

Study programmes: Master studies - Informatics			
Course name: R307 - Formal methods			
Lecturers: Filip Marić and other lecturers of the Department for Computer Science			
Status: Optional			
ECTS: 8			
Attendance prerequisites: P306			
Course aims: Acquiring basic knowledge about formal specification and verification of software and hardware systems.			
Course outcome: After the course, students have adopted theoretical and practical foundations which are necessary for writing a specification, modeling and checking correctness of software and hardware systems. Students are capable of constructing formal models of simple computer systems and to check their properties using verification tools. Students are aware of algorithms on which these tools are based.			
Course content:			
<ul style="list-style-type: none"> - Formal methods - introduction. - Static and dynamic verification of hardware and software. - Semantics of programming languages. - Hoare logic. - Formal specification (VDM, Z, Event-B). - Theoretical and practical boundaries of static verification. - Model checking. Bounded model checking. - Abstract interpretation. - Symbolic execution. - Theorem provers and their applications. - Verification with SAT/SMT solving. - Applications of formal methods. 			
Literature:			
<ol style="list-style-type: none"> 1. Michael Huth and Mark Ryan: Logic in Computer Science - Modelling and Reasoning about Systems, Cambridge University Press, 2004. 2. Edmund Clarke, Orna Grumberg and Doron Peled: Model Checking, MIT Press, 1999. 3. J.F. Monin: Understanding Formal Methods. Springer, 2003. <p>(the lecturer can choose another appropriate literature)</p>			
Number of hours: 7	Lectures: 2	Tutorials: 3	Laboratory: -
Research: 2			
Teaching and learning methods: Frontal/Individual/Group work/Practical work.			
Assessment (maximal 100 points)			
Course assignments	points	Final exam	points
Lectures	10	Written exam	-
Exercises / Tutorials	-	Oral exam	-
Colloquia	20	Written-oral exam	50
Essay / Project	20		