

# CARLOW

## UNIVERSITY

### SKQ-101: Quantitative Reasoning

Syllabus | Spring 2022 | Section: DD  
 Tuesdays & Thursdays 3:30-4:45 pm |  
 A J Palumbo Science & Tech, 115

|                             |   |
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| instructor:                 | <b>Eric C. Darsow</b><br>Adjunct Instructor   |
| office Hours:               | Tuesdays 12:30-1:45pm<br>Thursdays 12:30-1:45pm<br>or by appointment in AJP 308   |
| semester:                   | <b>Spring 2022</b>  |
| instructor Contact methods: | <b>1) Meeting in person during office hours is preferred,</b><br><b>2) followed by phone calls: 412.894.3020</b><br><b>3) Then email via <a href="mailto:ecdarsow@carlow.edu">ecdarsow@carlow.edu</a></b> |
| credits                     | 3.0 credits   |
| CIT Dept chair              | Dr. Ericka Mochan<br><a href="mailto:edmochan@carlow.edu">edmochan@carlow.edu</a>   |

### I: Course Description:

This course is designed to study the fundamental skills required to understand quantitative information in personal, societal, and career contexts, and to use this information to effectively form conclusions, judgments, or inferences. These skills include the ability to consume quantitative information presented in many formats as well as the ability to articulate arguments using quantitative evidence to a variety of audiences. Topics include critical thinking, number sense, statistical interpretation, basic probability, graphic representation, and analysis of data. Students will have the opportunity to consider the ethical issues surrounding the use of data as engaged citizens of the world. It is recommended that this course be completed during the first year of study. (2021/2022 Undergraduate Course catalog)

### II: Learning Outcomes

Quantitative Reasoning is a "habit of mind", implying competence and comfort working with quantitative information. Individuals with strong quantitative reasoning skills possess the ability to reason and quantitative problems from a wide array of authentic contexts and everyday life situations. They understand and can create arguments using words, tables, graphs, mathematical equations, etc. as appropriate to a variety of audiences. Students will exhibit quantitative reasoning by:

- Properly interpreting and representing quantitative data
- Drawing reasonable conclusions based on appropriate analysis while acknowledging any limitations/assumptions

- Reporting conclusions in an evidence-based contextual argument

SKQ-101 is a foundation course where the student is introduced to the fundamentals of quantitative reasoning. Proficiency in this skill area is achieved through additional opportunities to quantitatively reason in coursework in the Carlow compass as well as the student's program of study.

Upon successful completion of SKQ-101 the student will exhibit the ability to:

- Demonstrate understanding of units by making appropriate conversions to compare quantities.
- Appropriately interpret a variety of reported percentage comparisons and use percentages to make meaningful comparisons of contextual data.
- Appropriately summarize a variety of graphical presentations of contextual data and effectively display such data to support quantitative arguments.
- Identify components of a statistical study, effectively explore and analyze sample data, and appropriately communicate the results to a variety of audiences.
- Make appropriate assumptions and apply basic probability models in contextual settings.
- Reason from probability models to gain insight into statistical studies, distinguishing between coincidence and meaningful outcomes.

*Section text from SKQ-101 Syllabus by Dr. E. Mochan*

### III: The nitty gritty

**textbook & materials** *Using and Understanding Mathematics: A Quantitative Reasoning Approach.* Custom edition for Carlow University SKQ-101 Pearson, 2015.  
 Custom edition ISBN: 978-1-323-19897-1  
 Non-custom ISBN: 978-0-321-91462-0

| course components | Component           | % of overall grade |
|-------------------|---------------------|--------------------|
|                   | In-class projects   | 22%                |
|                   | Out-of class work   | 21%                |
|                   | Checkpoint tests(3) | 34%                |
|                   | Final Exam          | 23%                |
|                   | <i>total</i>        | 100%               |

*The Test and final exam percentages are based on Dr. E. Mochan's past course breakdown*

**letter grades** Points earned by students toward each component are weighted using the above values to yield a cumulative percentage which map to letter grades:

| %       | Letter | %      | Letter |
|---------|--------|--------|--------|
| 97-100% | A+     | 77-79% | C+     |
| 93-96%  | A      | 73-76% | C      |
| 90-92%  | A-     | 70-72% | C-     |
| 87-89%  | B+     | 67-69% | D+     |
| 83-86%  | B      | 63-66% | D      |
| 80-82%  | B-     | 60-62% | D-     |
| <60%    | F      |        |        |

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| work format | <p><b>"Always by hand; write out your thinking; include units"</b></p> <p>We'll do all our problems on paper with a simple (non-"phone") calculator in this class, including on assignments in class, your out-of-class work, and on test and exams. During our COVID online period, please prepare to submit scans or photos of your hand written work.</p> <p>Full credit for problems will only be awarded to students whose work appropriately shows the computations they undertook to arrive at their answer.</p> <p>While it's true that computerize tools can do many of the computations we work in this class, the goal is to learn <i>how</i> those tools work so we can understand and trust their output if we decide to use them.</p> |
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| Com-<br>ponent<br>details | <p><b><i>In-Class projects</i></b></p> <p>Class sessions exist in pairs. On Tuesdays sessions we'll explore the fundamental concepts for the week through guided exercises. Students then practice the topic between Tue and the Thursday session where we'll review core concepts and layer on complexity.</p> <p>We'll also take "pulse quizzes" to help your instructor fine-tune lessons based on student absorption. Instead of scoring each and every assignment, <b>you can earn 100% of this component's weight toward your final grade by thoughtfully attempting 80%+ of all in-class work.</b> If you must miss class, in consultation with your peers or instructor during office hours, complete the in-class work on your own time. If your in-class work falls below 80% complete, a percentage of all assignments attempted will be computed and this will drive your score in this component.</p> <p><b><i>Out-of-class work</i></b></p> <p>You'll be asked to complete 10 out-of-class assignments/mini-labs which will generally be due at the start of Tuesday's class sessions and will be based on the content from the previous week. You'll get grades back for your assignments within a week of submission.</p> <p>Extensions for out-of-class work are considered on a student-by-student basis BEFORE due dates and times. The instructor makes no commitment to accept work after due dates if no communication is initiated prior to the due date/time.</p> <p><b><i>Check-point tests</i></b></p> <p>Three mid-term tests will be administered, each with equal weight, according to the schedule below. They will be equally weighted and together compose 34% of your overall grade. These tests will occur during the second half of class sessions marked in the schedule.</p> <p>If you must miss class on a test day, you can</p> |
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| <p>schedule with the instructor to take the test during office hours. Failing to show up for a test without prior communication will result in a score of zero points. Very sad.</p> <p>Make up check-point tests will be offered on a student-by-student basis on the following conditions:</p> <ul style="list-style-type: none"> <li>- Incorrect computations or answers on the original test must be corrected and brought to office hours for discussion</li> <li>- The makeup test must be completed before the next test</li> <li>- Students can "earn back" points <i>at a rate 80 cents "on the dollar"</i>, or weighted as 80% of missed points on the original test.</li> </ul> <p>Example: you score a 50% on test 2, You study your mistakes and take the makeup test, on which you score 88%—an increase of 38%, which you can count toward your original grade at a weight of 0.8, for a total gain of 30.4% on your original test, which will then be counted as a score of 80.4%.</p> <p><b><i>Final exam</i></b></p> <p><b>COME TO THE FINAL EXAM:<br/>Monday, 2 May 2022 from 3:30-5:30 pm!</b></p> <p>This course culminates in a standardized final exam administered to all SKQ-101 students at Carlow and will be scored using the standard rubric provided by the department. You must attend the final exam session or coordinate with the Department Chair for excused absences. There is no making up of final exam points.</p> |
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| Schedule | <p>This schedule is approximate. Check Schoology and Teams for updates.</p> <table border="1"> <thead> <tr> <th>Week #</th> <th>Topics and Book Sections</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2A: Working with units<br/>2B: Problem solving with units</td> </tr> <tr> <td>2</td> <td>3A: Using and abusing percentages<br/>3B: # in perspective</td> </tr> <tr> <td>3</td> <td>3C: Uncertainty<br/>3D: Indexes &amp; CPI</td> </tr> <tr> <td>4</td> <td>3D: Indexes cont.<br/>3E: Deceptive numbers</td> </tr> <tr> <td>5</td> <td>3E: Incidence rates<br/><b>Check-point test #1 in class</b></td> </tr> <tr> <td>6</td> <td>5A: Statistics Fundamentals<br/>5C: Tables &amp; Graphs</td> </tr> <tr> <td>7</td> <td>5C: Graphs continued<br/>5E: Correlation and Causality</td> </tr> <tr> <td>8</td> <td>6A: 5-number summaries</td> </tr> <tr> <td>9</td> <td>6B: Standard deviation<br/><b>Check-point test #2 in class</b></td> </tr> <tr> <td>10</td> <td>6B: Standard deviation cont.<br/>6C: Normal distribution</td> </tr> <tr> <td>11</td> <td>6D: Statistical inference<br/>7A: Probability basics</td> </tr> </tbody> </table> | Week # | Topics and Book Sections | 1 | 2A: Working with units<br>2B: Problem solving with units | 2 | 3A: Using and abusing percentages<br>3B: # in perspective | 3 | 3C: Uncertainty<br>3D: Indexes & CPI | 4 | 3D: Indexes cont.<br>3E: Deceptive numbers | 5 | 3E: Incidence rates<br><b>Check-point test #1 in class</b> | 6 | 5A: Statistics Fundamentals<br>5C: Tables & Graphs | 7 | 5C: Graphs continued<br>5E: Correlation and Causality | 8 | 6A: 5-number summaries | 9 | 6B: Standard deviation<br><b>Check-point test #2 in class</b> | 10 | 6B: Standard deviation cont.<br>6C: Normal distribution | 11 | 6D: Statistical inference<br>7A: Probability basics |
|----------|---|--------|--------------------------|---|--|---|---|---|--------------------------------------|---|--|---|--|---|--|---|---|---|------------------------|---|---|----|---|----|---|
| Week #   | Topics and Book Sections  |        |                          |   |  |   |   |   |                                      |   |  |   |  |   |  |   |   |   |                        |   |   |    |   |    |   |
| 1        | 2A: Working with units<br>2B: Problem solving with units  |        |                          |   |  |   |   |   |                                      |   |  |   |  |   |  |   |   |   |                        |   |   |    |   |    |   |
| 2        | 3A: Using and abusing percentages<br>3B: # in perspective   |        |                          |   |  |   |   |   |                                      |   |  |   |  |   |  |   |   |   |                        |   |   |    |   |    |   |
| 3        | 3C: Uncertainty<br>3D: Indexes & CPI  |        |                          |   |  |   |   |   |                                      |   |  |   |  |   |  |   |   |   |                        |   |   |    |   |    |   |
| 4        | 3D: Indexes cont.<br>3E: Deceptive numbers  |        |                          |   |  |   |   |   |                                      |   |  |   |  |   |  |   |   |   |                        |   |   |    |   |    |   |
| 5        | 3E: Incidence rates<br><b>Check-point test #1 in class</b>  |        |                          |   |  |   |   |   |                                      |   |  |   |  |   |  |   |   |   |                        |   |   |    |   |    |   |
| 6        | 5A: Statistics Fundamentals<br>5C: Tables & Graphs  |        |                          |   |  |   |   |   |                                      |   |  |   |  |   |  |   |   |   |                        |   |   |    |   |    |   |
| 7        | 5C: Graphs continued<br>5E: Correlation and Causality   |        |                          |   |  |   |   |   |                                      |   |  |   |  |   |  |   |   |   |                        |   |   |    |   |    |   |
| 8        | 6A: 5-number summaries  |        |                          |   |  |   |   |   |                                      |   |  |   |  |   |  |   |   |   |                        |   |   |    |   |    |   |
| 9        | 6B: Standard deviation<br><b>Check-point test #2 in class</b>   |        |                          |   |  |   |   |   |                                      |   |  |   |  |   |  |   |   |   |                        |   |   |    |   |    |   |
| 10       | 6B: Standard deviation cont.<br>6C: Normal distribution   |        |                          |   |  |   |   |   |                                      |   |  |   |  |   |  |   |   |   |                        |   |   |    |   |    |   |
| 11       | 6D: Statistical inference<br>7A: Probability basics   |        |                          |   |  |   |   |   |                                      |   |  |   |  |   |  |   |   |   |                        |   |   |    |   |    |   |

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|                 | 12   | 7A: Probability continued<br><b>Check-point test #3 in class</b> |
|                 | 13   | 7B: Combining probabilities                                      |
|                 | 14   | 7E: Permutations and combinations<br>7D: Risk                    |
|                 | 15   | 7C: Law of large numbers   |
|                 | 16   | <b>Final exam: Monday, 2 May 2022<br/>from 3:30-5:30 pm!</b>     |
| tech-<br>nology | <b>You'll need a digital calculator for each class session and each test, and the device should be <i>only</i> a calculator, not a full-fledged computer.</b> It need not be fancy, just capable of basic + - x / , square root, and exponents. While certainly capable of these operations, a pocket computer, "smart phone", "smart watch", tablet computer, or full on laptop do not satisfy the requirement. |  |

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|  | provide reasonable accommodations for students with disabilities. This includes individuals with physical disabilities, learning disabilities and mental health disorders who meet the definition of disability under the Americans with Disabilities Act. Students with disabilities have the same responsibility as other students to meet the University's academic, technical, and behavioral standards and to follow the University's general policies and guidelines regarding standards of conduct. Students who plan to request accommodations should contact the Disabilities Services Office at the beginning of each semester since accommodations cannot be granted retroactively. To determine whether you qualify for accommodations, or if you have questions about services and procedures for students with disabilities contact: Jacqueline M. Smith<br>Disabilities Services Office<br>University Commons, 4th floor<br>Phone - 412.578.6257 (Office line)<br>412.578.6050 (Direct line)<br>Fax - 412 578.2027<br>dso@carlow.edu |
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## IV: Official Carlow notices

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| student<br>academic<br>support | <b>Academic support: CAA – Center for Academic Achievement</b><br>The Center for Academic Achievement (CAA), 4th floor University Commons, offers free in-person tutoring for improving writing skills and understanding course content. We also offer academic coaching for time management and learning skills. To make an appointment click on "CAA tutoring" in the Quick Links drop down menu on the Carlow website which connects to our scheduling system at <a href="http://carlow.mywconline.com">http://carlow.mywconline.com</a> or call 412-578-6146 (appointments must be made at least 48 hours in advance). Cancellations can be made online within 8 hours of the appointment time. For last minute cancellations, please call 412-578-6146. Students can also access "CAA Resources" under Groups on celticonline for guides on college survival skills, reading, learning strategies, math, and writing/research. |
| diversity                      | Title IX of the Education Amendments 1972 (20 U.S.C. 1681 et seq.) and its implementing regulations, 34 C.F.R. Part 106, prohibit discrimination on the basis of sex in education programs or activities operated by recipients of Federal financial assistance. It is the landmark legislation that bans gender based discrimination in schools and colleges.<br><br><i>"No person in the U.S. shall, on the basis of sex be excluded from participation in, or denied the benefits of, or be subjected to discrimination under any educational program or activity receiving federal aid."</i><br><br><a href="https://www.cac.edu/diversity/title-IX.php">https://www.cac.edu/diversity/title-IX.php</a><br><a href="https://www.cac.edu/diversity/notices.php">https://www.cac.edu/diversity/notices.php</a>  |
| disability                     | Accommodations: Students with Disabilities<br>Carlow University makes every effort to   |

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| temporary<br>disability | <b>CARLOW UNIVERSITY TEMPORARY DISABILITY POLICY</b><br>Carlow University values each student and is invested in encouraging his or her academic success in line with the Mercy mission "to respond reverently to God and others; and to embrace an ethic of service for a just and merciful world." In keeping with the mission, the University has chosen to offer assistance to those with temporary conditions such as short term illnesses, injuries, or other temporary medical conditions. While the University is not required to provide such support under the Americans with Disabilities Act, some assistance may be arranged via the Disability Services Office (DSO). Each situation will be reviewed; however, the office cannot guarantee that services will be provided.<br>In order to determine if a student with a temporary condition may receive some assistance via the DSO, he/she should contact the office at 412 578-6257. The student will be asked to meet with Jackie Smith, Disabilities Services Representative, and to provide the requisite documentation of his/her condition. Mrs. Smith will review the documentation and may consult with the student accommodation committee to determine what, if any, assistance may be provided. All documentation will remain confidential. |
| academic<br>honesty     | Academic Policies and Procedures: Academic integrity, plagiarism: Carlow University aims to educate and challenge students to reach their highest potential by guiding students along a path of honesty and integrity throughout their   |

intellectual pursuits. Students are thus expected to uphold the highest standards of academic integrity. Forms of academic misconduct include (but are not limited to):

1. Cheating—providing or receiving inappropriate assistance on any coursework.

2. Plagiarism—submitting another's work as one's own; not properly citing sources, using exact wording without quotations or proper attribution, paraphrasing without proper citation, or improper paraphrasing; attributing citations to inaccurate or misleading sources.

3. Self-plagiarism—unauthorized use of one's own work or part of a work, either from the same course or from another course, in more than one assignment.

4. Academic deceit—use of false or altered information or withholding information critical to the processes of the University; providing false information or documentation with the intent to obtain an exemption, extension or exception to one's coursework; signing other students into classes or on group reports.

5. Fabrication of data—using falsified or fabricated data, forgery, or unsanctioned documents for research or other coursework.

6. Interference with other students' learning or achievement—sabotaging (including failing to contribute to) group projects or laboratory work, disrupting in-class work, altering computer files or online posts, or making educational materials unavailable to others.

7. Unauthorized acquisition or exchange of coursework—purchasing, borrowing, stealing, or otherwise obtaining material with the intent to use as one's own coursework; selling, lending, or otherwise offering one's own coursework to others with the intent of allowing the recipient to use the work as one's own; obtaining a copy of one's own completed tests and exams (either a physical copy, an electronic image, or a screenshot) without explicit permission from the course instructor.

All violations of Carlow's academic integrity policy will be kept on permanent record. Serious or multiple violations will be forwarded to the Academic Integrity Council for a judicial hearing.

It is the student's responsibility to become familiarized with Carlow's Academic Integrity Policy. The full policy can be found in the Course Catalog.