

Open for PhD candidates from all universities and universities of applied science in the Netherlands.

Organized by [TU Delft Safety and Security Institute](#), together with RIVM and VU.

Safety is becoming increasingly relevant in various fields, particularly in designing products and processes. The renewed focus on Safe by Design tries to identify and include safety (along with other important values such as sustainability, security and circularity) at an early stage of design. This course offers an excellent overview of the extensiveness and importance of the integral approach of Safe by Design. The team of lecturers together represent both the broad academic as the more practice-oriented approach and represent TU Delft and VU, and the National Institute for Public Health and the Environment (RIVM) in Safe by Design. The program of the two days PhD course is as follows.

Day	Block	Time	Who	Topic
June 30	1	09:30-11:00	Pieter van Gelder Pim Klaassen (VU)	Introduction to Safety in Science
	2	11.30 - 12.30	Behnam Taebi	Values in Design and Responsible Research and Innovation
	3	13.30 - 14.30	Lotte Asveld	Safe by Design in biotechnological innovations
	4	15.00 - 16.00	Lotte Asveld	Discussion Safe by Design in practice
July 1	5	09:30-11:00	Ruud van Ommen	Qualitative approaches in Safe by Design of nanomaterials
	6	11.30 - 12.30	Pieter van Gelder	Risk quantification in Safe by Design
	7	13.30 - 14.30	Bart Walhout (RIVM)	Safe by Design in the governance of Science Technology & Innovation
	8	15.00 - 16.00	Pieter van Gelder Behnam Taebi	Concluding remarks and course takeaways

In recent years, we have been witnessing an increased attention in research and innovation for society's grand challenges. Think of the Sustainable Development Goals, and the large national and European mission-oriented research and innovation programs.

Under labels such as Responsible Research and Innovation, Corporate Social Responsibility, or Science With & For Society, efforts are undertaken to engage in research and innovation in reflective, anticipative, forward-looking and simultaneously responsive ways and incorporate this way work working into grand societal needs. Safe-by-Design continues these academic traditions.

This approach serves the purpose, amongst other things, of proactively addressing potential risks and addressing ethical, legal and societal issues early on in research and innovation. In several fields of emerging technologies, much of such thinking and doing has been undertaken under the tag of SbD.

SbD acknowledges the importance of safety in all phases of research and innovation trajectories and potentially looks at safety as integral to the entire chain of any research or innovation trajectory. What this precisely entails in terms of risk assessment, risk management, chain coordination and so on, will vary from one field to the next. SbD aims to mitigate risks as much as possible during the design process rather than during manufacturing or customer use. This approach frontloads thinking about safety at an early stage of development. And of course, this preventive rationale gains all the more force in light of the transition towards circularity. Think of the circular economy in which products and materials are intended to escape the linear produce – consume – dispose pathway and are foreseen to remain here to stay.

This course will address two aspects:

- I) Discussion of theory and practice of Safety Science, focusing on interdisciplinary perspectives on the notion of risk, the design models and tools of value sensitive design as well as methods of identifying and including values in design, as for instance promoted by Responsible Research and Innovations (RRI).
- II) Designing for Safety: how can this approach be addressed at all phases of the life cycle of the system, i.e. plan, design, test, implement/build, operate, maintain and dispose / reuse. SbD by definition, concentrates on the plan and design phase of the system. SbD aims for the inclusion of safety as a design requirement at the earliest stages of product and process development.

Keywords:

Safe by design, secure by design, fail safe design, fail secure design, inherent safe design, active safety, passive safety, fault tolerant design, graceful degradation design, fool proof design, redundant design, probabilistic design, risk-based design, safety chain, life cycle, quantitative risk analysis, risk management, safety management systems, probabilistic safety analysis.

Course Objectives:

- I) Introduce the Safe by Design approach;
- II) Consider design for safety in the broader societal context and values like security, privacy, circularity, autonomy, while discussing cases from different fields of science and engineering;
- III) Introduce designing for safety in a way that complies with other values.

Course preparation:

It will be a highly interactive workshop consisting of two days. The workshop requires minimal preparation by watching this webinar: <https://www.tudelft.nl/en/tu-delft-safety-security-institute/events/webinars/kivi-annual-congress-2020-safe-by-design> and articles. The course material will be made available by the organizers.

Costs & Enrolment:

The course is *free of charge*. You can express your interest by sending an email to TUDSSI@tudelft.nl. Then we will send you an enrolment form.