# Fakultät für Informatik
# Facoltà di Scienze e Tecnologie informatiche
# Faculty of Computer Science

unibz

# COURSE DESCRIPTION – ACADEMIC YEAR 2020/2021

| Course title | **Applied Formal Methods** |
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| Course code | 71053 |
| Degree | PhD Programme |
| Semester | second |
| Year | 2020/2021 |
| Credits | 2 |
| Modular | No |

| Total lecturing hours | 10 |
| --- | --- |
| Total lab hours | 0 |
| Attendance | Attendance is not compulsory but recommended. |
| Prerequisites | A background on propositional logic is welcome. |
| Course page | http://www.inf.unibz.it/~artale/ |

| Specific educational objectives | Students will develop a deeper understanding of technologies based on applying formal methods for the specification and verification of hardware systems. Students will learn the most important techniques based on Model Checking to check properties of a system. In particular, the student will be able to understand how to formally specify a hardware system by means of transition systems and how to express computation properties by means of formulas in Temporal Logic. Both Linear Temporal Logic (LTL) and Computation Tree Logic (CTL) will be studied. A tutorial on NuSMV will introduce the student to one of the most successful software used in industrial applications to specify and test synchronous concurrent systems and critical software. |
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| Lecturer | Alessandro Artale |
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| Contact | Office 2.03, artale@inf.unibz.it, http://www.inf.unibz.it/~artale/ |
| Scientific sector of lecturer | INF/01 |
| Teaching language | English |
| Office hours | During the lecture time span. <br> To fix an appointment email at artale@inf.unibz.it |
| List of topics | • Modeling Systems as Transition Systems <br> • Linear Temporal Logics: LTL and CTL <br> • Model Checking temporal formulas |
| Teaching format | Frontal lectures |

| Assessment | To obtain a pass each student should develop a small project using the model checker NuSmv. |
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| Assessment language | English |
| Assessment Typology | Monocratic |

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| **Required readings** | • *Logic in Computer Science--Modelling and Reasoning about Systems*. Michael Huth and Mark Ryan. Publisher: Cambridge University Press, 2004. (Text Book)<br>• *Model Checking*. Edmund Clarke, Orna Grumberg and Doron Peled. Publisher: MIT Press, 1999.<br><br>Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it |
| **Supplementary readings** | |
| **Software used** | NuSMV (to be downloaded from: https://nusmv.fbk.eu/) |