

1. Essay

In today's social atmosphere, diversity reigns as king as one of the most important issues that our society has ever faced. Having come from Colorado, whose culture is far more homogeneous than that of California's, transitioning to life at Caltech showed me just how important this issue was to my own growth, both academically and personally.

First and foremost, I was thrown into an environment with students from a plethora of different social backgrounds and given the opportunity to learn with them at an institution of a higher caliber than I had ever attended before. Such an opportunity was paramount to my academic growth, as it forced me to perform at a higher level every single day. Fueled by my peers' encouragement and enthusiasm, I was able to transition from life at an average high school to life at a world-renowned technological institution.

However, the growth was not purely academic. With a new environment, one that encouraged the intermingling of ideas and cultures, came an increased appreciation for the traditions, customs, and cuisines that surrounded me. Being enveloped by a diverse array of cultures enabled me to experience firsthand what I had been missing out on my whole life. My world-view expanded more than I had thought was possible.

And this transition only involved traveling two states over from home.

To study at the University of Edinburgh, I would travel more than five times that distance to a continent I have never visited before. I would be immersed in a culture completely foreign to my own, and I would once again have the opportunity to find my place at yet another incredibly respected university. To achieve such a level of academic prowess abroad is what I yearn for. I look forward to studying with peers who grew up in a completely different part of the world and seeing firsthand how student life at institutions abroad differs from my experience in the United States.

If a journey of only 1000 miles to a state within the same country was able to encourage massive personal and academic growth, I am excited to see what a journey to an entirely new continent holds for me.

2. Program Fit

I intend to study fully within the electronics option at the University of Edinburgh, and, in doing so, I will be able to fulfill some of the last requirements that I will have left as a senior in Electrical Engineering. The engineering courses I have selected will allow me to get EE elective credit, also fulfilling a specific requirement to take EE112 within those electives.

3. Proposed Edinburgh Course List

Total Edinburgh Credits: 70

Total CIT Units: 36

Course by Correspondence/Units: 0

1. Digital Signal Analysis 4 (ELEE10010)

College of Science and Engineering

School of Engineering

Electronics Department

SCQF Level 10

Semester 1

10 Credits

9 Caltech Units

Caltech evaluator: P P Vaidyanathan

Type of Caltech credit: Option (Elective)

CIT equivalent course: EE 112

Students will explore the analysis of practical signals through time and frequency analysis techniques, and understand the effect of each step in the process. After successful completion of this course a student should be able to: explain the relationships between and be able to manipulate time domain and frequency domain representations of signals; apply correlation techniques to an analytic or numerical problem, and relate the outcome to the statistical properties of the signal source(s); correctly define probability density functions and cumulative distribution functions, and be able to manipulate them to find moments of random variables and their sums; define the distinctions between wide-sense stationary, stationary, and ergodic processes, and be able to reason to which category a random process belongs; derive the power spectrum of a signal; define techniques for calculating moments in spectral and temporal domains; explain the importance of linear phase filter design and apply time and frequency techniques to design a FIR filter; evaluate power spectral density at the output of a linear filter given the PSD at the input; recognise the effect of resolution and windowing functions upon the discrete Fourier transform; analyse the effects of downsampling and upsampling on a signal and recognise the importance of decimation and interpolation filtering; explain the basis of matched filtering and be able to determine an appropriate filter for a given problem.

2. Introductory Applied Machine Learning (INFR10069)

College of Science and Engineering

School of Informatics

Informatics Department

SCQF Level 10

Semester 1

20 Credits

9 Caltech Units

Caltech evaluator: Yaser Abu-Mostafa

Type of Caltech credit: Option (Elective)
CIT equivalent course: CS/CNS/EE 156a

Introduction to Machine Learning and its Goals. Introduction to Data and Models. Memory based methods. Decision Trees. Error functions, Minimizing Error. Regression, Logistic Regression, Neural Networks. Margin Based Methods: Perceptron, Support Vector Machines. Naïve Bayes. Dimensionality Reduction. Clustering: K-means, Simple Gaussian Mixture Models, Hierarchical Clustering. Boosting Approaches. Model Averaging, Mixtures of Experts. Evaluation of Performance.

[We will also use a modern machine learning programming environment]

3. Economic and Political Geography (GEGR08003)

College of Science and Engineering
School of Geosciences
Geography Department
SCQF Level 8
Semester 1
20 Credits
9 Caltech Units
Caltech evaluator: Colin Camerer
Type of Caltech credit: General (SS under "Additional HSS")
CIT equivalent course: N/A

The course is divided into three main sections: (1) Economic and Political Systems of the Past; (2) Industrial Capitalism and the Nation-State; and (3) Towards a Global Society?. The first section introduces key economic and political factors and shows how they have worked and combined differently in various systems, such as feudalism, colonialism and mercantilism. As its title suggests, the second section of the course focuses on capitalism and the nation-state and it explores the relationships between industrialisation, imperialism and the emergence of a world economy, with a particular focus on changing geographies of labour. The third section concentrates on recent economic and political systems such as nationalism and neoliberalism as well as current issues including global consumption, waste, debt and crisis; slums; and the 'state of the future'.

4. The Internet and Society (STIS10001)

College of Humanities and Social Science
School of Social and Political Science
Science, Technology, and Innovation Studies Department
SCQF Level 10
Semester 1
20 Credits
9 Caltech Units
Caltech evaluator: Colin Camerer
Type of Caltech credit: General (SS under "Additional HSS." Should qualify as Writing Intensive)
CIT equivalent course: N/A

Internet technologies play an important, often controversial, role in contemporary society, touching almost every aspect of our lives. Many dramatic, both dystopian and utopian, claims have been made about the transformative 'effects' of these technologies. This course will investigate these claims across

different areas of life, technologies and practices. It will treat 'the internet' not as one monolithic entity, but as a collection of at times disparate technologies, platforms, practices and discourses that are co-evolving with rather than impacting on society. The course will cover key themes, historical and contemporary, that have informed and challenged our understanding and assumptions about the interaction between the internet and society. This will include, but will not be limited to: identity and subjectivity, social exclusion and inequality, politics and democracy, globalisation and development, privacy and surveillance.

The course will focus on specific empirical case studies and technologies as well as theoretical and methodological questions on how to best study and conceptualise the role of internet technologies in society. We will draw, in particular, on the multidisciplinary area of research referred to as science and technology studies (STS), but, where relevant, will complement this with research in sociology, geography, anthropology, philosophy, history, media and communications, and politics. At the end of the course students will not only be familiar with the social study of the internet, but will also be able to apply key conceptual frameworks and sociological thinking to tackling contemporary issues, policy and practice pertaining to information and communication technologies (ICT) and digital media more broadly.

No specialist technical knowledge is required other than students' personal experience of computers, internet, and mobile phone use.

The classes will consist of a combination of lectures, group discussions and debates, in class and home work with data and evidence, presentations, and on-line work. Students will be expected to read and summarise set papers online before each class, and prepare personal exercises for use in group activities.