FM4All @ ETAPS 2026

Formal Methods (FM) are rigorous, mathematical approaches with a precise semantic foundation for developing software and systems that can be thoroughly verified. FM are taught at universities worldwide in an unsystematic manner along several dimensions. The coverage and depth of FM topics vary widely, as do the compulsory/optional status of FM courses and the undergraduate/graduate level at which they are taught. During the past decade, the adoption of Formal Methods in industry has increased significantly, but many industries report a shortage of FM specialists to hire. It is apparent that the current Computer Science (and Engineering) curricula do not systematically produce FM competence at scale. This establishes a clear need for systematically integrating Formal Methods into the Computer Science (CS) curricula.

Formal Methods Europe (FME) - the worldwide association bringing together researchers and practitioners in Formal Methods - has recently started the **FM4ALL** initiative for achieving two objectives:

A. Develop and publish comprehensive **guidelines for teaching Formal Methods**, to be endorsed and widely disseminated by FME, with the goal of **encouraging adoption by universities worldwide**.
B. Develop a **Formal Methods "Knowledge Area" (FM-KA)** suitable for inclusion in the **ACM Computer Science Curriculum**, supporting integration of Formal Methods teaching into existing curricula.

Objective A provides the foundation for creating or updating an entire CS curriculum, assuming sufficient flexibility to (re-)formulate CS domains to include FM topics. **Objective B**, constrained by the ACM format and requirements, expresses how Formal Methods education can be integrated within existing CS curricula, largely independent of their current structure or degree of formality.

The **FM4ALL Session at ETAPS** officially launches the initiative for public awareness. We will inform the community on the key design choices and planned progress of this project and will gather feedback for prioritizing concepts and validating structures. The session will be interactive, alternating the presentation of content with opinion polls. An earlier (2024) discussion on the reasons for defining a "knowledge area" dedicated to Formal Methods can be found here: https://fme-teaching.github.io/#curriculum.

Preliminary concepts

A knowledge area (KA) is a coherent, topical structuring unit of a curriculum. Our focus is on devising a KA dedicated to Formal Methods, denoted **FM-KA**. A KA is made up of knowledge units (KUs); for instance, "specification methods" can be seen as a KU in the

FM-KA. Each KU is made of topics; for instance, “pre- and post-conditions” can be seen as a topic in the “specification methods” KU. The format for describing a KA has several sections, some of them listed below:

- **Preamble** → describes KA, includes
  - Changes in KA since CS-2013
- Table with **teaching hours** assigned to the KA, includes
  - **List of KUs**, each
    - composed of **topics**
    - having **Learning Objectives (LO)**
- **Professional dispositions** most relevant to the KA
- **Math requirements** for the KA → both required and desired
- **Suggestions for packaging courses** from the KA