**DAILY ASSESSMENT FORMAT**

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| **Date:** | **29-07-2020** | **Name:** | **Bhavith** |
| **Course:** | **Basic Statistics** | **USN:** | **4AL17EC009** |
| **Topic:** | **Probabilities,sample spaces,events** | **Semester & Section:** | **6th,A** |
| **Github Repository:** | **Bhavith-Online-Courses** |  |  |

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| **FORENOON SESSION DETAILS** |
| **Image of session** |
| **Report – Report can be typed or hand written for up to two pages.**  **Probability & randomness**   * **Before we can understand probability we first have to understand another concept: **randomness**. The first video explains this concept. It also shows that even though randomness is everywhere around us, humans are nonetheless bad in assessing it.** * **Once we understand randomness we can define **probability** as a way to **quantify randomness**. The second video explains how this quantification can be accomplished by experiments which record the **relative frequency** that certain **events** of interest occur. It follows that probabilities are always **larger or equal to zero** and **smaller or equal to one**; and also that the **sum of the probabilities for all possible events equals one**. Due to the very nature of random events, the experiments may have to continue for a while before the relative frequencies represent the probabilities accurately, but the law of large numbers dictates that it will do so eventually.**   **Sample space, events & tree diagrams**   * **If we want to learn something about a random phenomenon we can collect observations or conduct an experiment on that phenomenon. The following two videos present the key terminology relating to this activity. They also explain how to use a tree-diagram to organise your thoughts and subsequently keep track of the observations when conducting such an experiment.** * **The first video explains that all the possible outcomes for the experiment form the so-called **sample space**,and that elementary or combined outcomes in the experiment are called **events**. It shows how all events can be organised in a **tree-diagram**, which helps to understand how events relate to each other. At the same time it provides a clear structure to **quantify** the **probabilities** relating to each of these events. The various probability calculations that can be conducted with support of a tree-diagram are further explained in the second video**   **Conditional probability & independence**   * **This lecture introduces quite a few new concepts again: **joint probabilities**, **marginal probabilities** and subsequently also **conditional probabilities** and **independence between events or random variables**. Finally, the relationship between conditional probabilities in two directions, **Bayes' law**, is explained.** * **The probabilities that values of different variables co-occur are called joint probabilities. Such joint probabilities can be summed over one variable to form so-called marginal probabilities (the probabilities for a single variable). In the first video-lecture these concepts of joint and marginal probability are explained by using an example of beach-visitors which are characterized by gender and activity.** * **In the subsequent video the conditional probability is defined and clarified. Conditional probability is the probability of an event, given that another event occurs. In this lecture the example with beach-visitors is used again, but now to illustrate how probabilities of the activity distribution would f.i. change conditional on gender. Mathematically, the conditional probability of A given B equals the joint probability of A and B, divided by the (marginal)probability of event B.** * **The third video explains that independence of random events is closely related to the conditional probability between these events. It appears that random events are independent if the joint probability of these events is equal to the product of the marginal probabilities or, equivalent, if the conditional probability of random variable equals its marginal probability.** * **The fourth and final video of this module brings together joint and conditional probabilities as well as tree-diagrams to derive and intuitively explain Bayes' law. It shows how the observation that joint probabilities can be calculated based on the conditional probability of A given B as well as B given A, leads to Bayes’ law. The last video lecture ends by explaining that while Bayes' follows mechanically by rewriting two probability-relations, it is often applied much more generally - by updating a prior belief in or knowledge about an hypothesis A with additional evidence B towards a posterior belief .** |