# Statement of Teaching

**Swaprava Nath**

Fulbright-Nehru Postdoctoral Fellow

Computer Science Department, Carnegie Mellon University

A major reason for me to choose an academic career is to get the opportunity of teaching and interacting with bright students. I feel that teaching is a mutually rewarding process where a teacher gets to learn as much as he teaches. Learning is an open-ended process and the job of an ideal teacher is to provide the right impulses and creating the environment to make students interested in the pursuit of knowledge. My training makes me suited for teaching computer science courses like algorithms and computer programming, computer networks, linear and non-linear optimization, information and coding theory, stochastic processes and queuing theory, mathematical courses like probabilistic models, linear algebra, real analysis, and research focused courses like game theory and mechanism design, electronic commerce etc. At undergraduate and graduate levels, I am capable of developing new research-oriented courses that aim at economics and computation, and introduces mechanism design as a problem solving tool in Internet commerce.

The goal of my teaching endeavors is to equip students with the right skills to accomplish good research. I always encourage them to think about new, out-of-the-box problems. In the courses I taught in the past and in the student mentoring, I was supportive in making students take research as a career goal. I designed the courses to have more student interactions, e.g., sharing a project for the course, that can potentially lead to a research publication – and had been successful to a certain extent. A significant proportion of the students whom I worked with as a teacher, teaching assistant (TA), or mentor, are currently pursuing PhD in different universities in India and abroad.

## Teaching Experience

I have taught the following courses at Indian Statistical Institute, New Delhi: "Mathematical Programming with Applications to Economics" (January - April, 2014, co-taught with Dr. Debasis Mishra) and "Scientific Computing using Python" (July - November, 2014) [1]. The first one was an optimization course designed to solve problems in microeconomics and the second one was a formal introduction to algorithms and programming using the versatile programming language Python. The primary audience in both these courses was masters students of quantitative economics, even though some masters students of statistics attended the programming course. In the programming course, I was involved in giving lectures as well as supervising lab sessions for the students for a hands-on learning. The course had two sit-down examinations and one course project. The projects were to implement ideas of economics through programming and I mentored all projects with the help of one TA.

As a graduate student, I was involved in teaching as a TA for many courses. I was a TA of the course "Game Theory" taught by Prof. Y. Narahari at Indian Institute of Science (IISc) for four consecutive years (January - April, 2010-2013, head TA for the last two years). The responsibilities included checking class assignments (written and programming), discussing the problem sets, and mentoring student groups for final course projects. I undertook similar responsibilities as a TA in the following other courses at IISc: "Mathematical Foundations for Modern Computing" (graduate level, taught by Prof. Ravi Kannan, January - April, 2011), "Linear Algebra" (graduate level, taught by Prof. R. Vittal Rao, August - December, 2010), and "Algorithms and Programming" (undergraduate level, taught by Prof. Y. Narahari and Prof. T. Matthew Jacob, August - December, 2012).

## Importance of Research in Courses

A course in any branch of science serves two purposes: on one hand it gives the flavor of the current state of the art and makes the students get familiarized with the concepts, on the other hand, it asks for an independent thinking that extends the current understanding and requires raising insightful questions

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[1]The course webpage is available here: http://scientificcomputing.is-great.net/.

about the presented results. Designing courses therefore needs a nice balance between these two competing thinking. To make science progress through the questions and doubts, courses need to have a research component. I feel that introducing course projects as part of graduate and advanced undergraduate courses is a necessary step towards this end. All courses in my initial teaching career had a significant portion dedicated to research. I am committed to involve students in interactive discussions from the early stages of their coursework, and design courses that help them imbibe this methodology.

## Continuous Evaluation Policy

Evaluation of a student in courses or credited projects is crucial since it incentivizes the student to take the right direction to pursue a career in computer science. I am in favor of a continuous evaluation policy, where instead of one or two examinations having the major weight on deciding the grades, the evaluation is in form of multiple short tests or assignments, and includes a course project. The projects help the students create new ideas, design new things, and often are stress-free than a timed examination. I have found, in my limited experience, that many students do excellent work in the projects even though their talents are not discovered in a timed test. This form of evaluation system takes more effort from the teaching staff, but serves a better purpose in bringing out the best out of a student.

## Collaboration among Student Groups

With the additional effort in the teaching policy, it is fair to ask for additional commitments from the students. I support a *fair* collaboration among the students on solving problems or carrying out projects. Collaboration has a positive impact in a research career. However, it is necessary to set out the rules of the collaboration that motivate every student to spend honest effort in carrying out the research component in the courses. Research in a group environment often yields better output than that in isolation – so it is a definite factor which can complement the teaching in the class.

## Mentoring Goals and Experience

Mentoring research students is an indispensable part of an academic job, and I totally look forward to it. This is an occasion where students get the first experience of research. Over the time, I have worked with a number of graduate and undergraduate students either as a mentor of course projects, masters thesis, or internships. My goal as a mentor is to implant the curiosity about a research topic and see them wonder about the potential of a solution and get excited by it. I observed in most of these energetic and inquisitive students a zeal of solving the problems, which often extend beyond the classes and meetings. I thoroughly enjoy the academic life along with the inquisitive student community and will continue to nurture it in my future career.