Model-Driven Software Development in Technical Spaces (MOST)
- Heterogeneous Software Factories -

Announcements

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http://st.inf.tu-dresden.de/teaching/most

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DRESDEN concept
Exzellenz aus Wissenschaft und Kultur

Relation of the Course to Modules

The course can be used for the following modules:

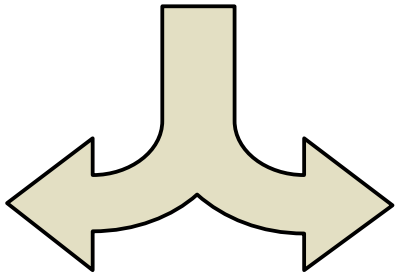
- Diplom Informatik: INF-BAS3, INF-VERT3
- Master Informatik: INF-BAS3, INF-VERT3
- Bachelor Medieninformatik: INF-B-540
- Master Medieninformatik: INF-BI-4, INF-BI-5
- Diplom IST: IST-B-321
- Diplom Informatik (2004): INF-04-FG-SWT
- Diplom Informatik (2004): FG 4 SE
- Master Distributed Systems Engineering (DSE)
- Master Computational Modeling and Simulation (CMS)

For other programs, special rules may hold; consult the manuals of your "Nebenfach".

Master‘s Courses (Hauptstudium)

Softwaretechnologie II (Bachelor)
Modellierung, Entwurfsmethoden, Produktlinien, Geschäftsmodelle (WS)

Model-Driven Software Development in Technical Spaces
How to be productive in software development (WS)



Academic Skills in Software Engineering
How to work scientifically (SS) (Dr. Götz)

Requirements Engineering und Testen (Dr. Demuth)
Wie man Qualität für Software erzielt (WS)

Software-Management
Wie man Projekte macht (SS) (Dr. Demuth)

Design Patterns and Frameworks
Architektur objektorientierter Systeme (WS)

Ausgewählte Kapitel aus der Softwaretechnik (Dr. Götz)
Softwarearchitektur (SS)

Component-Based Software Engineering
Product lines with component models (SS)

Softwarentwicklung in der industriellen Praxis
Ringvorlesung mit Industriedozenten

Future-Proof Software Systems (Prof. Furrer)
Evolvable architectures (WS)

Automotive Software Engineering (Dr. Conrad) (SS)

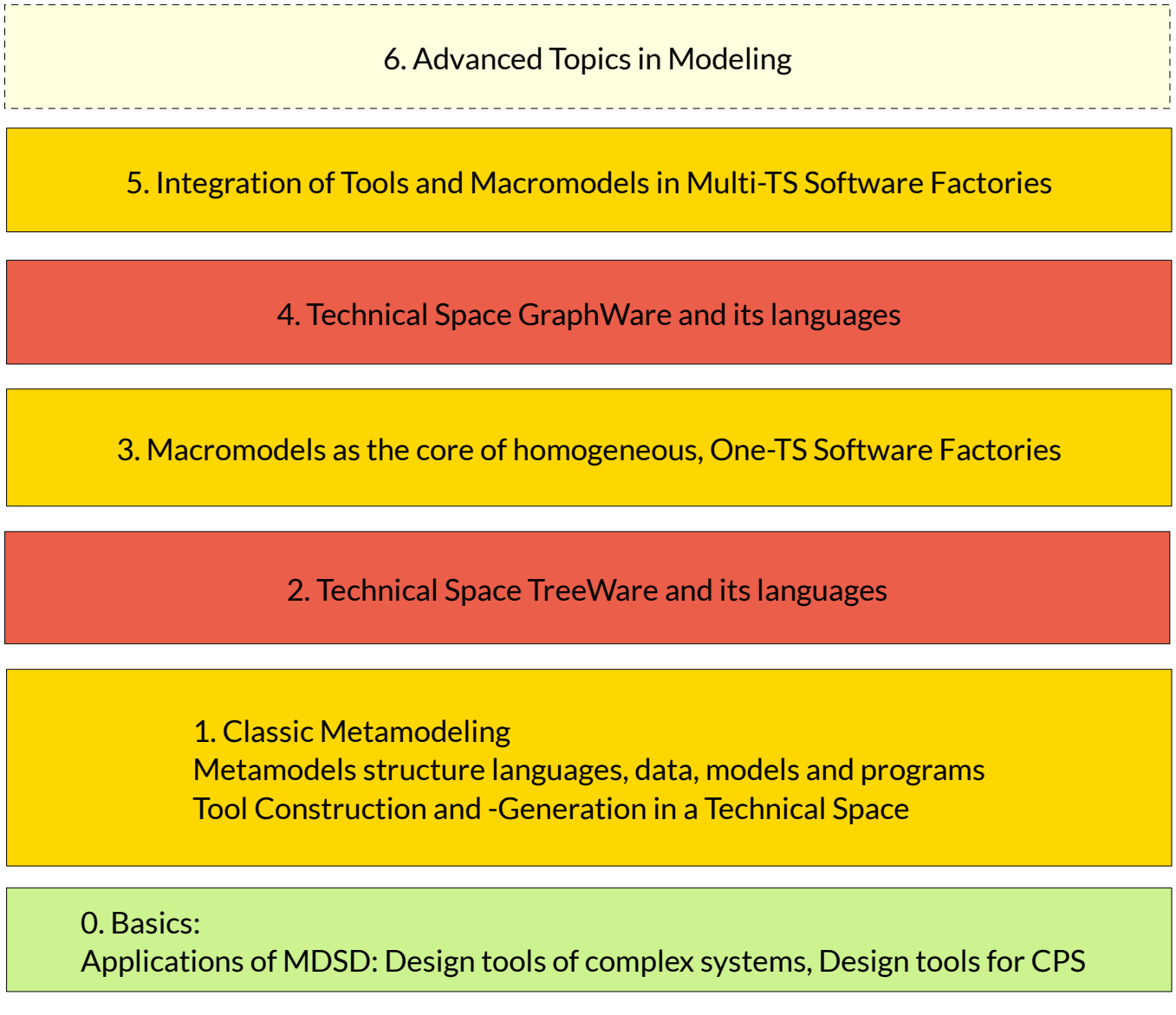
Software as a Business (WS)
How to develop a business model and a startup

Lecturing – How in Corona-Times?

- We will start with presence teaching and film a video

- If Aßmann catches a cold, there might be sudden changes
  - Then, lecture films from home
  - Lecture dates will morph to question hours
  - People may ask questions via a video conference room
  - https://www.gotomeet.me/UweAssmann

Central Topics of the Course



Melanie
Deep Modeling

Transformation Bridge
Adapter Bridge

Datalog
Graph Transformation

MDA OSM ROSI

Tree Grammars
Ref. Attr. Grammars

EMFText eMOFlon

EMOF MOF EMOF
CROM

MDSD and Heterogeneous Software Factories

- MDSD is the engineering of applications with *several related models* (inclusively code), based on systematic engineering of metamodels (languages) in technical spaces.
- MDSD therefore treats *heterogeneous models*
  - Treating different aspects of a system
  - Specified in different modeling languages
  - Living in different *technical spaces*
- How are models related?
  - Model cover by matching rules
  - Model mappings
  - Model transformations
- How are the languages related?
  - By mapping
  - By role fattening
- How are the technical spaces related?
  - By macromodelling

Engineering of Technical Spaces, Macromodels, and Software Factories

- Def.: A ***multimodel*** is a set of correlated models.
- Def.: A ***macromodel*** is a set of *systematically* related, heterogeneous models.
  - Macromodelling treats heterogenity
  - Requires model integration techniques
- Engineering of Technical Spaces and macromodels is one of the most important topics of the future of software and systems development
- Dresden has modern technologies and tools based on macromodels
  - Role-and context-based languages (CROM, SCROLL)
  - Invasive composition (SkAT)
  - Metacomposition tools (Reuseware, SkAT, Style Sheets)
  - Round-Trip Engineering and Role-based tools

Outline

Outline Part IV-VII – Architecture of Software Factories

Part IV Treating heterogenity in GraphWare

- 40 Flat Analysis in Graph- and Modelware
  - Semmle .QL, TGreQL
- 41 Deep Analysis in Graphware
  - Reachability
- 42 Graph and Model Transformations
- 43. MetaCASE tools (MetaEdit+)
- 44. MOFLON as example
- 45. Smart applications (SMAGs)
- 46. Fujaba

Part V: Architecture and Composition of Tools to Applications

Tool integration, Exchange formats, Bridges between technical spaces, Composition of stream-based tools

- 50. Tools-and-Materials Pattern Language
- 51. Role-based composition of languages for the composition of materials
- And tools
- 52. Role-based repository architecture
- 53. Material-exchange and Stream-Based integration
- 54. Synchronization and Round-Trip Engineering with Triple Graph Grammars

Part VI: Advanced Modeling

- 60. Orthographic Software Modeling
- 61. 2-d-Software Modeling

Part VII: Multi-TS Software Factories

- 70. Large Software Factories

Literature - Books

- [GPHS] Cesar Gonzalez-Perez and Brian Henderson-Sellers. Metamodelling for software engineering. Wiley, 2008.
- [Züll] Züllighoven, Heinz. Object-Oriented Construction Handbook; dpunkt.verlag 2005
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- Wolfgang Hesse. More matters on (meta-)modelling: remarks on Thomas Kühne's 'matters'. Software and System Modeling, 5(4):387-394, 2006.

ST Works on Metamodelling in the Last Years

Henrik Lochmann. HybridMDSD: Multi-Domain Engineering with Model-Driven Software Development using Ontological Foundations. PhD thesis, Technische Universität Dresden, Fakultät Informatik, 2009, http://nbn-resolving.de/urn:nbn:de:bsz:14-qucosa-27380

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