Stuart Bathurst Catholic High School

Mathematics Department

Long-term sequencing Year 13 Statistics and Mechanics

HALF TERM 1:
STUDENTS MUST KNOW:

Statistics

Chapter 1: Regression and correlation

Change of variable may be required e.g. using knowledge of logarithms to reduce a relationship of the form $y = ax^n$ or $y = kb^x$ into linear form to estimate a and n or k and b.

Understand and calculate the product moment correlation coefficient.

Understand and apply the language of statistical hypothesis testing, …., extend to correlation coefficients as measures of how close data points lie to a straight line and be able to interpret a given correlation coefficient using a given p-value or critical value (calculation of correlation coefficients is excluded).

Chapter 2: Conditional Probability

Understand and use mutually exclusive and independent events when calculating probabilities

Understand and use conditional probability, including the use of tree diagrams, Venn diagrams, two-way tables

Understand and use the conditional probability formula $\boldsymbol{P(A|B) = \frac{P(A \cap B)}{P(B)}}$

Modelling with probability, including critiquing assumptions made and the likely effect of more realistic assumptions

Mechanics

Chapter 4: Moments

- Calculate the turning effect of a force applied to a rigid body.
- Calculate the resultant moment of a set of forces acting on a rigid body.
- Solve problems involving uniform and non-uniform rods in equilibrium.
- Solve problems involving rods on the point of titling.
- Understand and use moments in simple static contexts.

Chapter 5: Forces and friction

- Identify the forces acting on a particle and represent them in a force diagram;
- Understand how to find the resultant force (magnitude and direction);
- Find the resultant of several concurrent forces by vector addition;
- Resolve a force into components and be able to select suitable directions for resolution.
- Solve problems involving smooth or rough inclined planes.
- Understand friction and the coefficient of friction.
- Use $F \leq \mu R$

HOW THIS WILL BE ASSESSED:

Recall and Retrieval tasks

End of unit assessments

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HALF TERM 2:
STUDENTS MUST KNOW:

Statistics:

Chapter 3: Normal Distribution

- Understand the normal distribution and the characteristics of a normal distribution curve.
- Find percentage points on a standard normal curve.
- Calculate values on a standard normal curve.
- Find unknown means and/or standard deviations for a normal distribution.

Mechanics:

Chapter 6: Projectiles

- Model motion under gravity for an object projected horizontally.
- Resolve velocity into components.
- Solve problems involving particles projected at an angle.
- Derive the formulae for time of flight, range and greatest height, and the equation of a projectile.

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

HALF TERM 3:
STUDENTS MUST KNOW:

Statistics

Chapter 3: Normal Distribution

- Approximate a binomial distribution using a normal distribution.
- Select appropriate distributions and solve real-life problems in context.
- Carry out a hypothesis test for the mean of a normal distribution.

Mechanics

Chapter 7: Application of forces (Mechanics)

- 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; resolving forces in 2 dimensions; equilibrium of a particle under coplanar forces.
- Understand and use addition of forces; resultant forces; dynamics for motion in a plane.
- Understand and solve problems involving limiting equilibrium esp. static rigid bodies.

Chapter 8: Further Mechanics

- Work with vectors of displacement, velocity and acceleration when using the vector equations of motion.
- Model motion under gravity in a vertical plane using vectors; projectiles.
- Use calculus with harder functions of time involving variable acceleration.
- Differentiate and integrate vectors with respect to time.

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

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HALF TERM 4:
STUDENTS MUST KNOW:

- Revision and review

HALF TERM 5:
STUDENTS MUST KNOW:

- Revision and review

HALF TERM 6:
STUDENTS MUST KNOW:

- Exams