Clément Aubert
Department of Computer Science
Appalachian State University
Boone, NC 28608
(828-)278-4620
(828-)262-2386
aubertc@appstate.edu
cs.appstate.edu/~aubertc/

Teaching Effectivenes

During the past six years, I taught both in France and in the United States. This led me to write my own syllabus (see an example at `https://cs.appstate.edu/~aubertc/CS1440/`), manage Teaching Assistants (TAs), organize weekly pedagogic meetings and face an interesting diversity of situations. When I was a Ph.D. student, I had to take a 180-hours program to train and improve my teaching. I don't have any teaching evaluations yet—we don't have this practice in France, and this semester's evaluation will be out by the end of December—but would happily provide you contacts of students and colleagues and the result of my evaluation once they were made available, upon request.

Not having formally collected feedback from my students did not prevent me from monitoring carefully their progress, comments, and critiques. Encouraging their questions, making myself available whenever needed, and discussing with colleagues—both at a general level and on particular situations—help me to improve my teaching method.

Detailed overview

I have been a TA[1] in the *Instituts Universitaires de Technologie* (IUT) during my Ph.D. (2010–2013) at the *Laboratoire d'Informatique de Paris Nord* (LIPN) (Université de Paris 13). I then was, on top of my post-doctoral position in the *Laboratoire d'Algorithmique, Complexité et Logique* (LACL) (2014–2015), assistant[2] at the *Université Paris-Est Créteil* (U-PEC), at the *Faculté des Sciences et Technologie*. Finally, I am currently, on top of my post-doctoral appointment at the Appalachian State University (ASU) (2015–present), an instructor in the Department of Computer Science. In all those situations, I volunteered to teach in those liberal, comprehensive and professional Universities: to me, research and teaching have always been two part of a fruitful dialogue.

The table next page gives the detail of my teaching experience. I am this year teaching formal lectures and co-monitoring TAs during weekly meetings, as it is expected in a university in the United States. In France, I was TA, i.e., in charge of lab and classes sessions, but I volunteered to take more responsibilities:

- I was the coordinator of a course on software engineering, designing from scratch the content, activities and assessments, being in charge of a TA and responsible for the evaluations.
- I was TA two year in a row for a decisive course in the students' curriculum, and had an active part in the writing of sessions, exercises, classes and evaluations.
- I was the sole TA during the design of a new course on `C`, previewing the exercises, providing feedbacks on the lectures and re-orienting them.
- I beta-tested the WIMS e-learning platform, composed exercises sheets and evaluations.
- I often read accreditation's documentation (such as the *Instituts Universitaires de Technologie* (IUT)'s national program [2]) and discussed with colleagues on the best way to achieve its requirements.

Environments

In the US Appalachian State University is a liberal arts and applied fields University. The Department of Computer Science, a unit of the College of Arts and Sciences, offers a Bachelor of Science (B.S.), Master of Science (M.S.), a certificate program, and a minor.

[1] As "allocataire-moniteur", which corresponds roughly to a faculty non-tenured position. Please refer to the Acronyms List, and to Wikipedia [6] for a correspondence between French and US academic ranks.

[2] In a teaching-only, part time and non-tenured position.

Appalachian State University

Fall 2016 **Computer Science I** (Beginner) Coordinators: Clément Aubert & Patricia Johann
Introduction to Computer Science (CS), in `Java`: first interactions with Integrated Development Environment (IDE), data types, control structures, object-oriented paradigm, class development. Syllabus: `https://cs.appstate.edu/~aubertc/1440/`

Université Paris-Est Créteil

Spring 2015 **Initiation to Algorithms and Complexity** (Intermediate) Coordinator: Sergey Verlan
Fundamental concepts in algorithmic: recursion, stacks, backtracking, data representation and problems on graphs. Lab session in `C`.

Fall 2014 **Imperative Programming** (Beginner) Coordinator: Eric Petit
Compilation, data types, arrays, expressions, functions. Lab session in `C`, ambitious and innovative pedagogic methods.

Université Paris 13

Spring 2013 **Databases** (Intermediate) Coordinator: Jean-Michael Barrachina
Models (Unified Modeling Language (`UML`), class diagrams, normalization, relational algebra) and practical design and administration of databases: Structured Query Language (`SQL`) queries, constraints, views, functions, programming in `C` and `SQL`.

Spring 2012
Spring 2013 **System Administration & Network** (Intermediate) Coordinator: Laure Petrucci
Initiation to network administration and operating systems: bash scripts, databases, `UNIX`-like Operating System (OS) (`*NIX`) systems administration (users rights, Filesystem Hierarchy Standard (FHS), etc.), network card configuration, and packet control (using Wireshark). The content can be accessed at `https://lipn.fr/~petrucci/cours_R3.pdf` and `https://lipn.fr/~petrucci/tp_R3.pdf`. I was involved in the writing of exercises, assessments and proposed modifications to the course.

Spring 2011
Spring2012 **Software Engineering** (Beginner) Coordinators: Clément Aubert & Fayssal Benkhaldoun
Guiding of ± 25 students projects in groups of two to five. I designed an introductory course on software engineering and guided the students in the development of their softwares (writing specification, workflow, monitoring and evaluation). The projects were largely developed at home, classes serving as stepping stones. The languages chosen were numerous (`C`, `Java`, PHP: Hypertext Preprocessor (`PHP`), My Structured Query Language (`MySQL`), HyperText Markup Language (`HTML`)). I was responsible for evaluations (consultation with colleagues, evaluation design, in charge of the final grades).

Fall 2011 **Algorithmic and Programmation** (Beginner) Coordinator: Camille Coti
Deployment of a new course on algorithms and programming in `C`. The pace alternated exercise classes explaining the algorithmic key concepts in natural language and lab sessions. Its content was ambitious: loops, graphics libraries, pointers, linked lists. Syllabus: `https://lipn.fr/~coti/cours/#I3`.

Fall 2010 **New Ways of Learning Mathematics** (Beginner) Coordinator: Fayssal Benkhaldoun
Lectures to help the students struggling with Mathematics. The goal was to get them through the program content differently, thanks to the e-learning platform WIMS. There was a need for consultation with the heads of mathematics modules, writing exercises, regular evaluations.

The course I am teaching is "the bottleneck" of the department, and hence play a crucial rôle: we all want our students to benefit from the best start in their study of CS. A lot of effort and resources are devoted to those sections totalizing ±300 students, to make sure they benefit from all the resources one could wish for to grasp fundamental aspects of CS as well as to provide hands-on experience.

In France Villetaneuse (Université de Paris 13) and Créteil (U-PEC) are in the suburbs of Paris and known to reflect a great diversity: foreign students are numerous [1, p. 15, 4, p. 48] and students with modest or disadvantaged backgrounds are over-represented comparatively to other Universities [5, p. 33].

The University of Paris 13 is a liberal art college that hosts an *Instituts Universitaires de Technologie* (IUT) delivering a two-year undergraduate technical diploma called a *Diplôme Universitaire de Technologie* (DUT), as well as B.S., M.S. and Ph.D programs. Research-wise, it is is a mixed organization with the *Centre National de la Recherche Scientifique* (CNRS), with a strong record of national and international fundings, awards and Ph.D. diploma [5, p. 17].
I taught in the IUT, in the DUT *Réseaux & Télécoms* (Networks & Telecoms), where 90% of the students choose to continue studies [3]: this very high rate pinpoints that students are well-prepared and willing to face liberal studies afterwards. I taught five different lectures, covering most of the syllabus for the diploma, including its most critical parts (system administration, network, databases and software engineering).

The University of Paris 12 is a multidisciplinary liberal art college that offers B.S., M.S. and Ph.D. programs. The University has an internationally focused policy, having international partnerships with more than 300 institutions [4, p. 48] and almost 1500 Ph.D. students from all over the World [4, p. 25].
The B.S. degree where I taught regroups majors and minors first year students, sophomores and juniors, and hence required a strong cooperation between colleagues of different fields (CS, Mathematics, Physics, Chemistry). The coordinator of one of the course I was involved in was in a different department, and we weekly discussed mock-up and pre-requesites with colleagues.

An Ever-Growing Involvement

I should stress that, before my Ph.D., I did *not* study any programming language or receive any technical CS-related instructions: my intellectual journey to Theoretical Computer Science went along Logic and Mathematics. I had some OS administration skills, using Linux since 2007, basics knowledge in `PHP`, `HTML` and Cascading Style Sheets (`CSS`), rudiments in `Prolog`, and practical knowledge of LaTeX.

I taught in the *Instituts Universitaires de Technologie* to first year students and sophomores with a growing complexity of content and varying the subjects. During my Ph.D., I successfully learned from scratch to teach a programming language (`C`), network administration, `*NIX` and `UML` theories, and a query language (`SQL`).

I sharpened my teaching methods during Fall 2010 thanks to the "New Ways of Learning Mathematics" courses, whose mathematical content had to be taught with special care to students in need. It pushed me to be vigilant in coaching students and to double my efforts to present the content in innovative ways. Being the coordinator of a course in software engineering early in my career (Spring 2011) strengthened my organization skills and abilities to plan ahead, and sharpened my ability to monitor students.

My experience is varied and demonstrates my ability to quickly acquire specialized contents. I learned to train myself efficiently, and I have no doubt in my ability to develop new lectures in terms of pedagogy or content. During my Ph.D. and post-doctoral positions, I learned a subject of deemed difficulty—the von Neumann algebras—and studied by myself automata, concurrency and category theory.

I am prepared to give lectures on `Java`, `C`, `HTML`, System, `PHP` and Software engineering at the undergraduate level, and could teach theory (Automata, Complexity) or Databases with minimal additional preparation.

References

[1] Agence d'évaluation de la recherche et de l'enseignement supérieur. *Rapport d'évaluation de l'université Paris 13*. 2013. URL: http://www.aeres-evaluation.com/content/download/21997/337535/file/AERES-S1-Paris13.pdf (visited on 11/28/2015).

[2] Ministère de l'enseignement supérieur et de la recherce. *Programme Pédagogique National du DUT « Réseaux et Télécommunications »*. 2008. URL: http://media.enseignementsup-recherche.gouv.fr/file/DUT_-

_Programmes_pedagogiques_nationaux/40/0/PPN_Reseaux_Telecommunication_Rentree08_32400.pdf (visited on 10/30/2015).

[3] Université Paris 13. *Website of the DUT RT*. URL: http://www.iutv.univ-paris13.fr/formations/dut/reseaux-et-telecommunications.html (visited on 11/15/2015).

[4] Université Paris-Est Créteil Val-de-Marne. *UPEC - Rapport d'activités 2014*. Ed. by L. Hittinger. URL: http://www.u-pec.fr/servlet/com.univ.collaboratif.utils.LectureFichiergw?ID_FICHIER=1259768749086 (visited on 11/25/2015).

[5] Université de Paris 13. *Paris 13 en chiffres 2012 / 2013*. URL: http://www.univ-paris13.fr/images/paris13en-chiffres2014.pdf (visited on 05/16/2013).

[6] Wikipedia. *Academic ranks in France — Wikipedia, The Free Encyclopedia*. URL: https://en.wikipedia.org/wiki/Academic_ranks_in_France (visited on 11/12/2016).

Acronyms List

ASU Appalachian State University
B.S. Bachelor of Science
CNRS *Centre National de la Recherche Scientifique*
CS Computer Science
`CSS` Cascading Style Sheets
DUT *Diplôme Universitaire de Technologie*
FHS Filesystem Hierarchy Standard
FST *Faculté des Sciences et Technologie*
`HTML` HyperText Markup Language
IDE Integrated Development Environment
IUT *Instituts Universitaires de Technologie*
LACL *Laboratoire d'Algorithmique, Complexité et Logique*
LIPN *Laboratoire d'Informatique de Paris Nord*
M.S. Master of Science
`MySQL` My Structured Query Language
`*NIX` `UNIX`-like OS
OS Operating System
`PHP` PHP: Hypertext Preprocessor
`SQL` Structured Query Language
TA Teaching Assistant
TCS Theoretical Computer Science
`UML` Unified Modeling Language
U-PEC *Université Paris-Est Créteil*