting texts explaining or evaluating aspects of a scientific article you have been assigned. You will provide and receive feedback from other students. You will then join a group with students from your master program and together you will start on the final submission. The assignment consists of writing a popularized presentation as well as a critical evaluation of the scientific article you have been given. You will also give feedback on other the other groups texts. More information about this part is available on Canvas.

Note that the project part introduction lecture is mandatory. Also note that you will join a group from your master program. If you have not yet been registered to a master program you will need to e-mail the course administration with information about your planned master program.

Students from TTMAM, TMAKM and TMLEM take a different project part - more information is given on the Canvas-page. You can find the names and abbreviations of the different master programs here, under "Master of Science (Two Years)": <https://www.kth.se/student/kurser/kurser-inom-program?l=en>.

EXAM (3 ECTS) - GRADE SCALE A, B, C, D, E, FX, F

The course is examined by a four hour written exam. You need to be registered for the course in order to sign up for the exam, and you have to sign up for the

exam on My Pages to get a seat. Note that you are not allowed to be registered for two TaMoS-exam dates at the same time.

During the course various opportunities for continuous examination will be provided. Participating in these will give you bonus points for the exam. These points cannot bring you from an F to an E; they are only considered when your exam score sum is above the level required for E. These bonus points are still valid for the re-exam.

If you receive FX, you will be sent a take-home exam by email when the grade has been reported in Ladok. The only possible grades for the FX exam is E or F, hence bonus points are not valid. On very rare occasions, such as when a student returns permanently to a home country outside Europe, the examiner may decide to issue a different exam, such as an E home exam, instead of a regular exam. More information regarding the exam is found on the Examination pages on Canvas.

ABOUT THE COURSE LITERATURE

The texts and a detailed list of the course literature can be found on Canvas. The main text is *The Art of Doing Science* by Sven Ove Hansson, available online on Canvas.

DISABILITY - SUPPORT VIA FUNKA

If you have a disability, you may receive support from Funka. <https://www.kth.se/en/student/studentliv/funktionsnedsattning>. We recommend you inform the teacher regarding any need you may have since Funka does not automatically inform the teacher.

EXAMINER

Till Grüne-Yanoff (gryne@kth.se)

QUESTIONS AND COMMENTS

Contact Johan Berg or Helena Björnesjö at kurser.tamos@abe.kth.se. (You can write in English or Swedish.) Include your course code.