



Course Syllabus

EH2780

IT Management with Enterprise Architecture II, Case Studies

12.0 credits

Fall 2013

Background

Today there are information systems for most of the tasks performed in an enterprise. There are customer management systems, contract management systems, product design systems, production systems, financial systems, human resource systems, business intelligence systems, asset management systems, waste management systems, document management systems, workflow management systems, and hundreds of other systems. In recent years, these systems have been integrated with each other to such an extent that it is oftentimes necessary to view them, not as hundreds of different systems, but as one single system of systems. For many companies, such as banks, insurance companies, Internet stores, and stock brokers, the bulk of the core business is today performed by this enterprise-wide information system rather than by people.

The enterprise information system is under constant change. Every year, new systems are developed and introduced, old systems are extended, modified, integrated with each other, and retired. In large enterprises, these changes are the result of many different stakeholders' requirements and many developers' actions. It has become increasingly evident that there is a need to plan and manage the evolution of this system in order to keep chaos at bay.

In this course, an approach to enterprise information systems management that relies on models of the information systems and their environment called Enterprise Architecture (EA) is presented. The idea is the same as for Computer-Aided Design (CAD) systems in mechanical engineering: virtual models of the system are used in the design phase instead of real prototypes. Virtual cars can be crash tested at low cost, virtual bridges can be analyzed for their structural stability, virtual homes can be used for calculating the optimal placement of radiators and to study whether the dishwasher will fit in the kitchen. Similarly, models of enterprise information systems can be used to rapidly and cheaply understand the effects of design changes. How will a certain change to the system affect information security, service availability, application modifiability, or system cost?

In this course, the students will learn what we believe is the most central part of information systems management, namely how to rationally determine what actions to take with respect to information systems in order to support the goals of the user organization. Examples of goals that often are important to user organizations are system qualities such as the availability of the system (e.g. measured in uptime), the cost of the system (e.g. measured in €), the fit between functions and functional requirements, the quality of the processed data, the modifiability of the system, etc. With the increase in the number of quality attributes that are being considered, the decision maker also needs a systematic way to balance these attributes against each other to obtain the best possible architecture. In this course you will use utility theory, which addresses this need.

Course goals

At the start of the course, you will form small groups of three persons. Each group will be assigned one or several information systems in operational use at some organization. The main concrete result expected of you is a set of recommendations regarding the future evolution of the systems and their enterprise environment. The recommendations will be presented to the owner organization, which might choose to implement them.

In order to generate the system development recommendations, you are expected to employ the enterprise architecture methods and tools provided in the course. The goal of the course can be summarized in the following two learning objectives:

What are the factors that affect the utility of information systems, and through what mechanisms do they act?

How can enterprise architecture modeling and analysis be employed to predict the effects of changes to system utility?

Pedagogical Stance

In this course, we want you to take control of your learning. You should be free to learn in any way you like. Of course, as teachers and examiners, it is our responsibility to provide the content of the course and to assess that you indeed have learnt that content at the end of the course, but we believe that you are the better judge of *how* you best acquire that content. Our role is therefore two-fold: i) at a few very specific occasions, we will assess your mastery of the course content, ii) during the rest of the course, we attempt to provide you with an environment in which you can learn freely and efficiently (and without being evaluated). To give you control, there are few compulsory elements in the course. If you do not believe that a certain lecture, seminar or exercise will help you learn, you need not participate in it. But as you take control over the learning process, you also mantle the responsibility of it. You plan your project. You search for and find the information you need.

As mentioned, it is our responsibility to provide a fertile learning environment. For that, we have a plethora of learning tools. These include a book and other reading materials, a software tool, films, tutorials, examples, exercises, guest lectures, seminars, designated tutors and teachers prepared to assist you according to your needs (and their capabilities). This material is available, most of it is strongly recommended, but its consumption is not mandatory. There will be very few planned lectures on planned topics. Instead, you can request the lectures you feel that you need (some suggestions are presented in Appendix 2).

Examination

In order for the course's pedagogical stance to work, the examination must be well aligned with the learning goals. The grade will be based on three reports written by you in order to convince the case study organization of your study's results. The first report is written early and aims to convince the case study organization of the benefits of the study to be conducted. What's in it for them? The second report presents the metamodel that is going to be used in the case study, including case study specific enhancements to the already available metamodel. The third report contains your recommendations and aims to convince the case study organization of the credibility of those results. Why should they follow your proposals?

1. Case study motivation report. Write a report to the case study organization motivating your study. Why should the organization spend their valuable time providing you with information? What will the benefit be for them? You should write the report to convince someone with about the same background knowledge that your co-students had before starting this course. The report should be no more than 2 000 words. It will be evaluated on

how strong an argument it makes to the case study organization for performing the study, i.e. how convincing it is. The strength of your argument will be assessed using argumentation analysis. One such approach is the Toulmin method, see Appendix 3 for more information. The important message of the argumentation analysis is that it is the content of your argument that is central: how convincing is it?

Your case study motivation report should be in pdf format and submitted to your teachers, tutors and opponents at the date and time presented in the course schedule (see Appendix 1).

2. Metamodel report. In this report, you describe your proposed extension to the Multi-Attribute Prediction (MAP) metamodel (for more information about MAP you are referred to the book *IT Management with Enterprise Architecture* written by Johnson, Lagerström, Ekstedt, and Österlind). Your extension should evaluate a quality attribute that is not in the MAP, or significantly improve on one of the existing quality attribute assessments. The chosen quality attribute should be agreed upon between yourself, your case study company, and your tutor. It is important that the theory behind your extension is based on existing research. Your extension will be as good as the theory behind it. The report should contain no more than 5 000 words. The most important part of the report is the motivation for your contributions. Why is the selected approach the best way to assess the chosen quality attribute? It is thus important to identify the relevant alternative approaches. Discuss competing approaches and compare with respect to expected prediction accuracy, data collection cost, and computational cost (some assessment procedures are prohibitively computationally complex). As for all your reports, you should assume that the reader has background knowledge corresponding to that of your co-students before starting this course. A proposed outline contains the following headings:

- (i) Introduction
- (ii) The MAP class diagram
- (iii) Literature review of the selected quality attribute
- (iv) The proposed extension to MAP
- (v) Comparison with alternative approaches
- (vi) Discussion
- (vii) Conclusion

Your metamodel report should be in pdf format and submitted to your teachers, tutors and opponents at the date and time presented in the course schedule (see Appendix 1).

3. Case study results report. This report describes the results of the case study. The report should build on the Metamodel report and contain no more than 10 000 words. The purpose of the report is to present your recommended changes to the user organization's enterprise architecture and to convince them to follow those recommendations. As for the previous reports, the grade will depend on the strength of the presented argument. Examples of important questions to answer include: Why is the recommended scenario better than the others? How can we trust the calculations that lead to these results? How do we know that the evaluated scenarios are the most relevant? How do we know that the current system is correctly modeled? etc. It may be that your study cannot unequivocally propose a single

recommendation. In that case, it is quite acceptable that your conclusion is "we cannot recommend anything", as long as your argumentation is solid. The case study results report should begin with a management summary of maximum 1 000 words. A proposed outline contains the following headings:

- (i) Introduction
- (ii) The extended MAP class diagram
- (iii) Description of the data collection method
- (iv) Presentation and justification of the as-is model
- (v) Presentation and justification of proposed to-be scenarios
- (vi) Comparison between scenarios
- (vii) Recommendation
- (viii) Discussion
- (ix) Conclusion

Your case study results report should be in pdf format and submitted to your teachers, tutors and opponents at the date and time presented in the course schedule (see Appendix 1).

4. Presentation and opposition. As a part of the examination, all three of the aforementioned reports are presented before the class. These presentations are compulsory and may influence your grade. For each of the reports, you are also obliged to read the report of one of the other groups in the class. During their presentation, you are expected to act as the opponent, discussing the strengths and weaknesses of their arguments. Prepare to present and make your opposition according to the following durations.

	Presentation	Opposition
Motivation report	15 min	5 min
Metamodel report	20 min	10 min
Results report	30 min	15 min

Motivation report presentation and opposition order:

Presenters	Opponents
Group 1	Group 4
Group 2	Group 3
Group 3	Group 2
Group 4	Group 1

Metamodel report presentation and opposition order:

Presenters	Opponents
Group 4	Group 2
Group 3	Group 1
Group 2	Group 4
Group 1	Group 3

Results report presentation and opposition order:

Presenters	Opponents
Group 3	Group 4
Group 2	Group 1
Group 1	Group 2
Group 4	Group 3

5. Interview. As a part of the examination you will also perform an interview with an enterprise architect at a company (different from the company of your case study to give you a broader perspective). This interview will result in a presentation before the class. The presentation should be planned to take approximately 15 minutes. The presentation should focus on presenting the life as an architect at company X. The purpose is for you to find out if it would be interesting for you to work at company X as an architect or not. The title of your presentation should be “Why we *do/don't* want to become enterprise architects at company X.”

Interview presentation order:

Presenters
Group 2
Group 4
Group 1
Group 3

6. Manual architecture analysis. The exercise is related to understanding the benefit of a modeling language that also contains prediction theory. The goal is to act as the analyst in predicting interoperability based on an architecture model. I.e. you will be presented with a case and given the possibility to ask questions to a respondent, based on that analyze the scenario from an interoperability perspective, and finally do a prediction. The exercise is carried out individually during a 1h session. No preparations are necessary. You are responsible to at latest <Tuesday October 29th> have performed the session. Book your individual time slot with Johan Ullberg (johanu@ics.kth.se) at latest <Tuesday October 15th>.

7. Company presentation. If the case study organization can allocate the time, you will also have the opportunity to make oral presentations of the contents of your reports to them.

Those presentations will not influence your grade but may very well affect their decisions about the studied system.

In general, **grading** is only based on the quality of your reports and on your presentations (if the workload within the group is unfairly distributed or there are other special circumstances, we may deviate from this norm). 60% of the grade is based on the case study results report while 20% is placed on the case study motivation report and 20% on the metamodel report. In order to finish the course you also need to complete an interview with an architect and present the results of the interview, as well as complete the manual architecture analysis exercise. The modeling exercise based on our SCADA laboratory environment is not obligatory but is a good exercise before starting your actual data collection at your case study company.

Course Description

The course consists of a set of activities for you to engage in. They are divided into an introductory (motivation), metamodeling, the case study including a preparatory modeling exercise and a manual architecture analysis exercise, and an interview with an architect.

Motivation

This part will support you in producing the case study motivation report. Three topics will be discussed.

Enterprise Information Systems

Objectives. To convince your case study contacts of the benefits of your study, it is important to first understand the basic structure and management of their enterprise information systems. In this topic we attempt to support your learning of this subject.

Support. A newly-produced film is available in the electronic version of the course book (iBook for Apple users) to give you a first introduction to the problems of enterprise information systems. The film can also be seen at www.ics.kth.se/EAAT. Furthermore, the course book contains two subchapters, *1.1 A brief history of enterprise information systems* and *1.2 The information systems of today*, relevant to this topic.

Enterprise Architecture

Objectives. Since your recommendations to the company will be based on an enterprise architecture approach, you will need to have some background on this discipline.

Support. Subchapter 1.3 of the course book, *A brief history of enterprise architecture*, provides some background. An article with the title "A Framework for Information Systems Architecture" that appeared in the IBM Systems Journal in 1987, authored by John Zachman is generally considered the starting point of enterprise architecture. This article is available for your perusal. We will also provide you with an additional set of articles and videos on enterprise architecture that will be of use in this phase, see KTH social.

Background to EA for Decision-Making

Objectives. You will provide a recommendation for a decision that the case study organization can choose to make. To convince the organization that your approach is suitable as decision-making support, you must be able to explain plainly how your use of enterprise architecture will lead to good recommendations.

Support. Subchapter 1.4 of the course book, *Enterprise architecture as decision making support*, explains how the two concepts can fit together. The introductory film in the course book makes the same case by an analogy to traditional architecture used in the construction of buildings. The Multi-Attribute Prediction (MAP) model is designed to return a utility score for each modeled scenario.

Metamodeling

In the metamodeling assignment, the main task is to improve on the MAP in order to make recommendations tailored to the case study organization's needs.

Augment MAP with a system quality of importance for the owner organization

Objectives. MAP only contains analyses of a certain number of quality attributes, including modifiability, availability, interoperability, cost, etc. However, the case study organization may also be interested in other quality attributes, such as security, performance, organizational efficiency, or perhaps employee satisfaction, business profitability, etc. Even if the case study organization is mostly interested in one of the attributes already included in the MAP, chances are that it is possible to improve the analysis framework for that attribute significantly. This task thus aims to extend MAP to either include one other attribute or to improve on the analysis of an existing attribute.

Support. Course book Chapters 3-10 details the MAP, and thus serves as the baseline for your augmentation. The EA²T software tool features not only the object modeler application that you have employed so far (in EH2770), but also a second application to support metamodel development, the Class Modeler. The casual relations in MAP are written in a language called the Object Constraint Language (OCL), which is a declarative language featuring set theory, arithmetics and predicate logic. The OCL tutorial <http://www.slideshare.net/jcabot/ocl-tutorial> is a good source to learn about OCL. While, the formal OCL specification is a good source to use as a reference when you need to look something up. Don't forget to make use of your tutor. The most important information, however, is what you find in external sources, such as those referenced by Google Scholar. There, you can find the information that should constitute the credible base for your extension of the MAP.

The collection of papers and videos available on KTH social can also guide you in this phase.

In a seminar, your additions to the MAP model are reviewed by a peer group and discussed.

Case study

The goal of the case study is to provide recommendations to the case study organization on future enterprise system evolution based on MAP including the case study specific extension.

Model the system with your specific modeling language

Objectives. In order to predict the utility of a system, the proper information needs to be collected. Modeling languages are well suited to codify the required data. The goal of this step is to model the case study system. In order to accomplish the task, you need to understand the modeling language (this is done in the former task Metamodeling), establish contact with your designated case study organization (this should also be done early), conduct interviews, collect and study system and business documents, and finally actually do the modeling. Note that the contact people at the organization may have much on their plate. Early and active contact and meeting bookings are therefore key to the success of this activity.

Each student group is assigned a case study at the start of the course. Each group is also assigned an academic case study supervisor.

Support. In this task as well as all others associated with your case study, you will have available a dedicated case study tutor (typically a PhD student) to support your work. Your very first meeting should be with your tutor.

In order to gain access to the case study, it is also imperative that you establish contact with your case study contact person as soon as possible in order to book meetings and request documentation.

You are expected to use the EA²T software tool (the Enterprise Architecture Analysis Tool) loaded with your extended MAP model, for both modeling and prediction. Both the EA²T and the original MAP are available for PC and Mac at <http://www.ics.kth.se/eaat>.

Course book Chapter 2 *Basic enterprise architecture modeling* provides introductory information on enterprise architecture modeling with EA²T. Course book chapter 3-10 *The multi-attribute prediction (MAP) model* details the MAP modeling language. The book also features an introductory tutorial. The MAP model is based on an established enterprise architecture metamodel called ArchiMate. More information about that language is available in the ArchiMate[®] 2.0 Specification.

A modeling exercise has been prepared for you. You are presented with a substantial batch of poorly structured information, just as you will be in your case study. The goal of the exercise is to transform the available information into a MAP model. A seminar is offered where your results of the modeling exercise are discussed. Submit your model before the submission date to participate and receive feedback on your modeling choices.

In a second seminar, your as-is model is reviewed by a peer group and discussed. This provides you with feedback on your own work as well as with the opportunity to see and learn from your course colleagues' work, which in many respects is similar to yours. Submit your model before submission date to participate.

Model future candidate enterprise system scenarios with the extended MAP model

Objectives. In order to recommend future developments of the system to the user organization, a set of future candidate enterprise systems scenarios need to be proposed. These scenarios can either be proposed by people from the user organization, or can be created by the student group.

Support. The same as for the previous task except for another seminar, a case study candidate model seminar. In this seminar, your candidate models are reviewed by a peer group and discussed.

Model the user organization's requirements

Objectives. To determine which scenario is the better, the user organization's requirements need to be taken into account. Is Service A more important than Service B? Is modifiability more important than availability for Service A? What availability is minimally acceptable for Business Process C? These and similar requirements can be captured using the MAP model.

Support. The same as for the previous task but no seminar.

For all scenarios, predict the qualities supported by the MAP model

Objectives. Prediction with EA²T and MAP is really quite easy. Just press the “Calculate” button, wait, and see the results. A likely outcome is that the attempt to calculate reveals problems in the model. These must then be remedied. Perhaps it is possible for you, after the analysis, to modify one of the scenarios in a realistic way to increase its utility to the user organization. If you can, make sure to improve the scenarios in this manner.

Support. The EA²T software tool. The MAP model. Your tutor.

We have also prepared a manual architecture analysis exercise (mandatory) that will help you to understand the theory behind the prediction.

Justify your recommendations

Objectives. Your recommendation ought to be the candidate scenario that results in the highest utility score for the user organization. The user organization will, however, need to understand how you came to that conclusion. Therefore, you will need to motivate your recommendations in plain language. Why is Scenario A better than B? Why did Scenario C have a lower modifiability than Scenario B? Why should we trust your estimation of the investment cost of Node X? Why is Y modeled as a service and not a function and how does that affect your prediction?

Support. Course book chapter 3-10 explains in detail the workings of the MAP predictions. It is also advisable to use the EA²T software tool (the Enterprise Architecture Analysis Tool) together with the MAP model to perform what-if analyses, considering the effects of various changes. In a seminar, your motivations for your recommendations are reviewed by a peer group and discussed in group. Your tutor is as always available for guidance.

Architect interview

The goal with interviewing an architect is for you to learn more about the practical work in industry.

You should start looking for an enterprise architect to interview early in the course. Try to book the interview well in advance. It is good if you have found an architect during the first half of the course and have scheduled the interview to take place early in the second half. You are free to ask whatever questions you find interesting for you and your classmates.

If you have trouble finding an enterprise architect to interview we can help you to find one, but make sure to let us know well in advance if you need assistance. Most people in these positions are busy and need at least a few weeks notice for an interview. Some questions that may help you to start planning your interview are: What are the biggest challenges as an enterprise architect? What is most exciting with being an architect? What is most important? How do you become an enterprise architect?

General Support

Offered, as support in completing your work is a number of people, tools and documents. Please make use of them according to your own judgment.

Teacher

The course responsible are your main contacts regarding all issues of the course, unless otherwise stated.

Tutor

Your dedicated case study tutor is available to support your work. You can expect the tutor to allocate in total eight hours of meetings to your project during the duration of the course. It is your task to manage the tutor's allocated time to best support your project. The tutor will also provide feedback on your models and reports.

Case study contact person

A contact person from the case study organization has been assigned to your group. Turn to this person for all matters related to the case study, including bookings of meetings, visits, and access to documentation.

Seminars

A number of non-compulsory seminars are offered to support your project. Each seminar focuses on one essential ingredient in your report, such as the case study as-is models or the case study recommendations. To participate in the seminar, you are expected to turn in a deliverable (for instance, your case study as-is model) at a deadline a few days in advance. Before the seminar, your model will be reviewed by another group as well as by a teacher. You will also receive a deliverable to review. During the seminar, participants discuss strengths and weaknesses of their own and their course colleagues' work. The seminars do not influence the grade but are solely offered as a means for you to improve the quality of your work.

Open Sessions

A number of open sessions are available for your use. You may use these in two ways. The first option is the spontaneous Q&A sessions, where you participate to pose your own questions, hear your course colleagues' questions, and the teacher's answers. The second option is a pre-planned session where you in advance propose a certain topic for a lecture or seminar that you feel the need for. This allows the teacher (and possibly your colleagues) to prepare the material for the session (see Appendix 2 for some examples).

Tutoring sessions

As mentioned, you can expect the tutor to allocate in total eight hours of meetings to your project during the duration of the course. It is your task to manage the tutor's allocated time to best support your project. The tutor will also provide feedback on your models and reports.

Course book

For the course, we have authored the book *IT Management with Enterprise Architecture*. Currently, it is available as a pdf. We expect to release an iBook version later this year. You can read or download the pdf on the course homepage on KTH Social.

Collection of articles

In 1987, John Zachman wrote the article "A framework for information systems architecture" in the *IBM Systems Journal*, thereby setting the enterprise architecture discipline on its course. The article is well written and surprisingly relevant today, a quarter of a decade later. It is available on the course page at KTH Social together with a collection of other relevant articles and videos related to enterprise architecture and non-functional requirements analysis.

The EA²T software tool (the Enterprise Architecture Analysis Tool)

We hope you will employ the EA²T software tool extensively during the course. Developed at the department, it is capable of supporting enterprise architecture instance modeling, automatic prediction, and enterprise architecture class modeling. The EA²T is available for PC and Mac at <http://www.ics.kth.se/eaat>.

The Multi-Attribute Prediction (MAP) model

Based on the ArchiMate metamodel, the Multi-Attribute Prediction (MAP) model is a UML class diagram to be used as a base for your modeling and prediction. It features capabilities to make predictions on the modifiability, availability, cost, interoperability, data accuracy, application usage, and then to aggregate those quality attributes into a single utility score for a given scenario. The MAP is available at <http://www.ics.kth.se/eaat>.

The ArchiMate[®] 2.0 Specification

The ArchiMate metamodel is a well-established language for enterprise architecture, currently developed by The Open Group (<http://www.opengroup.org>). It constitutes the base for the MAP model. The latest specification is available for you on the course homepage in KTH Social.

The OMG Object Constraint Language (OCL) Specification, version 2.3.1

The causal relations in the MAP are specified in OCL. When updating MAP with your specific extensions, this specification will be a good reference for you. It (in particular Section 7) is quite pedagogical about the OCL. The OCL specification is available for you at <http://www.omg.org/spec/OCL/>.

SCADA modeling exercise

To assist your learning of the MAP model, a modeling exercise has been developed. A batch of semi-structured information regarding an enterprise system is available. The ambition has been to provide you with information not unlike what you might encounter in a real organization, such as your case study organization. The exercise consists of the transformation of the provided information into a MAP model. A seminar is available where you can receive feedback on your results. The material is available on KTH Social.



Teachers

The examiners and responsables for the course are Professor Pontus Johnson and Assistant Professor Robert Lagerström. Course secretary is Annica Johannesson. For all administrative business, such as travel expenses etc., please talk to the course secretary.

Name	Role	E-mail	Telephone
Pontus Johnson	Course ex.	pj101@ics.kth.se	08-790 68 25
Robert Lagerström	Course ex.	robertl@ics.kth.se	08-790 68 66
Annica Johannesson	Course secr.	annica.johannesson@ics.kth.se	08-790 69 30
Markus Buschle	Tutor	markusb@ics.kth.se	08-790 68 27
Matus Korman	Tutor	matusk@ics.kth.se	08-790 69 14
Margus Välja	Tutor	margusv@ics.kth.se	08-790 69 14

Administration and practicalities

All students in the course will have 24 hour access to the lecture room and the laboratory on the 7th floor (if these are not being used for other purposes, such as other courses).

If the doors are kept opened too long the alarm will go off. If the alarm goes off when no one at the department is present, stay put, wait for the security personnel and explain your situation. Notify the course administration as soon as possible.

Students will also have access to the coffee machine. Since we are many people sharing the same premises, it is necessary that good order be maintained, for instance by picking up trash and doing the dishes. Our cleaning staff is not responsible for dishes and the up-keep of the kitchen areas.

Quotes vs. plagiarism

Please note that when solving the project assignments co-operation between students is encouraged. However, the project groups are responsible for the content of their own reports and plagiarism will result in a failing of the assignment in addition to a written report to KTH's central disciplinary committee. This means that all groups should write their own reports. If you want to use a quote from a source, "it must be clearly indicated that it is a quote [X]".

Schedule

Mon. 2 Sep. 10-12	Course introduction (intro, case studies, administration)
Tue. 3 Sep. 10-12	Open session
Fri. 6 Sep. 10-12	Open session
Mon. 9 Sep. 10-12	Open session
Wed. 11 Sep. 10-12	Open session
Mon. 16 Sep. 23.59	Deadline case study motivation report (compulsory)
Wed. 18 Sep. 10-12	Open session
Fri. 20 Sep. 10-12	Presentations case study motivation report (compulsory)
Fri. 20 Sep. 13-15	Open session
Thu. 26 Sep. 10-12	Open session
Wed. 2 Oct. 23.59	Deadline case study motivation report v2 (compulsory)
Thu. 3 Oct. 8-10	Open session
Fri. 4 Oct. 10-12	Open session
Tue. 8 Oct. 8-10	Open session
Wed. 9 Oct. 23.59	Deadline metamodel report (compulsory)
Mon. 14 Oct. 13-15	<i>Metamodel seminar (preparatory)</i>
Tue. 15 Oct.	Manual architecture analysis, latest day to book exercise session (compulsory)
Wed. 16 Oct. 10-12	Presentations metamodel report (compulsory)
Thu. 17 Oct. 13-15	Presentations metamodel report (compulsory)
Mon. 28 Oct. 23.59	Deadline metamodel report (compulsory)
Tue. 29 Oct.	Manual architecture analysis, latest day to have performed exercise (compulsory)
Fri. 1 Nov. 13-17	Presentations metamodel report (compulsory)
Wed. 6 Nov. 10-12	<i>SCADA laboratory modeling seminar</i>
Tue. 12 Nov. 13-15	Interview seminar (compulsory)
Wed. 20 Nov. 13-15	<i>As-is model seminar (preparatory)</i>
Wed. 4 Dec. 10-12	<i>To-be scenario model seminar (preparatory)</i>
Tue. 10 Dec. 13-15	<i>Recommendations seminar (preparatory)</i>
Wed. 11 Dec. 23.59	Deadline final report (compulsory)
Wed. 18 Dec. 10-12	Final presentations (compulsory)
Wed. 18 Dec. 13-15	Final presentations (compulsory)

Appendix 2

Theme suggestions for EH2780 Open Sessions

Enterprise architecture

Enterprise architecture analysis

Non-functional requirements

- Security
- Modifiability
- Availability
- Cost
- Performance
- Interoperability
- ...

TOGAF (The Open Group Architecture Framework)

Business modeling (e3value)

Typical system in a modern enterprise

The Enterprise Architecture Analysis Tool

- The class modeler
- The object modeler

The Object Constraint Language

- Probabilistic version

The Multi-Attribute Prediction (MAP) class model

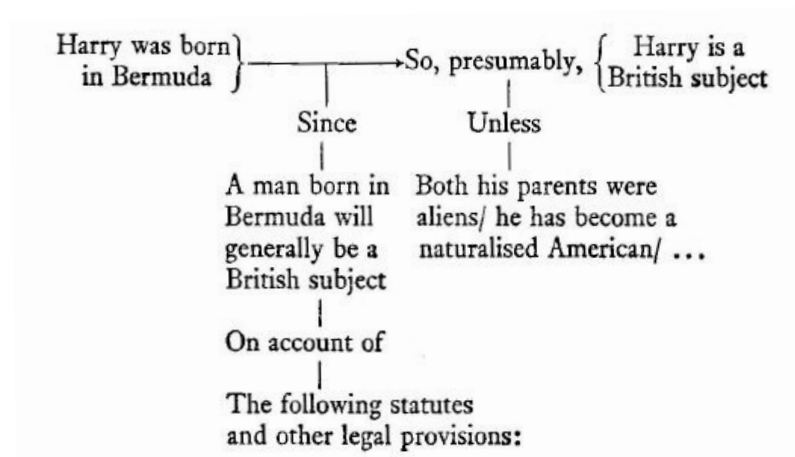
Utility theory

Collecting and using data for enterprise modeling

Argumentation analysis

Appendix 3 The Toulmin Method

More information about the Toulmin method, can be found here: <http://writing.colostate.edu/guides/reading/toulmin/index.cfm> or <http://www2.leon.leon.k12.fl.us/dewinterg/AP%20Lang%20Policies%20and%20Syllabi/Toulmin.pdf>.



The Toulmin method is used to assess the strength of an argument. It aids in answering the question "How much should we believe in this argument?"

As further input, here is a brief excerpt from one book (T. Govier, *A Practical Study of Argument*, 2009) on argumentation analysis:

"By using the ARG conditions [Acceptable premises, Relevant premises Good grounds], you can assess the cogency of an argument. That is, you can determine, on the basis of a reasonable, stage-by-stage evaluation, how good the argument is—how strong the support is that it gives to its conclusion. [First] you explore whether its premises are acceptable. Suppose that the audience to whom the argument is addressed is you. You should ask yourself whether you have good reason to accept the premises on which the argument is based. If you are inclined to accept the premises, ask yourself why you do. If you do not accept them, the argument cannot possibly provide you with a good basis for accepting its conclusion. An argument moves from its premises to its conclusion, and you will not get anywhere without a starting point. If the premises satisfy the A condition, you move on to R. Ask yourself whether the premises are relevant to the conclusion. How, if at all, do they bear on it? Could they support it if arranged into a sequence that would deductively entail the conclusion? Or is this a conductive argument, one in which various distinct considerations are put forward and there is a convergent pattern of support? Could they offer inductive support? Do they develop an analogy? If R is to be satisfied, it must be possible to interpret the connection between the premises and the conclusion so that they offer some support to the conclusion. If this cannot be done, the premises are irrelevant. In such a case, the argument fails on the R condition and does not qualify as cogent. If A and R are satisfied, you move on to G. Ask

yourself whether the premises, taken together, provide good and sufficient grounds for the conclusion. Premises that are acceptable and relevant may fail to provide sufficient grounds for the conclusion; they may offer an appropriate sort of evidence but fail to give enough of it. If this is a problem, then G is not satisfied and the argument is not cogent. A cogent argument passes all three conditions of ARG. All its premises must be acceptable. They must be relevant to its conclusion. And taken together they must provide adequate grounds for that conclusion. If any one of these conditions is not satisfied, the argument is not cogent. The premises do not offer strong support to the conclusion."