Software Engineering for Industry - Imperial College London - Robert Chatley

Software Engineering for Industry (CO475) is a class open to 4th year and MSc Computing students at Imperial College London, led by Robert Chatley. This course is about working on large, existing, software systems. We discuss how to successfully design, modify, maintain and operate the large software systems that form so much of the infrastructure of trade, commerce, communication and entertainment in the modern world. In terms of content and format, we believe this course to be unique.

Contemporary Content

Each week we cover a different topic related to contemporary industrial software engineering. The topics we covered this year were: Working with Legacy Code, Software Architecture, How Codebases Change (and how people change them), Agile in Practice, Continuous Delivery, Microservices in the Cloud (including Serverless), and Resilience at Scale. For each of these topics we set the students a research task together with a practical task related to the topic, with the aim of drawing everything together in a concise, balanced and well-researched answer to an engineering question — weekly assignments with weekly feedback.

Self-Directed Learning

The learning in this course is mostly self-directed. For each topic we give the class some starting points and suggested reading, and then send them away in small study groups to research the topic in more depth, reading other related articles and case studies that they find for themselves. Almost all of the students taking the class have some degree of industrial work experience, through placements and internships, which allows them also to draw on and share their own experiences. When we gather again as a class, different groups present their thoughts and findings — the class takes the form of a facilitated discussion, rather than a lecture. We discuss current issues faced by the practising software engineer, and particularly look at engineering trade-offs in different situations. This is not a course where there are right and wrong answers.

Authenticity

The course material combines academic literature with case studies from companies like Netflix, Spotify, LinkedIn, SoundCloud, Google, the BBC, as well as all of the companies that the students have previously worked at. We look at current industrial practices, and the forces that affect engineering decisions - from the technical to the economic. We try to keep the course as authentic and "real-world" as possible.
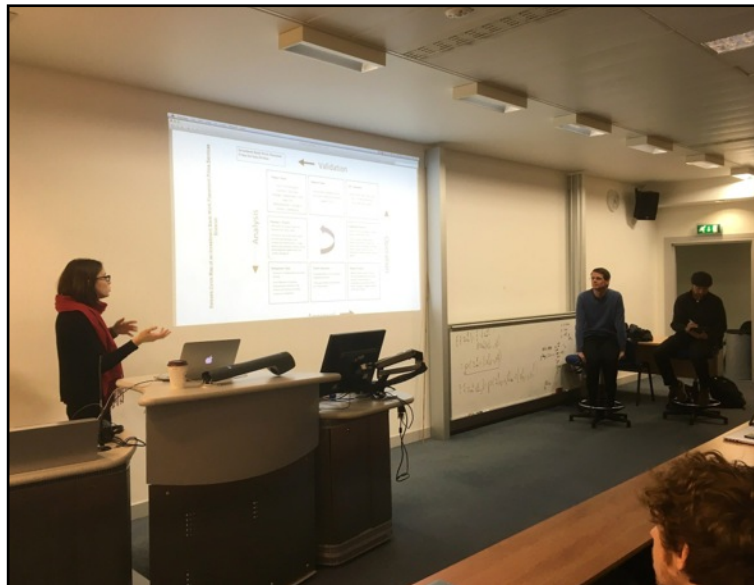
Masters student Diana presents a case study showing the release cycle in an investment bank she worked in — Allan Kelly listens and Dan North takes notes.

Industrial Involvement

Jawad Khokhar, BBC iPlayer

Architect Nick Rozanski, ICBC Bank

The other aspect of the class that adds a lot of value is the teaching team. The class is led by Principal Teaching Fellow Robert Chatley, who comes from an industrial background with many years of experience. Robert makes use of his extensive professional network to invite two notable guests each week to join the class as panellists, and to add their views, thoughts and experiences to the general class discussion. Over the past 7 weeks we were delighted to be joined by 15 different panellists from 13 different companies:

Nat Pryce - Independent Consultant and co-author of _Growing Object-Oriented Software_.
Duncan McGregor - Independent Consultant
Eoin Woods - CTO, Endava, co-author of _Software Systems Architecture_ with
Nick Rozanski - Head of Enterprise Architecture, ICBC Standard Bank
Anna Shipman - Technical Architect, Government Digital Service
Andrew Eland - Director of Engineering, DeepMind Health
Allan Kelly - Principal, Allan Kelly Associates
Dan North - Principal, Dan North and Associates
Amy Phillips - Engineering Manager at Moo
Christine O'Dell - Senior Consultant, Contino
Yan Cui - Space Ape Games and author of _Production Ready Serverless_
Tom Cartwright - Senior Product Manager - Cloud Infrastructure, BBC
Christos Karamanos - Site Reliability Engineer, Google
Stephen Godwin and Jawad Khokhar - BBC iPlayer

Thank you to all of them for giving up their time and sharing their knowledge and expertise.

Student Feedback

"I enjoyed coming to the lectures on Mondays. I knew it was an open-discussion time where we would learn a lot. I liked the fact that it was not a typical course with typical lectures and tutorials etc. It was oriented towards reflection and open-minded discussions."

"The aspect I liked most about this course was the diversity and breadth of experiences that were presented."

"My favourite part of the course is when fellow students discuss their weekly coursework submissions because a lot of alternative methods and ideas to the ones my group and I used are mentioned which is great. I also like the fact that the discussions turn into debates sometimes."

"The chance to develop the ability to … extract relevant information from papers is outstanding. All the courses in Year 4 encompass a good amount of paper-reading, but this course stood out for the variety of materials to read. I loved the approach of 'seed' materials to drive further independent research."

"Overall, I thought this course was wonderful, and what I learnt from this course is a prime example of what I had hoped to be taking away coming to study at a top university like Imperial."