

Introduction to Capstone

As part of the final weeks of the programme, you will complete a Capstone project, solving a real-world business problem, using the knowledge and techniques you have acquired throughout the programme. You are being provided with the problem statement and some data to work with; you will have to come up with your own questions and the scope for the project.

A submission portal in Week 17 is where you will submit your Capstone project.

Project data sets

With an increase in the elderly population, home medical alert systems are a multi-million pound and dollar business in Europe and the USA. These monitoring systems are often used by people with pre-existing medical conditions or post-operative patients who have returned home but are still required to be monitored in case of infection or other complications. The devices are usually worn by the user and send a signal to a specialized medical alert company that passes on any medical alerts from the devices to doctors and hospitals.

There are many such devices out there in the marketplace and prices range from hundreds to tens of pounds or dollars depending on the type of monitoring being performed by the device. As such, competition in the market is strong, so companies must be competitive to sell their products.

You are a research and development manager working in a small electronic company that manufactures a simple medical alert system called HeartSafe, which monitors users with heart conditions at home. If the user starts to display heart problems, such as Arrhythmia or fibrillation, the device signals an alert to the user and sends an emergency alert to a medical alert company.

While this is a good selling and useful device, you believe that you can make a similar more enhanced device that could serve some members of the public better, while at the same time making more profit for the company.

With your strong background in R&D and business management, you come up with the idea of a second device, which you call the SmartAlert system. This system also monitors respiration rate, blood oxygen, and blood pressure, so it can detect the early onset of a variety of medical issues including fainting, COPD, hypoxia as well as heart problems.

After doing a technical and business evaluation of the idea you decide to do a business proposal presentation to the upper management in the company to try to convince them of the merits of producing this new product. In your business proposal, you will have to show if it is more profitable to just replace the present HeartSafe device with the new SmartAlert device or if you should produce some combination of the two different devices.

For simplicity, we will refer to these device types as Type X for the HeartSafe device and Type Y for the SmartAlert device.

With the machinery you have right now, you see that you could make 200 Type X devices per hour, but you could also make 140 Type Y devices per hour on the same machinery. After some calculations, you note that the profit per Type X device is \$25 and the profit per Type Y device is \$30. You have also discovered that in a week you can create a maximum of 6000 Type X devices and 4000 Type Y devices because of the person-hours and capacity of specialists available to you.

Note that you have only 40 hours per week to produce them.

Project deliverables

Your final assignment must be submitted in either a PowerPoint or a PDF format.

Optionally, you may add a two-three minute video presentation of your Capstone project.

Here is the information that must be included in each of them in your final submission.

Please note that all of the following content must be included for this Capstone project to be graded as complete.

Developing your problem statement

In this project, you must apply the techniques of machine learning or linear programming to determine the following:

- Is it feasible to produce any type of device and sell them?
- Is it better to produce only one type of device or both? If you decide to produce both, in what proportion should each be produced?

Finally, you will have to calculate the final profit of the production of devices. You should include in your analysis what would happen if your product presents any defects, how to compete in a market that is new for you and what you would do if you overproduce devices or they undersell.

For the sake of framing a problem, think about other variables and situational considerations that can impact your organizational initiatives. For example, are there competitors to consider in the marketplace? How will regulation structures affect the timelines related to prototyping, approval, production and distribution? In considering some of these questions, you might need to conduct some additional research to identify the data that can inform your approach.

To aid in creating a business proposal presentation for all of the above, please look at the rubric below, which will give you an idea of how many slides and what content to include:

Here is the breakdown of the slides and the information that must be included in each of them in your final submission. Please note that all of the following content must be included for this Capstone project to be graded as complete.

Slides	Required content
1	Business Proposal Statement <ul style="list-style-type: none"> State the proposal you are making.
2	Method selection You must apply <u>at least</u> one of the methods of linear programming. Explain your selection of the method by answering the following questions: <ul style="list-style-type: none"> Which method(s) have you chosen and why? What steps have you followed?
3, 4	Visualisations and organisational challenges <ul style="list-style-type: none"> Include two or three plots or visualisations that explain the project to the people in your presentation. You can also draw a feasibility graph. List any company challenges you anticipate and how you will overcome them. Consider FDA approval for the device, over and underselling, competition and production defects.
5,6	Conclusions and anticipated results <ul style="list-style-type: none"> State the conclusions you might draw as well as your anticipated results.
7	Follow-up questions <ul style="list-style-type: none"> Depending on your anticipated results, suggest <u>at least</u> two more questions that would be interesting to ask as follow-ups.

Project timelines

Please take note of the following dates:

Milestone	Timeline
Review the instructions for the Capstone project.	Week 12
<p>Think about your Capstone project and create a draft of your plan. Be sure to attend the Learning Facilitator's office hours to discuss any questions you may have.</p> <p>Note: There are no regular graded assignments in weeks 16 and 17 to allow you to spend more time on the Capstone project.</p>	Weeks 13-16
<p>Submit your Capstone project using a PowerPoint or PDF format. Completing and submitting the Capstone project is mandatory to receive the Certificate of Participation for this programme.</p> <p>Note: You may submit a recording of yourself giving a video presentation of your Capstone project along with your submission in PowerPoint or PDF format. Submitting a video recording alone does not suffice toward earning your Certificate of Participation.</p>	Week 17

