

Essay

When I hear the phrase “study abroad,” a single word comes to mind: opportunity. I see an opportunity to live in a different country, an opportunity to take classes at a prestigious university, an opportunity to meet like-minded people in an international setting, and an opportunity I will not have after I graduate. While at Caltech, I have spent the majority of the past seven quarters within a two-mile radius. Study abroad is an opportunity to leave this bubble, without completely abandoning the beautiful campus around me.

Academically I hope to expand my capacity for learning, gaining exposure to material in a different fashion than I am used to. Edinburgh has a vastly different teaching philosophy than Caltech, in terms of structured work inside and outside the classroom. Most of the courses I hope to take have no direct equivalents to those at Caltech, and it feels quite valuable to receive elective credit in my major through material I would not otherwise have the chance to learn.

Given the opportunity to study Edinburgh, I plan to explore different interests by taking courses across the vast range of Informatics topics offered. Given the recent boom of cryptocurrency, I find it extremely relevant to have a strong understanding of how blockchains work, and I also hope taking a course in Human Computer Interaction will help explain what keeps people glued to their smartphones.

Socially, I would like to have experiences novel to those at Caltech. I appreciate the tight knit feeling of the Caltech community. However, it is difficult to exit my comfort zone in social situations with such a small student body. I am always surrounded by people I know, and although I have met many amazing and diverse people at this school, studying abroad gives me the chance to make new connections, with people from more diverse backgrounds than I am familiar with. From one angle, this can be viewed as a challenge, as I must leave behind the social comfort I am used to. However, I view this as an opportunity, one that will only prepare me more for life after Tech.

Program Fit

Edinburgh

At Edinburgh, I plan to take Informatics courses in Blockchains, Software Design and Modeling, and Human Computer Interaction. I have already taken the majority of strict requirements for the CS major, and plan to fill in either the advanced CS or Ma/ACM/CS elective requirements within the major. Through these classes I hope to explore as much breadth as possible in my academics while abroad, and also take advantage of the broad range of Informatics classes that Edinburgh is known for. For my final class, I plan to take Organisational Behaviour for humanities credit. I am interested in pursuing business and entrepreneurship in the future, so by taking a class in the business department I hope to gain practical experience through this class abroad.

Course List - Edinburgh

Total Edinburgh Credits: 60

Total CIT Units: 36

Course by Correspondence/Units: 0

Human-Computer Interaction (Level 11) (INFR11017)

College of Science and Engineering

School of Informatics

Department: Informatics

Level 11

Semester 1

Credits: 10

Caltech units: 9

Evaluator: Yisong Yue

Type of Caltech credit (option, general, etc.): Option – CS 114 or above

No Equivalent

Description:

- * Background--the development and scope of HCI. Practical goals.
- * HCI relevant issues in human perception, memory and thinking processes.
- * Approaches to designing information appliances--software objects and physical things.
- * Design methodologies and notations--levels of interface design. Task analysis, grammars, state charts.
- * Techniques and technologies--dialogue styles, information presentation, protocols for human-to-machine and machine-to-machine interactions; mobile computing, distributed wireless computation, wireless sensors.
- * The design process--user involvement, iterative design, prototyping.
- * Evaluation--methodologies, formative and summative. Performance analysis.
- * Specific issues in HCI: the internet of things; novel interfaces.
- * A theme running through the course is the relevance of the social context on Interaction Design.

Software Design and Modelling (INFR10064)

College of Science and Engineering

School of Informatics

Department: Informatics

Level 10

Semester 1

Credits: 20

Caltech Units: 9

Evaluator: Mike Vanier

Type of Caltech credit (option, general, etc.): Option – elective in Ma, ACM, or CS

No equivalent

Description:

The course begins by placing design and modelling in the context of the various software engineering processes in widespread use today. Via labs, lectures and self-study using readings, videos and formative exercises, it teaches students to produce (initially straightforward) designs and to document them using UML models, both on paper and with an appropriate tool. We discuss the different affordances of these modes and how models may be used (i) purely informally, (ii) as reviewed documentation for designs, and/or (iii) in model-driven development in which models are formal artefacts and code may be generated from them.

The second part of the course focuses on identifying and producing good designs. What principles should a good object-oriented design follow? We learn some common design patterns and their role in development and learning.

Finally we turn to practical model-driven development: how can the cost-benefit ratio of modelling be improved, now and potentially in the future? Students will learn about model transformations, both model-to-model and model-to-text (e.g., code generation) and be introduced to current tools supporting these. We discuss the role of domain specific languages and the integration of model driven development with agile processes. Throughout the course, we identify the deficiencies as well as the benefits of the fast-changing state of the art, aiming to equip students to critically evaluate tools and techniques that become available to them in future.

Blockchains and Distributed Ledgers (INFR11144)

College of Science and Engineering

School of Informatics

Department: Informatics

Level 11

Semester 1

Credits: 10

Caltech Units: 9

Evaluator: Donnie Pinkston

Type of Caltech credit (option, general, etc.): Option – CS 114 or above

No equivalent

Description:

The concept of blockchain will be covered in detail together with the supporting cryptographic technology. Questions that will be covered is why it works and what problems can it solve.

Syllabus:

1. Introduction to blockchain. What is a distributed ledger. Transactions. Digital Signatures.
2. The consensus layer. Basic Properties. Proof of Work.

3. Robust Transaction Ledgers. Properties and Objectives. Permissioned, permissionless ledgers.
4. Privacy Issues. Anonymity, Pseudonymity, Unlinkability. Zero-Knowledge Proofs.
5. Scalability Issues. Byzantine agreement protocols.
6. Blockchain as a platform. Smart Contracts.
7. Secure multiparty computation techniques and their application to blockchain protocols.
8. Alternative techniques to proof of work for blockchain protocols, proof of stake/space.
9. Game theoretic analysis of blockchain protocols.
10. Name and object registries. Reputation systems. Policy issues related to blockchain.

Organisational Behaviour 2 (BUST08028)

College of Humanities and Social Science

Business School

Department: Business Studies

Level 8

Semester 1

Credits: 20

Caltech Units: 9

Evaluator: Colin Camerer

Type of Caltech credit (option, general, etc.): Core additional HSS or advanced SS requirement

No equivalent

Description

The course is divided into two sections: the first will analyse organisations in context; and the second will focus on key individual and interpersonal processes.

The lectures emphasise the importance of adopting a critical and analytical stance in understanding and interpreting how people behave in organisations, and the most appropriate means of managing or regulating that behaviour. In addition, the course aims to familiarise students with current empirical research, including that of the lecturing staff.

Syllabus

Section One: Organisations, Management and Work

- Introduction to Organisational Behaviour 2
- Changing Organizations and the Meaning of Work
- Organisational Structures
- Power and Control
- Work and Control
- Technology and Changing Work
- Organisational Change
- Organisational Culture
- Conflict and Politics
- The Management of Human Resources: Resolving Tensions?

Section Two: Individuals and Organisations

- Individual differences 1 & Individual Learning Styles
- Attitudes and Job Satisfaction
- Commitment
- Communication, Involvement and Engagement
- Groups and Teams I
- Groups and Teams II
- Divisions within Organisations I: gender and power
- Divisions within Organisations II: the social construction of masculinity and femininity
- Pressure at Work I
- Pressure at Work II

Student Learning Experience

High standards of lecture delivery are supported by incorporating, where appropriate, alternative teaching delivery methods such as video-based case studies. In addition, case study teaching (mainly in tutorials) is employed as a means of emphasising the interconnected nature of managerial processes and of drawing on actual organisational experience.

The compulsory weekly tutorials comprise a mixture of practical exercises, case study tasks and analysis of journal articles, and are used to provide opportunities to test and evaluate theories and techniques learned in lectures. In addition, active participation in tutorials will lead to the development of analytical skills (through problem identification, data handling and critical thinking), decision making skills (generating alternative explanations, selecting decision criteria, evaluating alternatives, hypothesising on issues of implementation and consequences), and communication skills (listening to colleagues, constructing arguments, thinking on feet and convincing others).

As an innovation in recent years, students are now offered extended opportunities for individual learning. By replacing one of the traditional weekly lectures with a guided individual learning session, it is intended that students will be able to study topics to a greater depth and in a more interactive manner. This is supplemented by some online lectures from the Henry Stewart Talks Marketing and Management Series.