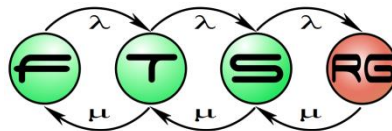


Formal Methods: Course overview

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Lecturers

- Course coordinator:
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- Lecturers:
 - Ákos Hajdu <hajdua@mit.bme.hu>
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Motivations for the course

- Increasing costs of **design faults** in computer based systems and software
 - Important to **prove** that the design of the critical system components is correct
- Formal methods offer:
 - Mathematically precise **requirement specifications** and **design models**
 - **Verification methods** and tools to prove that requirements are satisfied by the design model
 - **Evaluation methods** to derive properties of the design (like performance, safety, dependability)

Knowledge to be obtained

- Participants of the course will be able to
 - **Construct formal models** and specifications on the basis of informal descriptions
 - **Apply formal verification** and evaluation techniques
 - **Apply tools** that support the application of formal methods
 - Understand the **advantages and disadvantages** of various modelling formalisms and verification techniques

Assessment

- Assessment: 2 midterm exams + 1 homework
 - All these shall be successful
 - Final grade: calculated from the grades of the two midterm exams (35%-35%) and the grade of the homework (30%)
- Midterm exams
 - ME1: March 12, 18:15
 - ME2: May 14, 18:15
- Recaps: Each midterm exam can be repeated once
 - Repeated ME1: April 2, 18:15
 - Repeated ME2: May 23, 10:15 (repetition period)

Homework

- Goal: **Modeling** of a small-scale IT system + **verification** of its required properties using a tool
- Dates
 - Homework assigned on the 4th week of the semester
 - Deadline for **submission**: April 27, 23:59
 - **Presentation** of the homework is mandatory (dates to be offered from the 13th week)
- **Late submission**: During the repetition period
 - Deadline for late submission: May 22, 23:59
 - Late submission will result in **20% decrease** of the score
 - The submission of the homework cannot be replaced by a repeated midterm exam

Synopsis

- **Basic formal models** and their semantics
- Formalization of requirements: **Temporal logics**
- Formal verification using **model checking**
- Modelling state-dependent dynamic behavior: **Statecharts**
- Modelling and analysis of concurrent systems: The **Petri-net** formalism
- Modelling data-dependent behavior: **Colored Petri-nets**
- Modelling and evaluation of extra-functional properties: **Stochastic Petri-nets**

Important information

- Web page of the course:
<https://inf.mit.bme.hu/en/content/formal-methods>
- Expected content
 - Course material (slides) updated as the course will progress
 - News and announcements
 - Homework assignment and related information (tool to be applied)
- In case of questions contact the lecturer or the course coordinator