Unlike previous units, this unit will not have one central theme. Instead, we will go through a collection of a few different topics that are worth considering in some depth. In the first topic, derived distributions, we will learn how to find the distribution, that is the PMF or the PDF of a random variable that is defined as a function of other random variables with known distributions. In the second topic, we will define the concepts of covariance and correlation which help us describe in an easily quantifiable manner the strength of the relation between two dependent random variables.

In the third topic, we will make a move towards abstraction. We will revisit a familiar object, the conditional expectation, but view it in a different light. We will see that the conditional expectation can be viewed as a special kind of random variable. We will study some of its properties and provide a thorough interpretation.

These three topics all go beyond the basics of the subject. But each one of them is useful in its own way. They are quite certain to crop up if you were to work on any real-world probabilistic model.