Stuart Bathurst Catholic High School

Mathematics Department

Long-term sequencing Year 12 Statistics and Mechanics

HALF TERM 1:
STUDENTS MUST KNOW:

Statistics

Chapter 1: Data collection

- Understand and use the terms 'population' and 'sample'.
- Use samples to make informal inferences about the population.
- Understand and use sampling techniques, including simple random sampling and opportunity sampling.
- Select or critique sampling techniques in the context of solving a statistical problem, including understanding that different samples can lead to different conclusions about the population.

Chapter 2: Measures and Spread

- Calculate measures of location, mean, median and mode.
- Calculate measures of location such as percentiles and deciles.
- Calculate measures of spread such as range, interquartile range and inter-percentile range.
- Calculate variance and standard deviation.
- Understand and use coding.
- Interpret and draw inferences from summary statistics.

Mechanics

Chapter 8: Modelling in mechanics

- Understand how the concept of a mathematical model applies to mechanics.
- Understand and be able to apply some of the common assumptions used in mechanical models.
- Know SI units for quantities and derived quantities used in mechanics.
- Know the difference between scalar and vector quantities

Chapter 9: Constant Acceleration

- Understand and use the language of kinematics: position; displacement; distance travelled; velocity; speed; acceleration
- Understand, use and interpret graphs in kinematics for motion in a straight line: displacement against time and interpretation of gradient; velocity against time and interpretation of gradient and area under the graph
- Understand, use and derive the formulae for constant acceleration for motion in a straight line.
- Use the constant acceleration formulae to solve problems involving vertical motion under gravity.

HOW THIS WILL BE ASSESSED:
Recall and Retrieval tasks
End of unit assessments

HALF TERM 2:
STUDENTS MUST KNOW:

Statistics

Chapter 3: Representation of data

- Interpret diagrams for single-variable data, including understanding that area in a histogram represents frequency.
- Connect to probability distributions
- Recognise and interpret possible outliers in data sets and statistical diagrams
- Select or critique data presentation techniques in the context of a statistical problem
- Be able to clean data, including dealing with missing data, errors and outliers

Chapter 5: Probability

- Understand mutually exclusive and independent events.
- Determine whether two events are independent.

Mechanics

Chapter 10: Forces and Motion.

- Understand the concept of a force; understand and use Newton's first law
- Understand and use weight and motion in a straight line under gravity; gravitational acceleration, g, and its value in S.I. units to varying degrees of accuracy
- (The inverse square law for gravitation is not required and g may be assumed to be constant, but students should be aware that g is not a universal constant but depends on location)
- Understand and use Newton's third law; equilibrium of forces on a particle and motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2-D vectors); application to problems involving smooth pulleys and connected particles

HOW THIS WILL BE ASSESSED:
Recall and Retrieval tasks
End of unit assessments

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HALF TERM 3:
STUDENTS MUST KNOW:

Statistics

Chapter 6: Statistical Distributions:

- Understand and use simple discrete probability distributions including the discrete uniform distribution.
- Understand the binomial distribution as a model and comment on appropriateness.
- Calculate individual probabilities for the binomial distribution.
- Calculate cumulative probabilities for the binomial distribution

Mechanics

Chapter 11: Variable Acceleration

- Understand that displacement, velocity and acceleration may be given as functions of time.
- Use differentiation to solve kinematics problems.
- Use calculus to solve problems involving maxima and minima.
- Use integration to solve kinematics problems.
- Use calculus to derive constant acceleration formulae.
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HOW THIS WILL BE ASSESSED:
Recall and Retrieval tasks
End of unit assessments

HALF TERM 4:
STUDENTS MUST KNOW:

Statistics

Chapter 7: Hypothesis Testing

- Understand and apply the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, p-value.

Mechanics

- Revision

HOW THIS WILL BE ASSESSED:
Recall and Retrieval tasks
End of unit assessments

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HALF TERM 5:
STUDENTS MUST KNOW:

- Revision

HOW THIS WILL BE ASSESSED:
Recall and Retrieval tasks
End of unit assessments

HALF TERM 6:
STUDENTS MUST KNOW:

- Revision
- Review based on Mocks QLA

HOW THIS WILL BE ASSESSED:
Recall and Retrieval tasks
End of unit assessments