Teaching portfolio

1. Teaching CV: A list of teaching and supervision tasks, including specification of academic fields, scope, level (bachelor, master, continuing education, PhD). Please state the teaching method used (e.g. lecture, class teaching, exercises, supervision, examination, coexamination, distance teaching, internet-based teaching and evaluation of teaching). Please also indicate the language of instruction.

20+ years of experience organizing and teaching courses at B.Sc., M.Sc., and Ph.D. level in a number of different programmes at Aalborg University and supervising student groups in PBL.

In the past 10 years, my teaching duties have included the following selected courses:

Matrix Computations: Theory and Numerical Methods (B.Sc. course, 2 ECTS, ~75 students). This course covered numerical linear algebra and basic convex optimization. It covered the commonly used matrix factorization methods as well as methods for solving standard constrained and unconstrained optimization problems. I developed, planned, and executed this course from scratch, including lecture notes, exercises, and questions for the exam.

C/C++ Programming (B.Sc. course, 3 ECTS, ~50 students). This course was an introduction to programming, focusing on the C and C++ programming languages. The course had already run in previous years (I was only intended to run the course once), and I used the existing material but changed the exam from a written exam to an oral exam to allow for questioning and discussions to better reveal basic understanding of the subject. The course comprised a combination of lectures, subsequent exercises, and an individual project on image processing.

Machine Learning for Media Experiences (M.Sc. course, 5 ECTS, ~25 students). The course covered an introduction to multivariate statistics and pattern recognition. The course thus comprised both very fundamental statistics and linear algebra as well as practical methods for solving supervised and unsupervised classification problems. I planned, developed, and executed all aspects of this course. The course was executed as a combination of lectures and MATLAB exercises using the toolbox PRTools. The examination, which was an oral exam, was based on an individual project, wherein each student would work on a real-life data set from the UCI Machine Learning Repository. The course now runs at several campuses using the form and material I developed.

Audio Processing (B.Sc. course, 5 ECTS, ~60 students). The course focuses on the fundamental, technical aspects of signal processing (filtering, filter design, Fourier transform, sampling, quantization, etc.) and their applications in audio effects (chorus, flanger, phaser, delay, equalizers) and music synthesis (e.g., plucked string synthesis). I have led the development of the curriculum and written the textbook for the course. I have planned, developed and executed all parts of this course, which is comprised of lectures, exercises, individual projects and examination of these projects. I have experimented with making video recordings of lectures available, and this has been a success. In the individual projects, the students implemented a number of audio effects or synthesis methods in Puredata. The examination was based on a presentation and discussion of these projects.

Spectral Analysis of Signals, (Ph.D. course, 3 ECTS, ~25 students, with S.
H. Jensen and A. Jensen). This was a Ph.D. course on modern spectral analysis. The course covered the fundemantals, like definitions of the power spectral density, convergence, etc., and traditional non-parametric methods (e.g., periodogram and the correlogram) and refinements (e.g., Blackman-Tukey, Bartlett, Welch, and Daniell methods). It also covered parametric methods for rational spectra and line spectra, as well as filterbank-based methods (like the Capon and APES methods). Finally, the course also covered the application of spectral estimation methods to array signal processing. To pass the course, students were required to complete a project and hand in a written report about the implementation and application of the methods covered in the course to real signals.

Sound and Music Signal Analysis (M.Sc. Course, 5 ECTS, 5–10 students, with various colleagues). I developed the curriculum for this course from scratch. The course introduces the fundamentals of sound and music signal analysis, including analysis methods, representations commonly used in sound and music analysis, and various analysis tasks. The first part focuses on the basic methods, e.g., spectral analysis, parameter estimation, audio decomposition methods, filterbanks, etc. The second part includes commonly used representations for characterizing sound and music signals, e.g., parametric models, spectrograms, mel-frequency cepstral cofficients, chromagrams, and source-filter models. The third part focuses on examples of sound and music analysis tasks, e.g., transcription of music, key and chord detection, and modification of sound and music signals. I designed and organized the course and also executed parts of it and was responsible for the exam. It was executed as a set of research-based lectures with exercises and an individual project. For the exam, the students would present their project.

I have organized and taught a number of other M.Sc. and Ph.D. courses aside from these.

I have supervised many student groups in PBL projects since 2002. In the past 10 years, my supervision has mostly been in the programs B.Sc. Medialogy, M.Sc. Medialogy, and M.Sc. Sound and Music Computing where I have supervised on

several different semesters.

2. Study/programme administration and management: Experience in programme management and coordination. A list of study administration tasks, e.g. study board membership, chair of study board, semester or course coordinator, accreditation tasks, etc. Experience in planning teaching activities. Experience in programme development. Participating in committees and commissions etc. on education issues.

I am head of the Doctoral School of IT & Design at the Faculty of IT & Design at Aalborg University. In this capacity, I am responsible for more than 200 Ph.D. students and their supervisors. Before this, I served on the Ph.D. board of the doctoral school.

I have served as semester coordinator on several semester of B.Sc. and M.Sc. programs. Most recently I served as the coordinator for the 4th semester of the B.Sc. Medialogy program.

I was responsible for the M.Sc. program Sound and Music Computing in Aalborg.

I have been involved in the development of several curricula of new programs and new courses, and I have also been involved with many revision of curricula.

3. Formal pedagogical training: A list of completed courses in university pedagogy, PBL courses, workshops, academic development projects, collegial guidance and supervision, etc. Written assessment from the course in university pedagogy for assistant professors. Participation in conferences on pedagogy and didactics. Please enclose any documentation of the above, such as course certificates, references, etc

Executive Management Programme (1/2022–06/2022), INSEAD, Scandinavian Executive Institute.

Leading the Virtual Company (Pasteur Program) (1/2015–11/2015), Harvard Business School, Executive Education.

Research Management (5/2012–11/2012), Copenhagen Business School, CBS-SIMI Executive.

University Teacher Education for Assistant Professors, organized by AAU Learning Lab, Aalborg University.

Nordic Seminar for Ph.D. Supervisors, organized by Aalborg University.

4. Other qualifications: Conference contributions and attendance, contributions to debates, scientific articles on pedagogical issues etc. Peer supervision, editorials, mentoring experience or other types of competence development activities.

I have led several activities for career development for young researchers (Ph.D. students, Postdocs, and Assistant Professors) at department and faculty level.

I have mentored assistant professors.

5. Pedagogical development and research: Development of new courses, teaching materials, teaching methods, examination types or other types of pedagogical development. Didactic and pedagogical research. Cooperation with external collaboration partners.

I have developed several new courses from scratch, including:

Machine Learning for Media Experiences
Audio Processing
Numerical Linear Algebra and Convex Optimization

I have developed the teaching materials for most of my courses. My courses are also based on my own models for lectures, exercises, exams, etc. For the course Audio Processing I have written the textbook Introduction to Audio Processing. Springer-Verlag, 2019, p. 224, ISBN: 978-3-030-11780-1.

6. References on your teaching skills from superiors or colleagues. Teaching evaluations and any teaching awards received.

Type your answer here...

7. Personal reflections and initiatives: Here you may state any personal deliberations as regards teaching and supervision, any wishes and plans for further pedagogical development, plans for following up on student feedback/evaluations, etc. Personal reflections on your own pedagogical practice, including objectives, methods and implementation. This should include an analysis and a reasoned description of your pedagogical activities in relation to your pedagogical understanding and student learning. Thoughts on the teaching method at Aalborg University (which is largely based on group-organised project work and problem-based learning)

I have been teaching courses and supervising students in the PBL model at Aalborg University since 2002, and I have extensive experience teaching various courses and supervising students in several, different programs. Here are some of my thoughts and experiences regarding teaching and supervising students at university level.

As a university teacher, I see it as my job to organize a set of complementary acitivities for students to study and work on the curriculum. This is done by suggesting and organizing literature, doing traditional lecturing (with blackboard-based teaching or slides), supervising discussions, proposing exercises and helping students solve these, and, most importantly, helping them applying what they have learned to real-life problems in projects. I see all of these activities as services to the students that they can take or leave, depending on the way in which they learn the best (cf. Felder's learning styles), and I do not enforce any control of attendance or effort during the semester. However, I always stress that the learning objectives, as stated in the curriculum, must be met regardless of whether the students attend lectures, do exercises, etc., and that this is the responsibility of each individual student.

I always spend a lot of effort and time on motivating the topic I am teaching, and on showing the students why it is important and what it can be used for. This is particularly important when teaching in the medialogy program, where the students are more interested in applications of technology than in the technology itself. Regarding supervision, I differentiate between my supervision duties on the B.Sc., M.Sc., and Ph.D. levels. Early on in their studies, the students must be trained in more basic things like how to develop problem statements, manage projects, develop hypotheses, write reports, etc., while later in their studies, I focus my supervision more on technical aspects and at providing ideas and direction. With my Ph.D. students, I often provide them with solid ideas and directions to get started, and then let them take over more and more during their studies.

To me, high quality teaching means a whole range of things. Firstly, the contents must be correct and relevant, and the teacher must have extensive knowledge of the subject, and, at university level, the teacher's knowledge must be grounded in his/her research to offer anything beyond textbook recital. Secondly, the contents (i.e., the material presented in literature, during lectures, or in exercises or projects) must be well-organized and aimed at and progressively work towards meeting the learning objectives of the course, and this should be evident to the students throughout the process. Moreover, the learning objectives must be reflected in the chosen examination form and execution, something that is often not the case. My experience is that discrepancies between the learning objectives and the way in which examinations are conducted, lead to students ignoring the learning objectives and focusing on the requirements for passing exams. I primarily teach fundamentals and tools of a mathematical nature, such as statistics, optimization, linear algebra, signal processing, pattern recognition and programming. Since these are only tools for solving problems and building systems (whose relevance may not yet be evident), the students can easily feel demotivated to learn these subjects. Moreover, they often require a lot of time and effort to learn. I, therefore, try to incorporate as many examples of applications that are familiar to the students as possible when teaching them. I combine traditional lecturing with examples in MATLAB,Puredata, PRTools, etc., during the lectures, and the exercises for my courses focus (as much as possible) on the application of the theories and methods to real-life problems. I have been experimenting with recording videos of my lectures and making them available to the students for self-study. The students have been very pleased with this, and I am considering adopting this practice in all of my courses. I primarily rely on oral examinations, as written exams often, in my experience, fall short of realizing the learning objectives. An added advantage of oral examinations over written ones is that a discussion can take place, something that can both benefit the students in terms of learning, but also in terms of determining the level of understanding

8. Any other information or comments.

Type your answer here...