Supervision material for Part IB
Economics, Law and Ethics

2026-27

Please write your answers as short essays. You will be marked for style as well as substance. You should be making coherent arguments, explaining your reasoning and demonstrating your understanding of the course material.

Supervision 1

1. There are a number of competing video conferencing applications on the market.

   (a) Explain how this market may develop in the future, defining relevant concepts.

   (b) Let's assume at present there are three leading video conferencing applications, A, B, and C. Application A is available as part of a suite of services, including a search engine, email, and calendaring, at no cost to users. Application B provides higher quality video conferencing, but the length of meetings and number of participants allowed is limited unless you pay a subscription. Application C is made available open source, so users can install and run the application on their own servers, and modify it however they like. Explain the economic rationales that may have been considered by the providers of applications A, B, and C when deciding on their business models.

2. The new Master of (fictional) Porterhouse would like to modernise the college's room ballot. Previously, the Head Porter assigned rooms based on 'social standing' and family connections to the college, which the new Master deems opaque and inefficient. The Master proposes a new Centralised Allocation Algorithm, where students can bid on different rooms according to their preferences. As a member of the College Council, you are asked to provide input on the design. In your answers, explain and define all relevant concepts.

   (a) It is suggested that students should be able to voluntarily swap rooms after the allocation. Does this meet the Pareto efficiency aims of the college?

(b) The student representative proposes that students are able to bid on a 'bundle' of room attributes, e.g. a north-facing room near the library with an ensuite. Argue for or against this proposal, outlining the type of auction that would be required if it were to be accepted.

(c) A 'group ballot' has been proposed to allow students to bid with their friends as a block on 'groups' (clusters of rooms). Model the decision of four friends to bid together as a Stag Hunt. Create an illustrative payoff table and identify the Nash Equilibria in this scenario.

(d) It is well-known that some rooms in Porterhouse are decrepit, whereas others are splendid. However, the students are only shown photographs of the best rooms during the application process. If students cannot distinguish good rooms from bad rooms, what impact might this have on the ballot system?

Supervision 2

1. Describe virtue ethics, Ubuntu ethics, consequentialism and deontology. Explain and define all relevant ethical concepts.

2. (a) Your company wants to develop a secure messaging application, but worries that the UK government could legally compel it to remove electronic protection (encryption) or to build functions that allow for the interception of messages. How could the Government do this, and under which legislation?

   (b) The company needs to decide how to build a secure messaging application even in the scenario described in Part b. To do so, they consider two design options:

   Option A: Design the system using End-to-End Encryption (E2EE). This ensures maximum user privacy and security, but means the company cannot be compelled to decrypt data because it does not hold the keys.

   Option B: Design a Key Escrow system. This allows the company to maintain high security for users while ensuring they can assist law enforcement if the application is used to cause harm.

   Identify the key questions that arise under the four ethical frameworks. Given these considerations, what is your preferred design choice? Justify your answer.

3. Consider the context in the following 'trolley problem':

   - Company A produces a lifesaving wireless implantable medical device. It is the only device of its type ever invented. When a patient receives this device, it will (on average) extend their lifespan by ten years.
   - Company A goes bankrupt and closes due to poor financial practices, including a failure to calculate the market size and the costly manufacture of hundreds of thousands of devices before they were needed.
   - At the time of Company A's bankruptcy, approximately 100 000 people globally use Company A's device.
   - Doctors continue to implant the surplus of (now unsupported) device in new patients.
   - Shortly after Company A closes, you discover a software vulnerability in the device. If exploited, the vulnerability could cause significant harm to the patients. Since Company A no longer exists, the software cannot be updated to address this vulnerability.
   - You know that there is zero probability that the vulnerability will ever be exploited even if the vulnerability is disclosed to the public.
   - The computer security research field and the healthcare industry have already internalised the importance of computer security for wireless implantable medical devices; there are no field- or industry-wide gains to be made by disclosing the vulnerabilities to the public.

   You have the following choices:

   - Not disclose the vulnerability to anyone: Patients will have no awareness that their device is vulnerable; patients will keep and / or proceed with obtaining the device and receive significant health benefits.
   - Disclose the vulnerability to the healthcare industry, patients, and the public: Patients will have the choice to remove or not receive the device; there is a risk of health harm to patients if patients remove and / or do not receive the device; there is a risk of psychological harm to patients and loved ones if patients know that they have a vulnerable device in their bodies (even if they also are told that the likelihood of compromise is zero); given the psychological harms, most patients would have preferred not to have learned about the vulnerability.

   Which choice do you make? Justify your decision using a consequentialist or deontological approach.