Question [25 marks]

Read the following narrative, and develop appropriate models of process and data. Use a **UML use-case diagram** for the process model, and a **UML class diagram** as data model. For the data model, only show the classes/associations (do not show the fields). **Then** choose one class, and show (on a separate **UML class diagram**) the details of the fields in that class.

*There may be places where the narrative leaves some ambiguity about aspects of the model; when this occurs, you need to clearly identify a question you would ask the stakeholders to resolve the issue, and then state which answer you have chosen to incorporate into your models.*

The system to be modelled is used by a chemical laboratory to deal with the usage of equipment.

The laboratory has several chemists who work on one or more projects. Chemists also may use certain kinds of equipment on each project. The main problem being addressed is the need to track the usage of expensive equipment, so that a preventative maintenance program can be implemented. This means that the total hours each piece of equipment has been used for must be easily determinable.

The proposed systems needs to record name and contact phone number of chemists, the name and start date of each project and the serial number and cost of each item of equipment. When a piece of equipment is assigned to a chemist the date and condition of the equipment is recorded, and when it is returned, the total number of hours used must be supplied by the chemist. Every chemist is assigned to at least one project, usually several, but some equipment may not be assigned to any project at any particular time. Some projects have neither a chemist or equipment assigned.