Embedded Q
Synergy Between Existing Quality Assurance and Accreditation Requirements

Andrzej Wąsowski
linjeleder

Master of Science in IT
Software Development and Technology
IT University of Copenhagen

Before

After

Future

IT UNIVERSITY OF COPENHAGEN

Summary

- 1999: IT University is founded
- 1999: Fall: web-based **course base**
- 2000: web-based **evaluation system**
  - How **did we** use existing systems in accreditation ?

- 2008: SDT **accreditation**
  - What have we learnt from accreditation ?
  - What **are we doing** ?
- 2008: **employer's panel**
  - How **could we** use it in accreditation in future ?

2

Part I
Before

openoffice impress margins - Google Search - Gran Paradiso

https://mit.itu.dk/ucs/evaluation/evaluation_course_report.sml

File Edit View History Tools

mit Course Evaluation ✕

IT University of Copenhagen   my.ITU

Andrzej Wasowski's page   Change password   Danish   Intranet   Log out

Evaluation of the course Database Tuning (KSDT)

Teachers: Rasmus Pagh (pagh@it-c.dk), Milan Ruzic (milan@it-c.dk)

Data was gathered between Mon Apr 28 12:00:00 2008 and Sun May 18 18:00:00 2008. The data enclosed was collected from the Open University students, the Master of Science students (stud. it.) and the Ph.D. students.

Quality

1. I completely disagree
2. I largely disagree
3. I rather disagree
4. I rather agree
5. I largely agree
6. I completely agree

To what extent do you agree with the following statements?	6	5	4	3	2	1	replies	average
Overall conclusion: I am happy about this course	2	3	0	0	0	0	5	5.40
There is clear progression and cohorence in the contents of the course	1	4	0	0	0	0	5	5.20
I think this course is highly relevant for my future job profile	1	2	2	0	0	0	5	4.80
The contents is very practical	1	2	1	1	0	0	5	4.60
I would like to see more emphasis on practice	2	1	2	0	0	0	5	5.00
I think the theoretical level of the course is high	1	3	0	1	0	0	5	4.80
I would like the theoretical level of the course to be increased	0	2	0	1	1	1	5	3.20
I feel that the course gives me good knowledge of relevant literature	0	1	3	1	0	0	5	4.00
I feel I satisfy the specified requiremets for the course	0	4	1	0	0	0	5	4.80

Done   mit.itu.dk   100%   <24g>:13 8/<mies>

Method

Criterium by criterium, discuss use of these systems in documenting quality, and quality development

Disclaimer

- Only some criteria mentioned
- Only a part of documentation discussed
  (other sources **were** used)

Kriterium 3
Uddanelsen er forsknings baseret
Kriterium 4
Uddannelsen er baseret på et aktivt forskningsmiljø

List of courses with detailed descriptions is in the course base for any given historical period

Found the following 72 courses for the semester Autumn 2008:

Course name	Day of Week	Time of Day	Location	Language	Study programm
Advanced AI in Games		10.00–15.00	ITU	English	MTG
Advanced Algorithms		10.00–15.00	ITU	English	SDT
Advanced Game Theory		13.30–18.00	ITU	English	MTG
Advanced IT Project Management	Saturday	Netbaseret undervisning	ITU	Danish	SWU
Advanced Mobile and Distributed Systems		10.00–15.00	ITU	English	SDT
Advanced Object Oriented	Monday	10.00–18.00	ITU	English	SDT

7

Kriterium 3

Uddanelsen er forsknings baseret

Kriterium 4

Uddannelsen er baseret på et aktivt forskningsmiljø

Who is teaching our courses? Are these researchers? How many are local vs external lecturers? **AGGREGATE**

IT UNIVERSITY OF COPENHAGEN

Teachers

The following people are teaching the course:

Name	Email	Position	Type of teacher	Contribution (%)
Mikkel Bundgaard	mikkelbu@itu.dk	postdoc(ITU)	Teacher	30
Hugo Andres Lopez Acosta	hual@itu.dk	ph.d. student(ITU)	Teacher	0
Andrzej Wasowski	wasowski@itu.dk	associate professor(ITU)	Teacher	15
René Rydhof Hansen	rrha@itu.dk	external lecturer(ITU)	Course manager	55

8

Kriterium 3

Uddanelsen er forsknings baseret

Kriterium 4

Uddannelsen er baseret på et aktivt forskningsmiljø

Are learning outcomes of courses research related?

and "Efficient AI Programming".

After the course, the student should be able to solve a wide range of real-life programming problems in a scalable way, by employing algorithmic design techniques and tools. In particular, you should be able to:

- Identify and formulate precisely (if possible) the algorithmic problem hidden in a given programming task.
- Apply the following algorithmic techniques when solving a problem: Greedy, divide and conquer, dynamic programming, reduction to network flow.
- Theoretically analyze the performance of a given algorithmic solution, including the analysis of basic approximation algorithms and basic randomized algorithms.
- Look up suitable NP hardness results in a compendium, and perform simple reductions from such problems to establish NP hardness.
- At a basic level, evaluate theoretically the performance of an algorithm in a parallel or distributed setting, and in situations where there is a massive amount of data.
- Find results in the algorithms research literature relevant to a given problem.

9

Kriterium 3
Uddanelsen er forsknings baseret
Kriterium 4
Uddannelsen er baseret på et aktivt forskningsmiljø

Is research literature included in the course pensum? We register detailed pensum for the exam in the course base itself.

Curriculum

The following curriculum have been registered:

Filename	Description	Size	Date (upload)
curriculum.txt	Curriculum	887b	2008-10-15

Level and subject areas

- Slides of Lecture 2,3,…,12.
- Exercise texts and solution texts of Lecture 3,4,…,13.
- Projects texts of Game Project, Configuration Project, and Forward Checking Project.
- *Russell, S. and Norvig, P.*, "Artificial Intelligence. A Modern Approach. Second Edition", Prentice Hall, 2003, ISBN 0-13-080302-2.
  - Chapter 2.
  - Chapter 3, except Section 3.6.
  - Chapter 4, except Section 4.4 and 4.5 and recursive best-first search.
  - Section 5.1, 5.2, 5.3 and 5.5 of Chapter 5.
  - Chapter 6.
  - Chapter 7, except Section 7.7.
  - Section 11.1, 11.2, 11.3, 11.5, 11.6, and 11.7 of Chapter 11.
- *Andersen, H.R.*, "An Introduction to Binary Decision Diagrams", Lecture note, Technical University of Denmark, 1998.
  - Chapter 1,2,3,5,6,7.
  - Section 4.1, 4.2, and 4.3.
- *Michell, T.*, "Machine Learning", McGraw-Hill, 1997.
  - Chapter 3, except Section 3.7.2, 3.7.3, and 3.7.5
- *Sathiamoorthy Subbarayan, Rune M. Jensen, Tarik Hadzic, Henrik R. Andersen, Henrik Hulgaard, and Jesper Møller,* "Comparing Two Implementations of a Complete and Backtrack-Free Interactive Configurator", CP-04 Workshop on CSP Techniques with Immediate Application, 2004.

Kriterium 3

Uddanelsen er forsknings baseret

Kriterium 4

Uddannelsen er baseret på et aktivt forskningsmiljø

Are teachers teaching in their area of research ?
Contrast course base with other information about researchers.

Example from the report ...

	2006	2007	2008
Obligatoriske faglige rygrad-kurser			
O1: Objektorienteret programme-ring - introduktion	LB, CS	LB, CS	LB, CS
O2: Modellering og design	SL, JCG, RMJ, YD	TH, JCG	TH, JCG, YD
O3: Performance og test	HRA, AW	HRA, AW	DWH, KS, RP
O4: Systemarkitektur og – sikkerhed	-		ME, AW
Specialiseringskurser			
S1: Databasesystemer	RP, ERH	RK	RK
S1: Databasetuning	-	MR, RP, SR	RP
S2: Advanced Object Oriented Programming*	KØ, SV	KØ	ME
S2: Avancerede modeller og pro-grammer	KØ, LB, CS, PS	KØ, LB, ME, CS, PS	KØ, LB, ME, PS, CB
S3: Mobile og distribuerede sy-stemer	-	JCG, AJG, HN	AJG, JCG
S3: Avancerede mobile og distri-buerede systemer	-	JCG, AJG, SD	JCG, AJG
S4: Effektiv AI-programmering	-	SMS, TH, RMJ	RMJ, ADO
S4: Avanceret algoritmik	PB, AØP, SRS	RP, PB, RMJ	RP, PB, RMJ

Kriterium 6
Uddannelsens struktur (Progression og Struktur)

Progression and structure of the education is partly documented in the course base using prerequisties.

Before taking this course:

- You have implemented at least two medium-size programming projects (7.5 ECTS each)

- You are able to design, implement, and test medium-sized programs in Java or C#

- You know basic algorithms and data structures, and notion of complexity of algorithms

One way to obtain these prerequisites is by following Object-oriented programming (SOPI) and Performance&Test (SPT) at ITU. If you are an external student you preferably had followed a basic programming and an introductory data structures course.

It is an advantage, but not a requirement, to know some basics of database programming (basic SQL) and web-programming. ⑦
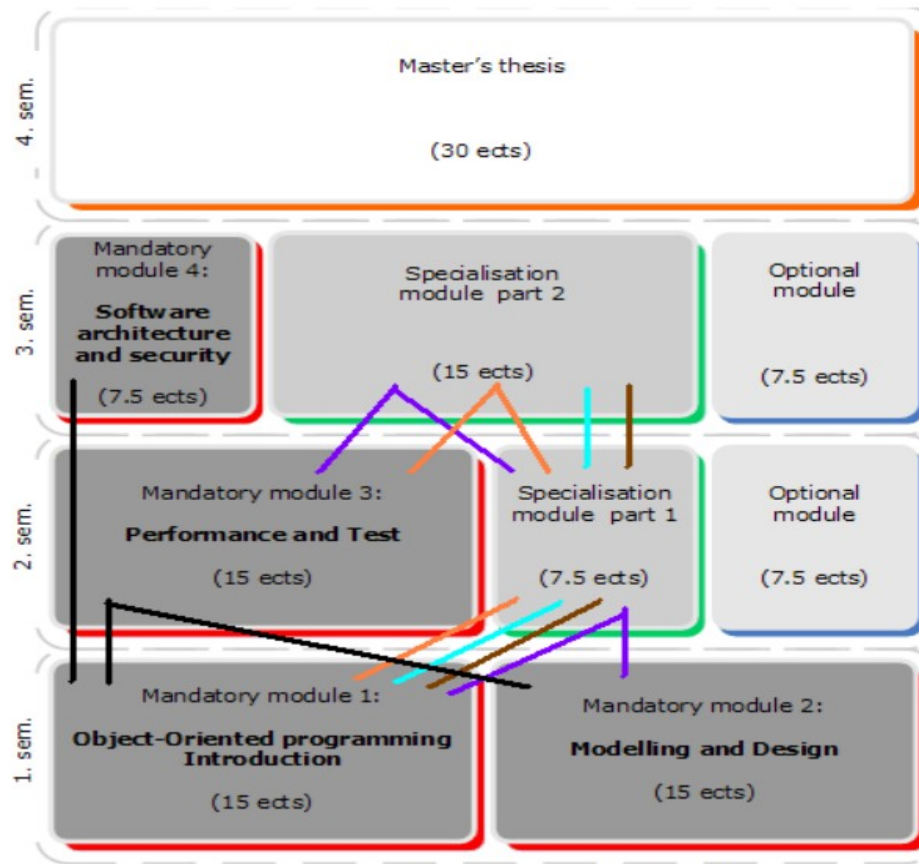
In this course you learn the following high-level skills:

14

Kriterium 6
Uddannelsens struktur (Progression og Struktur)

This information processed looked like that in the report:

15

Kriterium 6
Uddannelsens struktur (Orientation Towards Practice)

Orientation of courses towards practice, is among others documented in the course evaluation system:

There is clear progression and cohorence in the contents of the course	4	3	3	0	0	0	10	5.10
I think this course is highly relevant for my future job profile	5	3	2	0	0	0	10	5.30
The contents is very practical	3	2	1	2	2	0	10	4.20
I would like to see more emphasis on practice	3	0	3	2	2	0	10	4.00
I think the theoretical level of the course is high	6	4	0	0	0	0	10	5.60
I would like the theoretical level of the course to be increased	0	0	1	2	2	5	10	1.00

Kriterium 6
Uddannelsens struktur (Orientation Towards Practice)

This information aggregated in the documentation report:

"K 1.4: Indholdet er meget orienteret mod praksis"

K1.4	O1	O2	O3	O4	S1.1	S1.2	S2.1	S2.2	S3.1	S3.2	S4.1	S4.2
E2006	-	4.87	3.75	-	4.81	-	5.00	-	-	-	-	3.71
F2007	4.64	-	4.78	-	-	5.17	-	3.70	4.62	-	3.88	-
E2007	4.27	4.58	4.42	-	4.00	-	5.17	-	-	3.50	-	4.17

"K 1.5: Jeg så gerne, at kursets orientering mod praksis blev øget"

K1.5	O1	O2	O3	O4	S1.1	S1.2	S2.1	S2.2	S3.1	S3.2	S4.1	S4.2
E2006	-	3.87	5.00	-	3.38	-	3.41	-	-	-	-	3.14
F2007	4.27	-	3.56	-	-	3.50	-	3.00	3.85	-	3.62	-
E2007	4.64	3.58	4.50	-	4.67	-	3.28	-	-	4.50	-	3.50

Kriterium 7

Undervisningens Tilrettelæggelse og Undervisernes Kvalifikationer

To what extent do you agree with the following statements?	Re						
	6	5	4	3	2	1	re
Overall conclusion: I am happy about this course	3	5	1	1	0	0	10
There is clear progression and cohorence in the contents of the course	4	3	3	0	0	0	10
I think this course is highly relevant for my future job profile	5	3	2	0	0	0	10
The contents is very practical	3	2	1	2	2	0	10
I would like to see more emphasis on practice	3	0	3	2	2	0	10
I think the theoretical level of the course is high	6	4	0	0	0	0	10
I would like the theoretical level of the course to be increased	0	0	1	2	2	5	10
I feel that the course gives me good knowledge of relevant literature	3	2	5	0	0	0	10
I feel I satisfy the specified requiremets for the course	2	4	2	2	0	0	10
I spend a great deal of time on this course, compared to the hours a week it is supposed to take	1	3	2	2	1	1	10
I think a lot is expected compared to the hours, that are the norm	0	3	4	3	0	0	10

Course evaluation measures and documents students perception of teachers qualifications, preparation, and other quality aspects of individual teaching activities.

Also lots in open comments!

Kriterium 7
Undervisningens Tilrettelæggelse og Undervisernes Kvalifikationer

Follow up on course evaluation, documents our quality assurance processes:

- Minutes from fagudvalg meetings on results of evaluation
- Responses of teachers in the system
- Evaluation report from all of ITU, indicating steps to be taken

Kriterium 7
Undervisningens Tilrettelæggelse og Undervisernes Kvalifikationer

IT UNIVERSITY OF COPENHAGEN

Course base documents work form, exam form, admission requirements, end similar details. We aggregated this in the report in the following form:

Den aktuelle pædagogiske detailtilrettelæggelse af de enkelte kurser

Pædagogisk tilrettelæggelse	O1	O2	O3	O4	S1-1	S1-2	S2-1	S2-2	S3-1	S3-2	S4-1	S4-2	SPEC
Ugentlige forelæsninger	x	x	x	x	x	x	x	x	x	x	x	x	
Ugentlige øvelser	x		x	x	x	x	x	x	x	x	x	x	
Obligatoriske hjemmeopgaver	x				x			x				x	
Individuelle studier af videnskabelige artikler og bøger mm.	x	x	x	x	x	x	x	x	x	x	x	x	x
Parallelt gruppeprojekt inkl. vejledning		x	x		x			x	(x)	x		x	
Mundtlige oplæg fra studerende									x				
Mundtlige projektoplæg fra studerende		x									x		x
Projekt inkl. vejledning						x	x			x		x	

21

Part II
After

What we have learnt?
Where should we improve?

- 22 improvements have been sketched as a result of our reflection (many rather small)
- **Example 1:** Revision of our course evluation system, and the process, to increase attractiveness for students
- **Example 2:** A systematic revision of study forms in the course base (large diversity across courses on the level of detail)

23

Part III
Future

Aftager panel

- In 2008, required by law we have established employers panel (aftager panel)
- Not in place during preparation of our report
- 20 high profile managers (CEO, and similar) from major IT organizations in Copenhagen Area

We need to have it, we have it, how do we benefit from it?
- The panel works closely with study programmes (competence specifications, course selection)
- Open atmosphere, both harsh and constructive criticism
- Work is documented and published on www.itu.dk
- We would definitely use it in documenting:
  Kriterium 1. Behov for uddannelsen

Thank you for listening

Andrzej Wąsowski

linjeleder

Master of Science in IT
Software Development
and Technology

IT University of
Copenhagen