WBC TUTOR LMS — WATER SECTOR SKILLS DEVELOPMENT PROGRAMME

Descriptive Statistics

A Practical, Self-Paced Course for Understanding and Presenting Water Quality and Operations Data

Course Overview

Every chlorine reading, turbidity result, borehole water level and pipe-burst log is a data set. This self-paced course builds the skill of summarising, describing and presenting data — using the mean, median and mode to find a typical value; the range, variance, standard deviation, interquartile range (IQR) and percentiles to measure spread; and histograms, boxplots and pie charts to show the results. Clear explanations, fully worked examples and real water-sector data (chlorine residuals, turbidity, groundwater levels, water demand), together with a few school-based examples, show exactly why each measure and graph matters on the job. No prior statistics knowledge is assumed — basic arithmetic (including squares and square roots) and a calculator are all you need.

Who Is This Course For?

- Senior secondary scholars (Grades 10–12, ages 16–18) revising descriptive statistics before exams or further study.
- Young water-sector technicians in upskilling or re-skilling programmes who need to summarise, interpret and present operational data such as chlorine residuals, turbidity, groundwater levels, flows and demand.
- Operators and operational staff who record readings every day and need to tell normal variation from a real process problem, and to spot outliers and report results clearly.
- Adult learners returning to study who want a practical, jargon-free refresher in working with data.
- Anyone preparing for further technical or vocational training that assumes solid data-handling fundamentals.

Course Purpose & Structure

This course takes learners on a carefully sequenced journey — from what a data set is, through the three measures of a “typical” value (mean, median and mode) and the measures of spread (range, variance, standard deviation, quartiles, IQR and percentiles), to choosing, reading and interpreting histograms, boxplots and pie charts. It is delivered entirely online via the WBC Tutor LMS, so learners can study at their own pace, revisit any topic at any time, and track their own progress.

The material is organised into 11 topics and built around the same consistent, easy-to-follow elements:

- Learning Outcomes — know exactly what you’ll be able to do by the end of the course.
- Definition & Explanation — plain-language teaching, a key vocabulary table and clearly labelled figures.
- Equations & Key Rules — every formula and rule you need, gathered on a one-page Quick Reference formula sheet.
- Worked Examples — more than 20 step-by-step examples using realistic water-sector data, each with an interpretation of what the answer means.
- Tutor Tips & Field Notes — practical advice on common mistakes and on how each technique is used in the workplace.
- Self-Study Practice — 8 problems to attempt independently, with full worked solutions provided.
- Diagnostic Quiz — a 20-question multiple-choice quiz covering every topic, with an answer key and scoring guide.

Altogether, the course represents approximately 24 to 32 hours of self-paced study. The total time allocated for online access to complete the self-study course on the WBC LMS is two (2) months.

What You'll Learn — Topics & Objectives

The course progresses through 11 topics, from describing what is typical, to measuring spread, to presenting data in graphs:

No.	Topic	What You'll Learn
1	**What Is Descriptive Statistics?**	Explain what descriptive statistics is used for, and use the key terms (data set, population, sample, variable, outlier) with confidence.
2	**Mean and the Effect of Outliers**	Calculate the mean (chlorine residuals; groundwater levels for 20 boreholes) and show how a single outlier can distort the mean of a small data set.
3	**Median**	Find the median for an odd or even number of values, interpret it, and compare it with the mean when outliers are present.
4	**Mode and Choosing the Right Measure**	Identify unimodal and bimodal data sets, use the mode for categories such as pipe materials, and decide when to use the mean, median or mode.
5	**Range**	Calculate the range and judge what a larger or smaller range says about how consistent a process is.
6	**Variance and Standard Deviation**	Calculate the sample variance and standard deviation step by step, and interpret them using the 68% / 95% rule of thumb.
7	**Quartiles and the Interquartile Range (IQR)**	Determine Q1, Q2, Q3 and the IQR for odd and even data sets using two approaches (median of the halves and linear interpolation), and flag outliers with the 1.5 × IQR rule.
8	**Percentiles**	Define and calculate percentiles and percentile ranks, and relate the 25th, 50th and 75th percentiles to Q1, the median and Q3.
9	**Histograms**	Sort data, choose bins, build a frequency table, draw a histogram and interpret its shape (e.g. skewness) using daily turbidity readings.
10	**Boxplots**	Use the five-number summary to read and interpret a boxplot, spot outliers, and compare sampling points side by side along a treatment train.
11	**Pie Charts and Choosing the Right Graph**	Calculate percentages and slice angles, interpret a pie chart of water demand by sector, and know when a pie chart, histogram, boxplot or line graph is the better choice.

Course Policies & Practical Information

1. Engagement with Facilitator

The learner / participant will be able to post questions and/or comments on the activities / tasks. The developer of this self-study course will regularly respond to the questions and comments. The developer may also arrange an online meeting to respond to the questions and/or comments. The date and time for such an online meeting, specific to a course, will be posted on the WBC LMS. All online meetings / forums, etc. may / will be recorded and posted on the WBC LMS for the benefit of all learners / participants registered for the course.

2. Flexibility / Accessibility of Course Material

The self-study courses are available 24/7 and the learner / participant can start at any time once registered!

3. Course Structure

The content for this self-study course is sub-divided based on specific topics. The accompanying text and associated worked examples will guide learners through the various topics, including tasks / activities to be studied / completed by the learner. The course concludes with Self-Study Practice Problems and a 20-question multiple-choice Diagnostic Quiz. Learners check their answers against the answer key and use the scoring guide to see which topics to revisit.

4. Refunds

Cancelling and/or not completing the course does not qualify the learner / participant to be eligible for a refund. Refunds will only be considered if there are compelling reasons (for cancellation / termination) beyond the control of the learner / participant.

5. In Addition

- The Foundation Courses are not related to any qualification but may serve to support specific content of a related qualification.
- The Foundation Courses are not associated with specific NQF levels.
- The Foundation Courses are not accredited by the Engineering Council of South Africa (ECSA) and/or the South African Council for Natural Scientific Professions (SACNASP).

6. Course Fees

The introductory fee for the online **Descriptive Statistics** self-study course **for employed staff is R 250**.

The **significantly reduced introductory fee** for the online **Descriptive Statistics** self-study course **for registered (current registrations) full-time and part-time scholars** at any education institution is **R 50**. Scholars will be required to provide a copy of their annual registration form (current year) issued by the educational institution. Please submit your documentation to: students@waterbusinesscollege.co.za.

Ready to turn raw data into clear, confident decisions?

Enrol today through the WBC Tutor LMS and start learning at your own pace.