### GEOG 2251

#### Descriptive Title
Quantitative Methods in Geography

#### Semester Credits
3

### Calendar Description
This course is an introduction to the use of quantitative information in geography, including data collection, management, and analysis. Analytical procedures will include graphical presentation of data, descriptive statistics, application of probability and sampling theory, and inferential statistics. Examples will be taken from both physical and human geography. Computers and data analysis software will be used.

### Course Prerequisites
One 2000-level Geography course and C grade or better in BC Principles of Math 11 (or equivalent), or permission of instructor

### Course Corequisites
NONE

### Courses for which this Course is a Prerequisite
NONE

### Maximum Class Size
35

### PLEASE INDICATE:

- [ ] Non-Credit
- [ ] College Credit Non-Transfer
- X College Credit Transfer:

SEE BC TRANSFER GUIDE FOR TRANSFER DETAILS ([www.bctransferguide.bc.ca](http://www.bctransferguide.bc.ca))
M:  **Course Objectives / Learning Outcomes:**

At the conclusion of the course the successful student will be able to:

1.  Explain the role of quantitative information in geographic research and applications

2.  Demonstrate an understanding of basic descriptive statistics and regression methods as they apply to problem solving in Geography

3.  Perform basic data manipulation, statistical calculations and graphical presentation by hand, and using computer spreadsheets or statistical software (e.g. Excel, SPSS, R)

4.  Evaluate the roles of probability theory and sampling distributions in drawing inferences about populations based on samples

5.  Identify when and where statistical procedures are appropriate

N:  **Course Content:**

1.  Introduction
   - quantitative geography
   - statistics
   - nominal, ordinal, interval data
   - primary and secondary data
   - measurement and collection of data

2.  Visualization of data
   - tables, graphs and maps

3.  Descriptive statistics
   - central tendency
   - variability

4.  Spatial data analysis
   - areal and point data
   - directional statistics

5.  Probability theory and distributions
   - random variables
   - discrete probability distributions
   - continuous probability distributions

6.  Sampling and populations
   - types of samples
   - random sampling
   - sampling distributions
   - geographic sampling

7.  Parametric inferential statistics
   - estimation
   - hypothesis testing
   - t-tests
   - confidence intervals
   - statistical significance

8.  Nonparametric statistics
   - comparison of parametric and nonparametric tests
   - examples of nonparametric tests
<table>
<thead>
<tr>
<th></th>
<th>Correlation</th>
<th></th>
<th>Regression</th>
<th></th>
<th>Analysis of Variance (ANOVA)</th>
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</thead>
<tbody>
<tr>
<td>9</td>
<td>- Pearson’s product-moment correlation coefficient</td>
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<td>- simple linear regression model</td>
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<td>11. Analysis of Variance (ANOVA)</td>
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<td>- nonparametric correlation coefficients</td>
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<td>- goodness of fit</td>
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<td>12. Goodness of fit</td>
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<td></td>
<td>- spatial autocorrelation</td>
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<td>- assumptions of linear regression</td>
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<td>- Chi-Square testing</td>
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<tr>
<td>10</td>
<td>Regression</td>
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<td>- non-linear regression models</td>
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<td>13. Time series analysis</td>
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<td></td>
<td>- simple linear regression model</td>
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<td>- multiple regression analysis</td>
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<td>- characteristics of time series</td>
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<td>- goodness of fit</td>
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<td>- data homogeneity</td>
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<td>- assumptions of linear regression</td>
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<td>- smoothing</td>
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**Methods of Instruction:**

The course will employ a variety of instructional methods to accomplish its objectives, including some of the following: lecture, labs, observation, analysis and interpretation of geographic data, slides, videos, individual and/or team projects and small group discussions.

**P: Textbooks and Materials to be Purchased by Students:**

Texts will be updated periodically. Typical examples are:

Q: Means of Assessment:

The evaluation will be based on course objectives and will be carried out in accordance with Douglas College policy. The instructor will provide a written course outline with specific evaluation criteria during the first week of classes.

Evaluation will include some of the following:
- Laboratory assignments with a combined value of up to 50%.
- Multiple choice and short answer exams with a combined value of up to 50%.
- A term project with a value of up to 25%.

An example of a possible evaluation scheme would be:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Laboratory Assignments</td>
<td>40%</td>
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<tr>
<td>Midterm Examination</td>
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<tr>
<td>Final Examination</td>
<td>25%</td>
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<tr>
<td>Term Project</td>
<td>10%</td>
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<td>100%</td>
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Note: This course received a standing variance from Education Council in November 1999 to allow up to a 15% open book lab exam in the penultimate week of the semester. This is not a final exam; it is an assessment of student learning of lab work performed in the second half of the semester.

R: Prior Learning Assessment and Recognition: specify whether course is open for PLAR

No.