# NC 226B: INTEGRATED MATH IB

## Citrus College Course Outline of Record

| Heading | Value |
|---|---|
| **Effective Term:** | Summer 2022 |
| **Credits:** | 0 |
| **Total Contact Hours:** | 60 |
| **Lecture Hours :** | 60 |
| **Lab Hours:** | 0 |
| **Hours Arranged:** | 0 |
| **Outside of Class Hours:** | 120 |
| **Prerequisite:** | Placement by high school counselor or math placement exam. |
| **Transferable to CSU:** | No |
| **Transferable to UC:** | No |
| **Grading Method:** | Non-Credit Course |

## Catalog Course Description

This is an integrated course that combines the content of algebra with logical reasoning, statistics, probability, problem solving, real life situations, spatial visualization, and introductory topics in geometry. The course format will include activity-based investigations with hands on activities, concepts, and applications compliant with the adopted California State Mathematics Standards to meet the minimum course requirements for high school graduation. 60 lecture hours.

## Course Objectives

- Analyze givens, constraints, relationships, and goals.
- Explain the meaning of a problem and look for entry points to its solution.
- Reason abstractly and quantitatively.
- Abstract a given situation and represent it symbolically and manipulate the representing symbols.
- Construct viable arguments and critique the reasoning of others.
- Make conjectures and build a logical progression of statements to explore the truth of their conjectures.
- Reason inductively about data, making plausible arguments that take into account the context from which the data arose.
- Model with mathematics.
- Identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and formulas.
- Analyze those relationships mathematically to draw conclusions.
- Use appropriate tools strategically.
- Use clear definitions in discussion with others and in their own reasoning.
- Look for and make sense of structure.

## Major Course Content

1. Geometry
   a. Experiment with transformations in the plane
      i. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
      ii. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
      iii. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
      iv. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
      v. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software.
   b. Understand congruence in terms of rigid motions
      i. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
      ii. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
      iii. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.
   c. Make geometric constructions
      i. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.
   d. Express geometric properties with equations
      i. Use coordinates to prove simple geometric theorems algebraically.
      ii. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
      iii. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.
2. Statistics and Probability
   a. Summarize, represent, and interpret data on a single count or measurement variable.
      i. Represent data with plots on the real number line (dot plots, histograms, and box plots).
      ii. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

iii. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

b. Summarize, represent, and interpret data on two categorical and quantitative variables.
   i. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.
   ii. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
      1. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.
      2. Informally assess the fit of a function by plotting and analyzing residuals.
      3. Fit a linear function for a scatter plot that suggests a linear association.

c. Interpret linear models.
   i. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
   ii. Compute (using technology) and interpret the correlation coefficient of a linear fit.
   iii. Distinguish between correlation and causation.

# Examples of Required Writing Assignments

Students will be asked to write a formal proof about a diagram accompanied by given information. This task requires students to provide formal and logical series of statements that will lead to the indicated result through analyzing the given information.

# Examples of Outside Assignments

There will be homework given on a daily basis along with some performance tasks that will need additional time outside of class.

# Instruction Type(s)

Lecture, Online Education Lecture