FEH3240 Information Modeling with Application to Power Systems 6.0 credits

Informationsmodellering med tillämpning på elkraftsystem

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for FEH3240 valid from Spring 2017

Grading scale

Education cycle

Third cycle

Specific prerequisites

Admitted to PhD program at KTH.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After completing the course, the participants should be able to:

· Describe and apply fundamental information modeling concepts, and relate these to industry standard languages, such as UML.

· Apply tools, such as Protege, for creation of system ontologies, and using these to capture semantically valid models

· Apply tools for serialisation of information models to enable data exchange.

· Perform modeling of typical power system topologies for static model exchange.

Identify topics within power system control requiring information exchange beyond what is currently developed.

Course contents

The course consists of a series of seminars at which selected parts of the literature are presented and discussed. In addition, the course consists of a modeling assignment, a information exchange assignment finally the development of a research plan. Completion of all fours parts of the course are mandatory for passing the course.

Disposition

Seminars

The course consists of 6 seminars, covering:

1. Basics of information modeling, UML class diagrams
2. XML, RDF and OWL
3. Semantic modeling and ontologies
4. Power System topology modling using the CIM
5. CIM Profiles for planned and partial model exchange
6. CIM-XML serialisations for information exchange.

As preparation, participants will be asked to read relevant parts of the course literature and prepare short summaries to be presented at the seminars.

Modeling assignment

The modeling assignment consists of two parts, first, developing models of a small fictitious power system in UML using the Enterprise Architecture Sparx infomration modeling tool. Second, development of a semantically richer OWL model of the same system. The assignment is passed by presenting both models, and writing a short summary about the differences between the two modeling approaches.

Information Exchange Assignment

The information exchange assignment involves using the information model created previously and importing it into the InterPSS power system simulator, performing a power flow analysis and from the solved power system state create CIM profiles, for export.

Research Plan

Based on additional reading of research papers handed out during the course, the participants are expected to identify areas still requiring formalisation and standardisation to enable full interoperability.

Course literature

The following literature is mandatory reading, and in addition a list of research papers will be added as additional reading for preparation of Research plan assignment.

1. An Introduction to IEC 61970-301 & 61968-11: The Common Information Model, Alan McMorran, University of Strathclyde, January 2007.

2. The Common Information Model CIM IEC 61968/61970 and 62325 - A practical introduction to the CIM, Mathias Uslar, Michael Specht, Sebastian Rohjans, Jörn Trefke, Jose Manuel Vasquez Gonzalez ,ISBN: 978-3-642-25214-3, Springer, 2013.

3. IntelliGrid Common Information Model Primer, 2nd edition, EPRI report # 3002001040, 2013.

Equipment

None.

Examination

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

Complete all four course components with a passing grade.

Ethical approach

- All members of a group are responsible for the group's work.

- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.