Course Title: Statistical data analysis and research methods
Course Subject Code: BMI
Type of Instruction: SEM
Semester: Spring 2023

Version Mar 16, 2023

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1 Course Information

- **Date(s)/Time(s):** Thursdays Feb 2 – May 11 (Final Exam May 18), 10AM – 12.30/1PM
- **Location:** Remote
- **Delivery Mode:** Online synchronous (with availability of class-recordings afterwards)
- **Number of Credits:** 3
- **Instructors**
  - **Course director:** Werner Ceusters, MD (contact: 77 Goodell street, 5th floor, on appointment: wceusters@gmail.com)
  - **Lecturers:**
    - Statistics: Zackary Falls, PhD (contact: 77 Goodell street, 5th floor, on appointment: zmfalls@buffalo.edu)
    - All other topics: Werner Ceusters, MD (contact: 77 Goodell street, 5th floor, on appointment only through wceusters@gmail.com)

2 Course Description

- This course provides a thorough introduction to research design and methods used in biomedical sciences in general and biomedical informatics in particular. Its main aim is to enhance the students’ quantitative and qualitative research skills. Five themes will be covered: (1) the fundamentals of scientific research; (2) elements of philosophy of science, (3) quantitative research methods including statistics; clinical epidemiology, population studies and big data; (4) theoretically informed qualitative research; and (5) integration of research methods in biomedical sciences, including biomedical informatics.
- Most classes in the course consists of a theoretical and practical part, either in-class, or in the form of assignments and tests. The theoretical parts are in the form of interactive lectures surveying the formulation of research questions, the development of testable hypotheses, the selection and application of appropriate research designs and methods, data collection and analysis methods. These skills are then applied in the practical parts most of which are components for a research proposal which students will develop for a topic in their interest, but satisfying the principles outlined below.
- At the end of the course, students should be able to apply the methods taught in subsequent courses and research projects and use them for the evaluation and production of research proposals and papers.
- Course prerequisites: none.

3 Student Learning Outcomes (SLO)

3.1 Mapping of course learning outcomes to program and institutional outcomes and competencies.

<table>
<thead>
<tr>
<th>Course Learning Outcomes; students will be able to:</th>
<th>BMI Graduate Program Outcomes / Competencies</th>
<th>Instructional methods</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Explain the fundamentals of scientific inquiry</td>
<td>O1: The most widely used clinical and informatics research methods</td>
<td>Lectures: C1, C2, C3, C5, C7, C8, C12 Discussion: C4 Guided exercise: C13</td>
<td>Tests: T1, T2 Assignments: A2, A3 Final exam</td>
</tr>
<tr>
<td>2. Articulate research questions</td>
<td>O2: The generation, acquisition, modeling, representation, and management of evidence-based knowledge sources for decision support O3: The characteristics of public health data as distinguished from clinical healthcare data</td>
<td>Lectures: C1, C2, C3, C5 Discussion: C4</td>
<td>Assignments: A1 Tests: T2 Final exam</td>
</tr>
<tr>
<td>3. Assess the quality of quantitative and qualitative studies</td>
<td>O1: The most widely used clinical and informatics research methods O4: Methods of data representation, manipulation, storage, analysis and mining in healthcare and biomedical research databases</td>
<td>Lectures: C3, C5, C6, C12 Discussion: C4</td>
<td>Assignments: A6</td>
</tr>
<tr>
<td>4. Understand and apply the concept of hypothesis in quantitative studies</td>
<td>O1: The most widely used clinical and informatics research methods. O5: Technical approaches to acquiring, modeling, representing and managing healthcare and biomedical research knowledge</td>
<td>Lectures: C2, C7, C8, C12 Discussion: C4</td>
<td>Assignments: A2, A3, A6 Final exam</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>11.</td>
<td>Explain different forms of qualitative inquiry, including interviews, focus groups and observations and understand their benefits and limitations</td>
<td>O8: Information retrieval and critical analysis skills.</td>
<td>Lectures: C6, C7.</td>
</tr>
<tr>
<td>16.</td>
<td>Reflect critically on the extent to which this course contributed to an increase in the skills and competencies you deem important for your future career</td>
<td>O8: Information retrieval and critical analysis skills.</td>
<td></td>
</tr>
</tbody>
</table>

### 3.2 Mapping of course learning outcomes to institutional outcomes and competencies.

<table>
<thead>
<tr>
<th>Applicable institutional outcomes</th>
<th>Instructional methods</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>UB2. Apply effective communication, information, and digital literacy skills.</td>
<td></td>
<td>Assignments: A6, A7. Final Exam.</td>
</tr>
</tbody>
</table>
4 COURSE REQUIREMENTS

4.1 On-line teaching and participation

- All classes will be on-line in real-time using Zoom. Students must register once in advance for all meetings using the link: https://buffalo.zoom.us/meeting/register/tJYpduqpszpHtRgIEu0PwAl39k_u6sLpP-. After registering, students will receive a confirmation email containing information about joining the meetings. Attendance is restricted to students using their UB Zoom-account.
- Students are prohibited from sharing the registration link and subsequent meeting link, and doing so could lead to academic misconduct charges.
- Students must logon in time. Cameras must be on, and clearly show faces. Adjust lighting conditions on the side of Zoom or of the infrastructure of the instructor (interruption of power, internet access, …), students need to stay on-line and wait for instructions or email while the instructor works out an alternative (Skype, Google chat, …).
- Recordings of the classes will be made available.
- Students must attend all classes and must participate in class discussions. See attendance policy regulations on page 10 for exceptions.

4.2 Course materials

This course requires the following papers and electronic publications, all of which are available publicly or through the UB Libraries: (links to the papers are provided in the detailed class descriptions starting page 6):


4.3 Tests and assignments

- Some classes will start with a test to assess the student’s preparedness for the class. Students absent for these classes will receive a 0% score for these tests unless the instructor and the course director have been informed through email about a valid reason for absence prior to the beginning of the class. When notified of absence in due time, the instructor may — but is not required — propose an alternative test or assignment for that class.
- All assignments except A8 need to be completed and uploaded to UB Learns as a Microsoft Word document prior to the deadline specified in the course schedule. Google doc links or any other link to a cloud server are not allowed. The filename should be formatted as this: BMI504-[number of the assignment]-[your UBIT name]. For example, if the course director were a student: “BMI504-A1-ceusters.docx” would be the filename for the first assignment.
- The main assignment is A6, a fully worked out proposal for a scientific research project to be built according to precise specifications given during the course. Parts of this proposal are the subject of separate assignments A1, A2, A3 and A4. This approach gives the students the opportunity to receive feedback on these components so that they can be improved for inclusion.
in the final version. Grades received for these assignments do not count towards the final grade, but are to be seen as an indication of how that part of the proposal would be assessed were it included as such in the final proposal. There is thus no requirement to do assignments A1, A2, A3, and A4, but when they are not done in due time, i.e. prior to the due date, no intermediate feedback on the respective parts will be provided. Not receiving feedback on overdue assignments may of course have a negative effect on the overall score of A6.

- When assignment A5 is not delivered in time, a penalty of 1% of the positive final score will be applied for every 24 hours of delay. When this assignment is not delivered at all, the penalty will be equal to the % for which the assignment counts towards the final grade.

5 Grading Policy

- Grading follows standard graduate policies (http://grad.buffalo.edu/Academics/Policies-Procedures/Grading-Procedures.html)
- Learning assessments will be graded based on rubric criteria and weighted according to the following detailed break-down. If the final results for all students are outside the expected range, curve grading might be used at the discretion of the course director.

<table>
<thead>
<tr>
<th>Class</th>
<th>Date</th>
<th>Instructor</th>
<th>Pre-class required readings</th>
<th>Assessments</th>
<th>Due dates</th>
<th>Final Score weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>02-Feb</td>
<td>Ceusters (1)</td>
<td>R1</td>
<td>Post-class assignment A0</td>
<td>Feb 9 – 10am</td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>09-Feb</td>
<td>Ceusters (2)</td>
<td>R2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td>16-Feb</td>
<td>Ceusters (3)</td>
<td>R3</td>
<td>In-class closed book test T1</td>
<td></td>
<td>2%</td>
</tr>
<tr>
<td>C4</td>
<td>23-Feb</td>
<td>Ceusters (4)</td>
<td>R4, R5, R6</td>
<td>Post-class assignment A1</td>
<td>Feb 27 - noon</td>
<td>3%</td>
</tr>
<tr>
<td>C5</td>
<td>02-Mar</td>
<td>Ceusters (5)</td>
<td>R7</td>
<td>In-class closed book test T2</td>
<td></td>
<td>3%</td>
</tr>
<tr>
<td>C6</td>
<td>09-Mar</td>
<td>Ceusters (6)</td>
<td>R8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C7</td>
<td>16-Mar</td>
<td>Ceusters (7)</td>
<td>R9</td>
<td>Post-class assignment A2</td>
<td>March 27 - noon</td>
<td>3%</td>
</tr>
<tr>
<td>C8</td>
<td>30-Mar</td>
<td>Ceusters (8)</td>
<td>R10</td>
<td>Post-class assignment A3</td>
<td>April 3 - noon</td>
<td>3%</td>
</tr>
<tr>
<td>C9</td>
<td>06-Apr</td>
<td>Ceusters (9)</td>
<td>R11, R12</td>
<td>In-class closed book test T3</td>
<td></td>
<td>3%</td>
</tr>
<tr>
<td>C10</td>
<td>13-Apr</td>
<td>Falls (1)</td>
<td>R13</td>
<td>Post-class assignment A5</td>
<td>April 24 - noon</td>
<td>5%</td>
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<tr>
<td>C11</td>
<td>20-Apr</td>
<td>Falls (1)</td>
<td>R13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C12</td>
<td>27-Apr</td>
<td>Ceusters (11)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C13</td>
<td>04 May</td>
<td>Ceusters (12)</td>
<td>R14</td>
<td>Post-class assignments A6, A7</td>
<td>May 10 – noon</td>
<td>30%</td>
</tr>
<tr>
<td>C14</td>
<td>11-May</td>
<td>Ceusters (13)</td>
<td></td>
<td>In-class presentation A8</td>
<td></td>
<td>15%</td>
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<tr>
<td>EXAM</td>
<td>18-May</td>
<td>Ceusters (14)</td>
<td></td>
<td>In-class open-book exam</td>
<td></td>
<td>30%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Scoring per student learning outcomes and assessments

<table>
<thead>
<tr>
<th>Class</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>C7</th>
<th>C8</th>
<th>C9</th>
<th>C10</th>
<th>C11</th>
<th>C12</th>
<th>C13</th>
<th>C14</th>
<th>EXAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readings</td>
<td>R1</td>
<td>R2</td>
<td>R3</td>
<td>R4</td>
<td>R5</td>
<td>R6</td>
<td>R7</td>
<td>R8</td>
<td>C9</td>
<td>R9</td>
<td>T3</td>
<td>T10</td>
<td>T11</td>
<td>T12</td>
<td>Coverage</td>
</tr>
<tr>
<td>Assignments</td>
<td>A1</td>
<td>A2</td>
<td>A3</td>
<td>A4</td>
<td>A5</td>
<td>A6</td>
<td>A7</td>
<td>A8</td>
<td>A9</td>
<td>A10</td>
<td>A11</td>
<td>A12</td>
<td>A13</td>
<td>A14</td>
<td>A15</td>
</tr>
</tbody>
</table>

| SLO1 | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 100% |
| SLO2 | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 100% |
| SLO3 | 10% | 10% | 5%  | 10% | 5%  | 10% | 5%  | 10% | 5%  | 10% | 5%  | 10% | 5%  | 10% | 100% |
| SLO4 | 20% | 10% | 5%  | 20% | 10% | 5%  | 20% | 10% | 5%  | 20% | 10% | 5%  | 20% | 10% | 100% |
| SLO5 | 10% | 10% | 5%  | 10% | 5%  | 10% | 5%  | 10% | 5%  | 10% | 5%  | 10% | 5%  | 10% | 100% |
| SLO6 | 10% | 5%  | 55% | 10% | 20% | 5%  | 10% | 20% | 5%  | 10% | 20% | 5%  | 10% | 20% | 100% |
| SLO7 | 5%  | 5%  | 40% | 30% | 20% | 5%  | 40% | 30% | 20% | 5%  | 40% | 30% | 20% | 5%  | 100% |
| SLO8 | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 100% |
| SLO9 | 5%  | 75% | 20% | 20% | 25% | 30% | 10% | 20% | 5%  | 10% | 20% | 5%  | 10% | 20% | 100% |
| SLO10| 5%  | 10% | 5%  | 10% | 20% | 5%  | 10% | 20% | 5%  | 10% | 20% | 5%  | 10% | 20% | 100% |
| SLO11| 70% | 10% | 20% | 20% | 10% | 20% | 20% | 10% | 20% | 10% | 20% | 10% | 20% | 10% | 100% |
| SLO12| 80% | 20% | 20% | 20% | 10% | 20% | 20% | 10% | 20% | 10% | 20% | 10% | 20% | 10% | 100% |
| SLO13| 5%  | 20% | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 100% |
| SLO14| 5%  | 20% | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 100% |
| SLO15| 10% | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 100% |
| SLO16| 100%| 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 5%  | 100% |

Material contribution to SLOs: 10% 135% 50% 40% 55% 170% 5% 35% 10% 35% 110% 20% 165% 40% 115% 115% 100% 45% 80% 25% 105% 60% 25% 30%
Class importance ratio: 10% 6% 14% 3% 9% 12% 10% 7% 6% 8% 8% 4% 3% 100%
Assessment contribution to final score: 2% 3% 3% 3% 3% 3% 3% 5% 25% 5% 15% 30% 100%
Final Grades:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Quality Points</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>4.0</td>
<td>93.0% -100.00%</td>
</tr>
<tr>
<td>A-</td>
<td>3.67</td>
<td>90.0% - 92.9%</td>
</tr>
<tr>
<td>B+</td>
<td>3.33</td>
<td>87.0% - 89.9%</td>
</tr>
<tr>
<td>B</td>
<td>3.00</td>
<td>83.0% - 86.9%</td>
</tr>
<tr>
<td>B-</td>
<td>2.67</td>
<td>80.0% - 82.9%</td>
</tr>
<tr>
<td>C+</td>
<td>2.33</td>
<td>77.0% - 79.9%</td>
</tr>
<tr>
<td>C</td>
<td>2.00</td>
<td>73.0% - 76.9%</td>
</tr>
<tr>
<td>C-</td>
<td>1.67</td>
<td>70.0% - 72.9%</td>
</tr>
<tr>
<td>D+</td>
<td>1.33</td>
<td>67.0% - 69.9%</td>
</tr>
<tr>
<td>D</td>
<td>1.00</td>
<td>60.0% - 66.9%</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>59.9 or below</td>
</tr>
</tbody>
</table>

An interim grade of Incomplete (I) may be assigned if the student has not completed all requirements for the course. An interim grade of 'I' shall not be assigned to a student who did not attend the course. The default grade accompanying an interim grade of 'I' shall be 'U' and will be displayed on the UB record as 'IU.' The default Unsatisfactory (U) grade shall become the permanent course grade of record if the 'IU' is not changed through formal notice by the instructor upon the student's completion of the course. Assignment of an interim 'IU' is at the discretion of the instructor. A grade of 'IU' can be assigned only if successful completion of unfulfilled course requirements can result in a final grade better than the default 'U' grade. The student should have a passing average in the requirements already completed. The instructor shall provide the student specification, in writing, of the requirements to be fulfilled.

6 **Course Fees**
Standard UB tuition and fees. No extra costs, except for students wishing to purchase the statistics handbook.

7 **Course Organization / Schedule**
Reference: [http://registrar.buffalo.edu/calendars/academic/](http://registrar.buffalo.edu/calendars/academic/)

C1. Feb 2 / Ceusters / Course introduction – Introduction to research and research proposals

Required reading pre-class:

Class structure:
- a) Participant and instructor introduction
- b) Course introduction, housekeeping rules, expectations, course project work
- c) Traditional lecture on the structure of research proposals

Post-class assignments:
- a) Required reading
- b) A0 Reflect about your research interests concerning your future MSc or PhD thesis and formulate a number of research topics. These topics should for BMI students fit at least one of the detailed learning objectives for biomedical informaticists described in the document ‘BMI504-Spring2022-topic-requirements.pdf’. For students outside the BMI department, any topic will do. Be prepared to present and discuss this informally in class C2. No prior submission needed.

C2. Feb 9 / Ceusters / Fundamentals of science and research

Required reading pre-class:
Class structure:
   a) Traditional lecture on (1) philosophy of science and research and (2) the scientific method
   b) Students will report on pre-class assignment (b) and explain their ideas, each presentation followed by discussion.

Post-class assignment:
   Required reading:
   [3] !!! This paper will be the topic of a closed book in-class test during class C3 !!!

C3. Feb 16 / Ceusters / Parameters for research designs

Pre-class reading:
   [3]

Class structure:
   a) T1: Assessment of R3: in-class test (closed book) followed by discussion of correct answers.
   b) Lecture introducing various research designs

Post-class assignment:
   a) Optional reading: 
         [4]
   b) Required readings:
         [5]
         [6]
   c) On the basis of the lecture and papers R4, R5 and R6, reflect further on concrete topics for your research proposal, and pick one for presentation during C4.

C4. Feb 23 / Ceusters / Planning of research projects

Pre-class readings:
       [4]
       [5]
       [6]

Class structure:
   Discussion of individual proposals. At the end of the class, the scope and goals of the projects should be clear.

Post-class assignment:
   a) A1: Taking into account the content of all previous BMI504 lectures and papers, students must write an outline for their individual research project in the spirit of the scientific method thereby adapting the original ideas discussed in class in such a way that Ioannidis’ features for assessing whether clinical research is useful come out positive for what they propose. This should be backed up by an initial literature study.  
      Due date: February 27 – noon.
   b) Required reading:
      [7] !!! This paper will be the topic of a closed book in-class test during class C5 !!!
C5. March 2 / Ceusters / Types of Bias

Pre-class reading:
https://jech.bmj.com/content/58/8/635 [7]

Class structure:
- a) Question answering re required reading
- b) T2: Assessment of R7: in-class test (closed book)
- c) Interactive lecture on various types of bias, followed by guided exercise.

Post-class assignment:
Suggested reading:
https://journals.lww.com/ijaweb/Fulltext/2016/60090/How_to_write_a_research_proposal_.4.aspx [8]

C6. Mar 9 / Ceusters / Qualitative research methods: theory and data collection methods

Pre-class reading:
https://journals.lww.com/ijaweb/Fulltext/2016/60090/How_to_write_a_research_proposal_.4.aspx [8]

Class structure:
Lecture on common qualitative data collection methods (Document Review, Observation, Interview (face-to-face), Focus Group Discussion, Ethnography, …)

Post-class assignment:
Required reading:

C7. Mar 16 / Ceusters / Mixed methods: Integration of quantitative and qualitative methods

Pre-class reading:

Class structure:
- a) The first part will be an interactive lecture covering the topic.
- b) The second part will consist of a guided discussion aimed at determining the best research design to (dis)confirm hypotheses proposed for the individual research projects and to include an experimental design requiring a mixed design if not yet present in the original research proposal.

Post-class assignment:
- a) A2: Students will update the first version of their research proposal (A1) so as to include all elements discussed in class and covered in the required readings thus far. Detailed instructions about format will be provided in class.  
  Due date: March 27 – noon
- b) Required reading:

C8. Mar 30 / Ceusters / Introduction to data analysis of quantitative and qualitative variables

Pre-class reading:
Class structure: interactive lecture

Post-class assignment:
A3: Based on the slides and references used in lecture C8, students must rewrite their individual research project so that it satisfies all requirements with respect to (1) the precise research question, (2) the null-hypothesis, (3) the statistical null-hypothesis, (4) determination of all relevant variables (independent and dependent variables plus suggested methods for computing outcome variables) and (5) theoretical and operational linkage. Detailed instructions about format will be provided in class.
Due date: April 3 – noon.

C9. Apr 6 / Ceusters / Elements of epidemiology

Class structure:
Lecture covering essential notions in population studies such as incidence, prevalence, mortality ratios, validity, reliability, sensitivity, and specificity, etc…

Post-class assignment:
a) A4 Update, where needed, the proposal on the basis of C9-materials. This version will be used by the instructor of C11 to make that class maximally relevant to the students’ research proposals.
Due date: April 10 – noon.

C10. Apr 13 / Ceusters / Descriptive and elementary statistics

Pre-class reading:
https://academic.oup.com/bjaed/article/7/4/127/466523
https://academic.oup.com/ajh/article/24/1/18/165807
!!! This paper will be the topic of a closed book in-class test during class C10 !!!

Class structure:
b) Lecture covering the theories and applications of average value, median, mode, variance, standard deviation, inter-quartile range, skewness, kurtosis, histogram, box and whisker plot.

Post-class assignments:
Suggested reference book:

C11. Apr 20/ Falls / Statistical analysis

Pre-class reading:
Suggested reference book:

Class structure:
Lecture plus guided group work on statistics relevant to the students’ research proposals. Completed assignments A4 will be used to determine the relevant content of the class. Possibilities are: Discrete and Continuous Distributions, the Normal Distribution,
the Central Limit Theorem, Population vs Sample, Hypothesis Testing and Confidence Intervals (Z-test, t-test, Chi-Square Test, Fisher Exact, non-parametric), Power and Sample Size Calculations for One and Two-Sample Hypothesis tests.

Post-lecture assignment:

**A5: Part 1:** For each student, questions will be designed addressing statistical problems relevant to the student’s individual research project. Students will be expected to formally answer these questions with full, detailed explanations.

**Part 2:** Students will be given a mockup biomedical dataset and a set of questions related to the dataset. They must use the statistical skills and tests they were taught in the lecture to assess the characteristics of the dataset and select and carry out the appropriate statistical tests to answer the questions posed.

**Due date:** April 24 – noon

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**C12. Apr 27 / Ceusters / Clinical trial design**

**Class structure:**
Lecture on cohort study design, clinical study design, analysis of clinical trials, randomized controlled clinical trials, sample size and power, survival analysis, missing data, 2x2 factorial designs, cross over designs.

**Post-lecture assignment:**

a) Required reading:

b) Students will complete their final research proposal (**A6**) and prepare a Powerpoint presentation (**A7**) of this proposal for formal presentation (**A8**) during **C14**.

**Due date for A6:** May 10 – noon
**Due date for A8:** May 1 – noon

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**C13. May 4 / Ceusters / Presentation of final research proposals (first group of students)**

**Class structure:** presentation of research proposals. Each student has 150 minutes divided by number of students participating, 75% of time for presentation, 25% for questions.

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**C14. May 11 / Ceusters / Presentation of final research proposals (second group of students)**

**Class structure:** presentation of research proposals. Each student has 150 minutes divided by number of students participating, 75% of time for presentation, 25% for questions.

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**C15. FINAL EXAM: May 18 / 10AM**

The final exam will be held online. It will be composed of questions and exercises covering the complete content of the course. Students may use any documentation they consider useful to consult during the exam, whether or not used during the course. They must do the exam however alone! Cameras need to be on all the time.

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**8 ATTENDANCE POLICY**

Students are expected to attend all classes. For religious observances, university sanctioned events, athletic commitments and family/work obligations/emergencies, absences may be granted upon request and subsequent approval by the course director prior to the absence. Requests are to be sent by email. Medical absence must be accompanied by a doctor’s note. Even if absence is granted, it can have an effect on the finally obtained grade (see grading policy) unless additional coursework in replacement for missed graded activities is performed.

For course cancellation/emergency planning, see the university website for cancellations/delays due to weather or other unforeseen events ([http://www.buffalo.edu/administrative-services/emergency-management/emergency-procedures.html](http://www.buffalo.edu/administrative-services/emergency-management/emergency-procedures.html))

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**9 ACADEMIC INTEGRITY**
• Academic integrity is a fundamental university value. Through the honest completion of academic work, students sustain the integrity of the university while facilitating the university's imperative for the transmission of knowledge and culture based upon the generation of new and innovative ideas. See http://grad.buffalo.edu/Academics/Policies-Procedures/Academic-Integrity.html.

• Students may collaborate for the assignments in which case the submitted materials should be clearly labeled as such, with the names of all collaborating students. In case students who collaborate cannot come to a consensus for certain parts of the work, alternate solutions proposed by individual students should be clearly marked as such. Grading of individual students will take into account such alternatives.

10 **CLASSROOM DECORUM**
Students are expected to arrive in due time for each class. Most lectures will start with a pre-lecture test to assess the student’s level of preparation for the class. This test contributes to the final grading. Use of cell phones and laptops is allowed for the purposes of the class, but not for private reasons. Additional rules of conduct, when applicable, will be explained by the instructors prior to the class.

11 **ACCESSIBILITY RESOURCES**
If you have any disability which requires reasonable accommodations to enable you to participate in this course, please contact the Office of Accessibility Resources, 25 Capen Hall, 645-2608, and also the course director of this course. The office will provide you with information and review appropriate arrangements for reasonable accommodations. https://www.buffalo.edu/studentlife/who-we-are/departments/accessibility.html.

12 **UNIVERSITY SUPPORT SERVICES**
Students are often unaware of university support services. For example, the Center for Excellence in Writing provides support for written work, and several tutoring centers on campus provide academic success support and resources.

13 **AVAILABLE RESOURCES ON SEXUAL ASSAULT**
UB is committed to providing an environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic and dating violence and stalking. You may call UB’s Office of Equity, Diversity and Inclusion at (716) 645-2266 for more information. https://www.buffalo.edu/equity.html

14 **COUNSELING SERVICES:**
As a student you may experience a range of issues that can cause barriers to learning or reduce your ability to participate in daily activities. These might include strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, health concerns, or unwanted sexual experiences. Counseling, Health Services, and Health Promotion are here to help with these or other concerns. You learn can more about these programs and services by contacting:

Counseling Services: 120 Richmond Quad (North Campus), phone 716-645-2720
202 Michael Hall (South Campus), phone: 716-829-5800
Health Services: Michael Hall (South Campus), phone: 716-829-3316
Health Promotion: 114 Student Union (North Campus), phone: 716-645-2837