



AALBORG UNIVERSITET

## Minutes

Subject: Study board meeting – No. 2021.8  
Date: 22 September 2021  
Minute taker: Tatiana K. Madsen/Heidi Sørensen  
Participants: Tatiana K. Madsen, Peter Koch, Henrik Schiøler,  
Troels Bundgaard Sørensen, Henning Olesen, Damian  
Leporis, Johannes Kjær Helmers

Observer: Ove Andersen  
Cancellations: Thomas B. Moeslund, Peter Fisker, Lisa Bondo  
Andersen, Sandra Aynaddis Strabo, Rikke Skov  
Udengaard

## Agenda

1. Approval of agenda
2. Approval of minutes from meeting in August 2021
3. Dispensation
4. Curriculum for BSc in Elektronik og systemdesign
5. Curriculum for BSc in Computer Engineering
6. Curriculum for MSc in Computer Engineering
7. Curriculum for MSc In Electronics Systems
8. Curriculum for Innovative Communication Technologies and Entrepreneurship
9. Specializations
10. Digital Learning objectives
11. A.O.B.

## Minutes

### Ad. 1. Approval of agenda

The agenda was approved.



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#### **Ad. 2. Approval of minutes from meeting in August 2021**

With a minor comment on the changing one place where an old title for an education is mentioned, the minutes are approved.

#### **Ad. 3. Dispensation**

Three applications has been processed

#### **Ad. 4. Curriculum for BSc in Elektronik og systemdesign**

JHM has participated and presented the motivation behind the revision: the education landscape around EIT has changed during last decades; new educations such as ROB has appeared; previously E-line and D-line were running very closely and there is a need to keep a sharp profile for EIT. The new title is Electronics and System Design (Elektronik og System Design) with abbreviation ESD. JHM has presented main lines behind different modules design including math in time; analog electronics progression; HW focused programming on the first year of the program; removal of P0 project; selection of joined courses with other programs.

On behalf of ESN, TKM has thanked the working group and acknowledged the great efforts that WG has invested in the revision and the new and interesting ideas that has been generated.

During the following discussions, the following concerns and **questions** has been raised by ESN members :

**Math progression:** substitution of LA course on the first year of education with ASTA. LA concepts can be also used in the projects and courses already from the 1<sup>st</sup> semester and the proposed substitution is not obvious. There are definitely advantages of introducing LA later on the 4<sup>th</sup> semester, where it is directly applied; however early introduction to statistical concepts prevents giving it on a high theoretical level that is needed for Stochastic processes course later on.

**Difficulty of 2 semester:** it seems that there are many different and difficult concepts introduced on the 2nd semester. We are risking that the students becoming overwhelmed already on the 2nd semester. JHM: we should remember that we are introducing new courses and they are not the old courses that were recombined and moved to other semesters. The level of difficulty is adjusted accordingly to the semester.

**Descriptions of P1 and P2 project modules:** the descriptions are very detailed and it wont be possible to fulfill all listed learning objectives in the projects. It should be adjusted.

**Title of P2 project:** Dynamical systems can be interpreted in different ways. JHM has given examples of projects that could be run on the 2<sup>nd</sup> semester and explained what WG means by dynamical systems on this semester.

**Title and content of Data collection course** on the 2<sup>nd</sup> semester: there is a discrepancy between the title and content.

Furthermore, a list with minor suggestions for modules content adjustment will be sent JHM after the meeting.

Conclusion: It has been agreed that WG considers the discussed points and if deemed necessary, updates the descriptions. ESN expects to receive the updated description in 2 weeks. TKM calls for a separate meeting



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between interested ESN members and WG to further discuss and clarify the raised issues. ESN will make the decision regarding the updated study regulations after the revised version is received.

#### **Ad. 5. Curriculum for BSc in Computer Engineering**

JJN has participated and presented the motivation behind the revision: the purpose of the revision is to further strengthen the profile and keep the clear separation between COMTEK and EIT. Additionally, a synergy between COMTEK and Cyber and Computer Technology (CCT) bachelor in Copenhagen should be achieved by defining some joined courses.

On behalf of ESN, TKM has thanked the working group and acknowledged their efforts in updated the curriculum.

During the following discussions, the following concerns and **questions** has been raised by ESN members :

**Placement of Probability and Statistics course:** it should be synchronized with ROB to keep the possibility of following it together.

**Elective themes for project modules:** currently it is an elective theme on P5, however it is difficult with the course choice to support both themes equally. One possibility would be to make an elective theme on P2. Elective themes on P6 does not count in the number of elective ECTS and they are there to support specialization choice on the following master program.

**Withholding P0:** contrary to ESD, P0 project was preserved in the updated curriculum. JJN: there is a positive feedback about P0 from the students who like its social and team building aspects and at the same time it provides a possibility to start with Python programming also for those, without previous programming experience.

**Optimization course on the 6<sup>th</sup> semester:** would it be possible to follow it without a linear algebra course from ESD on the 4<sup>th</sup> semester? WG considers it

**Placement of OOAD course:** could it be possible to reconsider to move it to 3<sup>rd</sup> semester, thus allowing running it jointly with ESD?

**Missing content:** formal languages, compilers and parsing

Conclusion: ESN tentatively approves the curriculum change. After the additional changes are introduced by WG, TKM checks the consistency. Afterwards, the curriculum is considered approved.

TKM sets up a meeting with JDN, education coordinator of ROB, to clarify placement of joint courses.

#### **Ad 6. Curriculum for MSc in Computer Engineering**

TKM has presented the motivation behind the revision: the main idea is to have a master program that will be a natural continuation of bachelor studies in Computer Engineering. To underline this strong link, it has been suggested to name the program Computer Engineering. This program is a merge of the two programs: VGIS and CT. In defining the new program some new elements have been added: additional focus on sound technology (previously only focus on computer vision in VGIS) and increased focus on security (compared with CT). It also meant that some topics have been omitted from the new program: interaction design (WG believes that these



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topics are covered by other master programs at AAU) and radio communication (these topics will be covered by the updated program in Electronic Systems).

On behalf of ESN, TKM has thanked the working group and acknowledged their efforts in updated the curriculum.

During the following discussions, the following concerns and **questions** has been raised by ESN members :

**How to make the updated program attractive** for students who previously was choosing VGIS and NDS: the program covers a range of topics and it is important that students with particular interests in certain domains within the program could also become interested to join. TKM: having specializations would potentially help and increase visibility of particular topics that are studies within the program.

**No specialization option:** to give students more freedom in constructing their own way through the curriculum, an option with no specialization can be considered.

Conclusion: ESN tentatively approves the curriculum change. After the additional changes are introduced by WG, TKM checks the consistency. Afterwards, the curriculum is considered approved.

TKM finds out whether incorporating an option with no specialization is possible without violating the requirements.

#### **Ad 7. Curriculum for MSc in Electronic Systems**

TBS has presented the motivation behind the revision: this is a merge of the two master programs SPA and CA, with the addition of the topics on radio communications. This program should be a natural continuation on the master level for graduates of ESD bachelor program. The challenge has been to identify the common ground and present a coherent curriculum. WG suggests using a concept of a recommended track and no formal specializations are introduced.

On behalf of ESN, TKM has thanked the working group and acknowledged their efforts in updated the curriculum.

During the following discussions, the following concerns and **questions** has been raised by ESN members :

**No formal specialization:** it has been discussed whether promotion outside of AAU would be more difficult without a clearly defined specializations and whether the program with a title Electronic Systems would be perceived as too general for the potential external applicants. We do not have similar concerns for students with AAU bachelor in ESD.

**Match between titles and content of some courses:** titles such as Networks&Systemms and Sensors&Systems might be were general and do not indicate in details the course content. More "telling" titles could be considered.

**Scientific communication moved to 3<sup>rd</sup> semester:** ESN is positive that the students on the 3<sup>rd</sup> semester have a choice between "scientific" or "Entrepreneurship/ industrial" track.

Conclusion: ESN tentatively approves the curriculum change. After the additional changes are introduced by WG, TKM checks the consistency. Afterwards, the curriculum is considered approved.



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Given that it is a difficult task to find a common ground and make a consistent curriculum, WG has 2 more weeks to make the necessary adjustments in the descriptions. Additionally, synchronization of shared courses between ES and CE is required.

#### **Ad 8. Curriculum for MSc in Innovative Communication Technologies and Entrepreneurship**

CS has participated and presented the motivation behind the revision: with the start of a new bachelor program, Cyber and Computer Engineering, there is a need to update the master program ICTE to have a better fit with the students' qualifications. The updated master program should offer a natural continuation on the master level for CCT bachelor graduates. We could potentially consider renaming the master program to Computer Systems Engineering to make a link between the two programs more visible.

CS has presented an overview of modules. A number of modules are envisioned as shared with Computer Engineering master in Aalborg to exploit the synergy.

On behalf of ESN, TKM has thanked the working group and acknowledged their efforts in updating the curriculum.

During the following discussions, the following concerns and **questions** have been raised by ESN members :

**Placement of shared courses:** since different WGs are continuing working on the study regulations and constantly introducing the updates, there is a need to check on the placement of the courses shared with CE in Aalborg. Additionally, an extra check on the content of the shared courses is needed to avoid a potential overlap with other courses of the programs.

Conclusion: ESN tentatively approves the curriculum change. After the additional changes are introduced by WG, TKM checks the consistency. Afterwards, the curriculum is considered approved.

TKM provides the module descriptions of CE master program to WG. TKM and CS verify if any adjustments in the joined courses are needed.

#### **Ad 9. Specializations**

Revisions in the bachelor and master educations also imply the change in the currently available specializations. Removing or introducing specializations has been discussed on this and previous meetings, when change in curriculum for a particular education was on the agenda.

Conclusion: ESN approves the proposed change in the specializations. List of the changes can be seen in Appendix.

#### **Ad 10. Digital learning objectives**

TKM has presented an approach developed by OA and TKM on how to verify the presence of the digital competences in our study regulations. A table has been presented that would classify the competences in two dimensions. One dimension classifies the competences into general academic competences; PBL competences; domain specific competences. Another dimension includes user-, creator-, and reflective competences.

On the example of COMTEK bachelor, TKM has demonstrated how different learning objectives related to digital competences can be classified in the table. Analysis has demonstrated that new learning goals on P6 might be considered to introduce and make more visible competences related to reflection on the level of general academic and PBL competences.



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ESN is positive about the presented approach. TKM will repeat the process for all ESN educations and based on the performed analysis suggest addition of learning objectives in the curriculum. The result will be presented on the next meeting.

#### **Ad. 7. AOB**

None

#### **Appendix**

ES ansøger om flg. ændringer i specialiseringer i uddannelsesporteføljen:

BA i Elektronik og it (Aal)

Uddannelsen er under revision og der søges om ny titel til uddannelsen.

Den ansøgte titel er: Elektronik og systemdesign

I forbindelse med revision af uddannelsen søges om nedlæggelse af fire nuværende specialiseringer:

Danske betegnelser:

Bachelor (BSc) i teknisk videnskab (elektronik og it) med specialisering i kommunikationssystemer

Bachelor (BSc) i teknisk videnskab (elektronik og it) med specialisering i signalbehandling

Bachelor (BSc) i teknisk videnskab (elektronik og it) med specialisering i informatik

Bachelor (BSc) i teknisk videnskab (elektronik og it) med specialisering i proceskontrol

Engelske betegnelser:

Bachelor of Science (BSc) in Engineering (Electronic Engineering) with specialisation in Communication Systems

Bachelor of Science (BSc) in Engineering (Electronic Engineering) with specialisation in Signal Processing

Bachelor of Science (BSc) in Engineering (Electronic Engineering) with specialisation in Informatics

Bachelor of Science (BSc) in Engineering (Electronic Engineering) with specialisation in Control Engineering

De fire specialiseringer har før den nuværende revision af studieordningen givet studerende en mulighed for at gå i dybden med et fagområde i deres bachelorprojekt og få dette påført som specialisering på deres bachelorbevis. Langt en overvejende del af bachelorerne vælger at fortsætte på en kandidatuddannelse og bachelorspecialiseringen har derfor begrænset betydning for studerende. En fjernelse af specialiseringsmulighederne på bacheloruddannelsen får ikke betydning for studerendes muligheder for at fordybe sig i de hidtidige fagligheder. Det kan forsat ske gennem bachelorprojektet.

MA i Informations- og kommunikationsteknologier (Kbh)



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(OBS: på den nuværende udgave af uddannelsen er der 'faglige spor'. Det er uklart om dette skal sidestilles med specialiseringer, men der fremsendes en ansøgning for god ordens skyld)

Det faglige indhold i masteruddannelsen i informations- og kommunikationsteknologi (mICT) er under revision og vil fremadrettet fokusere på cyber- og informationssikkerhed. Dette har været drøftet og anbefalet i forbindelse med selvevalueringsmøde d. 28. september 2020 og aftagerpanelmøde d. 1. juli 2021.

Uddannelsen har hidtil fokuseret på tre faglige spor:

Services og platforme

Ledelse af IKT innovation

Cyber- og informationsikkerhed

I 2020 er kun sporet i cyber- og informationsikkerhed udbudt. Det ansøges om fremadrettet at nedlægge de faglige spor, således at uddannelsen udelukkende fokuserer på cyber- og informationsteknologi.

Der arbejdes på at søge om titelændring i 2022. Der foreligger pt. et forslag om titlen: MA i Cyber Security and Privacy

KA i Kommunikationsteknologi (Aal)

Der søges om sammenlægning af uddannelserne KA i kommunikationsteknologi med KA i vision, grafik og interaktive systemer. Den sammenlagte uddannelse søges godkendt til titlen KA i computerteknologi.

Den nuværende KA i kommunikationsteknologi har to specialiseringer:

Danske betegnelser:

Civilingeniør, cand.polyt. i kommunikationsteknologi med specialisering i netværk og distribuerede systemer.

Civilingeniør, cand.polyt. i kommunikationsteknologi med specialisering i radiokommunikation.

Engelske betegnelser:

Master of Science (MSc) in Engineering (Communication Technology with specialisation in Network and Distributed System).

Master of Science (MSc) in Engineering (Communication Technology with specialisation in Radio Communication)

Der søges om at nedlægge specialiseringen i radiokommunikation. Specialiseringen i netværk og distribuerede systemer videreføres i den sammenlagte uddannelse .



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#### KA i signalbehandling og akustik (Aal)

Der søges om sammenlægning af uddannelserne KA i signalbehandling og akustik med KA i regulering og automation. Der søges om godkendelse til at anvende titlen KA i elektroniske systemer for den sammenlagte uddannelse.

I forbindelse med sammenlægningen søges om at nedlægge to specialiseringer fra KA signalbehandling og akustik.

Danske betegnelser:

Civilingeniør, cand.polyt. i signalbehandling og akustik med specialisering i signalbehandling og beregning

Civilingeniør, cand.polyt. i signalbehandling og akustik med specialisering i akustik og audioteknologi

Engelske betegnelser:

Master of Science (MSc) in Engineering (Signal Processing and Acoustics with specialisation in Signal Processing and Computing).

Master of Science (MSc) in Engineering (Signal Processing and Acoustics with specialisation in Acoustics and Audio Technology).

#### KA i computerteknologi (Aal)

De to hidtidige uddannelserne KA i kommunikationsteknologi og KA i vision, grafik og interaktive systemer søges sammenlagt under titlen KA i computerteknologi. Der ønskes oprettet to specialiseringer:

Danske betegnelser:

Civilingeniør, cand.polyt. i computerteknologi med specialisering i netværk og distribuerede systemer

Civilingeniør, cand.polyt. i computerteknologi med specialisering i kunstig intelligens, vision og lyd

Engelske betegnelser:

Master of Science (MSc) in Engineering (computer engineering with specialisation in network and distributed systems).

Master of Science (MSc) in Engineering (computer engineering with specialisation in AI, vision and sound).

Baggrunden for oprettelse af specialiseringer:

Rekrutteringsmuligheder

KA i computerteknologi er en god titel i forhold til BA i computerteknologi, men vurderes for bred i forholdt til at rekruttere internationalt, hvor potentielle studerende typisk søger efter specifikke fagligheder fx 'netværk' eller 'computer vision'. Specialiseringer vil gøre international marketing lettere og sikre fortsat international rekruttering.





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Traditionelt har en del bachelorer i robotteknologi og bachelorer i medialogi valgt KA i vision, grafik og interaktive systemer grundet muligheden for at arbejde med computer vision. Det vurderes centralt at etablere specialiseringer, således, at disse studerende tydeligt kan identificere muligheden for at arbejde videre med computer vision på KA i computerteknologi

Positionering i det danske uddannelseslandskab

Der er i 2021 bevilliget mere end 530 mio. kr. til to danske initiativer indenfor AI (Pioneer Center & Data Science Academy), som begge har en uddannelseskomponent. Det vurderes vigtigt, at institut for elektroniske systemer har en tydelig og synlig uddannelse/specialisering indenfor AI området, således at instituttet kan spille en rolle i de kommende nationale uddannelsesinitiativer indenfor AI området.

Jobmuligheder for vores kandidater

Det vurderes, at specialiseringer vil gøre det lettere for kandidaterne, at 'sælge sig selv' overfor kommende arbejdsgivere, især når det står "AI" i specialiserings titlen. De to specialiseringer bygger videre på eksisterende fagligheder, som der hidtil har været efterspørgsel efter på arbejdsmarkedet (der fuld beskæftigelse for kandidaterne fra uddannelserne). Med specialiseringerne vil der være en kontinuitet i forhold til de tidligere uddannelser og genkendelighed for aftagerne.