Course Outline

Code: PUB701
Title: Epidemiology and Biostatistics

School: Health & Sport Sciences
Teaching Session: Semester 1
Year: 2019
Course Coordinator: Dr Mary Kynn  Phone: 07 5430 2839  Email: mkynn@usc.edu.au
Course Moderator: Dr Rachel Cole  Phone: 07 5459 4656  Email: rcole@usc.edu.au

Please go to the USC website for up to date information on the teaching sessions and campuses where this course is usually offered.

1. What is this course about?
   1.1 Course description
   This is an advanced course to develop specialised skills in epidemiology and biostatistics. You will design epidemiological studies to answer research questions, and collect, analyse and report on quantitative data. You will develop mastery in applying epidemiological and biostatistical concepts, critically analyse, reflect on and synthesise complex epidemiological research findings relevant to your professional area.

   1.2 Course topics
   Measures of health
   Epidemiological study designs, bias, confounding, and concepts of causation
   Simple sample size calculations
   Data collection strategies
   Analytical techniques in epidemiology, inferential techniques for categorical variables, non-parametric statistics, and regression

2. What level is this course?
700 level Specialised - Demonstrating a specialised body of knowledge and set of skills for professional practice or further learning. Advanced application of knowledge and skills in unfamiliar contexts

3. What is the unit value of this course?
12 units
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4. How does this course contribute to my learning?

<table>
<thead>
<tr>
<th>Specific Learning Outcomes</th>
<th>Assessment tasks</th>
<th>Graduate Qualities or Industry Standards mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>On successful completion of this course, you should be able to:</td>
<td>You will be assessed on the learning outcomes in task/s:</td>
<td>Completing these tasks successfully will contribute to you becoming:</td>
</tr>
<tr>
<td>Formulate hypotheses that can be addressed through epidemiological investigations</td>
<td>Task 2: Epidemiological study poster</td>
<td>Creative and critical thinkers.</td>
</tr>
<tr>
<td>Identify and apply techniques to reduce bias and control for confounding at the design</td>
<td>Task 3: Examination</td>
<td>Creative and critical thinkers.</td>
</tr>
<tr>
<td>and analysis phases of an epidemiological study.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collect and critically appraise information about epidemiological research designs and</td>
<td>Task 2: Epidemiological study poster</td>
<td>Empowered.</td>
</tr>
<tr>
<td>statistical analysis, to draw conclusions about public health significance</td>
<td>Task 3: Examination</td>
<td></td>
</tr>
<tr>
<td>Design and conduct a biostatistical analysis and produce a report.</td>
<td>Task 2: Epidemiological study poster</td>
<td>Empowered.</td>
</tr>
<tr>
<td>Identify and describe characteristics of, define terminology associated with, and</td>
<td>Task 1: On-line activities Task 3: Examination</td>
<td>Knowledgeable.</td>
</tr>
<tr>
<td>calculate measures relevant to, the epidemiological approach.</td>
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</tr>
</tbody>
</table>

5. Am I eligible to enrol in this course?
Refer to the USC Glossary of terms for definitions of “pre-requisites, co-requisites and anti-requisites”.

5.1 Enrolment restrictions
Nil

5.2 Pre-requisites
PUB708 and enrolled in SC713 OR enrolled in SC711 or SC740 or SC611 or ED705

5.3 Co-requisites
Nil

5.4 Anti-requisites
CPH361 or PUB761 or PUB361

5.5 Specific assumed prior knowledge and skills (where applicable)
Basic mathematical and statistical skills are assumed

6. How am I going to be assessed?
6.1 Grading scale
Standard – High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL)
6.2 Assessment tasks

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Assessment Tasks</th>
<th>Individual or Group</th>
<th>Weighting %</th>
<th>What is the duration / length?</th>
<th>When should I submit?</th>
<th>Where should I submit it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Project support activities</td>
<td>Individual and group</td>
<td>10%</td>
<td>N/A</td>
<td>Monday 10am</td>
<td>Blackboard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10%</td>
<td></td>
<td>Weeks 2, 3, 7, 11, 12</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Epidemiological poster</td>
<td>Group</td>
<td>35%</td>
<td>1200-1500 words</td>
<td>Monday Week 13</td>
<td>Blackboard</td>
</tr>
<tr>
<td>3</td>
<td>Exam</td>
<td>Individual</td>
<td>45%</td>
<td>2 hrs</td>
<td>Central examination period</td>
<td>In person</td>
</tr>
</tbody>
</table>

Assessment Task 1: On-line activities

**Goal:** To advance your knowledge and skills in applying foundational concepts relevant to epidemiological and biostatistical approaches.

**Product:** On-line activities including simulations, data collection and quizzes

**Format:** Various

**Criteria:** You will be assessed on your ability to:
- Identify and describe characteristics of, define terminology associated with, collect data and calculate measures relevant to, the epidemiological and biostatistical approach.
- Critically appraise information about epidemiological research designs and statistical analysis to draw conclusions about public health significance.

**Generic skill assessed:** Problem solving

**Skill assessment level:** Specialised

Assessment Task 2: Epidemiological study poster

**Goal:** To apply key biostatistical concepts to collect, organise and analyse data for the research proposal

**Product:** A3 poster

**Format:** A3 poster suitable for a scientific audience. Refer to Blackboard for format and details

**Criteria:** You will be assessed on your ability to:
- Formulate hypotheses that can be addressed through epidemiological investigation.
- Plan and conduct a biostatistical analysis and produce a scientific poster to communicate the results.

**Generic skill assessed:** Problem Solving, Applying technologies, Communication

**Skill assessment level:** Specialised
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Assessment Task 3: Examination

**Goal:** To apply your advancing skills of biostatistics and epidemiology to deconstruct papers and extracts, interpret statistical results, assess epidemiological research designs, as well as identifying the foundational concepts relevant to epidemiological and biostatistical approaches.

**Product:** Exam

**Format:**
- Open book
- Calculator required
- Two hours
- Mix of short answer and multiple choice questions

**Criteria:**
- Identify and apply techniques to reduce bias and control for confounding at the design and analysis phases of an epidemiological study.
- Critically appraise information about epidemiological research designs and statistical analysis, to draw conclusions about public health significance.
- Identify and describe characteristics of, define terminology associated with, and calculate measures relevant to, the epidemiological approach.

<table>
<thead>
<tr>
<th>Generic skill assessed</th>
<th>Skill assessment level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving</td>
<td>Specialised</td>
</tr>
<tr>
<td>Information literacy</td>
<td>Specialised</td>
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</table>

7. **How is the course offered?**

7.1 **Directed study hours**
13 weeks of blended delivery, inclusive of 10 x 2 hour computer labs across the semester

7.2 **Teaching semester/session(s) offered**
Online: Semester 1
Southbank: Semester 1

7.3 **Course activities**

<table>
<thead>
<tr>
<th>Teaching Week / Module</th>
<th>What key concepts/content will I learn?</th>
<th>What activities will I engage in to learn the concepts/content?</th>
<th>Directed Study Activities</th>
<th>Independent Study Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to epidemiological concepts, measuring disease frequency</td>
<td>Lecture, computer lab activities or on-line activities</td>
<td>Readings and/or on-line activities via Blackboard</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Study designs and ethical principals</td>
<td>Lecture, on-line activities</td>
<td>Readings and/or on-line activities via Blackboard</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Linking exposure and disease</td>
<td>Lecture, computer lab activities or on-line activities</td>
<td>Readings and/or on-line activities via Blackboard</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Sampling, error, power &amp; significance, Chi-squared test of independence</td>
<td>Lecture, on-line activities</td>
<td>Readings and/or on-line activities via Blackboard</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Bias, error and confounding</td>
<td>Lecture, computer lab activities or on-line activities</td>
<td>Readings and/or on-line activities via Blackboard</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Reading and writing epidemiological papers Understanding descriptive and inferential statistics</td>
<td>Lecture, on-line activities</td>
<td>Readings and/or on-line activities via Blackboard</td>
<td></td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Activities</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Analytical techniques for comparing data in two groups: t-test and Mann-Whitney U test</td>
<td>Lecture, computer lab activities or on-line activities</td>
<td>Readings and/or on-line activities via Blackboard</td>
</tr>
<tr>
<td>8</td>
<td>Analytical techniques for comparing data in more than two groups: ANOVA and Kruskal-Wallis test</td>
<td>Lecture, on-line activities</td>
<td>Readings and/or on-line activities via Blackboard</td>
</tr>
<tr>
<td>9</td>
<td>Association and causation, analytical techniques for evaluating associations between two continuous variables; correlation and regression; multiple regression</td>
<td>Lecture, computer lab activities or on-line activities</td>
<td>Readings and/or on-line activities via Blackboard</td>
</tr>
<tr>
<td>10</td>
<td>Analytical techniques for evaluating associations between two categorical variables, Chi-squared test and logistic regression</td>
<td>Lecture, on-line activities</td>
<td>Readings and/or on-line activities via Blackboard</td>
</tr>
<tr>
<td>11</td>
<td>Association and causation; critically reviewing evidence.</td>
<td>Lecture, computer lab activities or on-line activities</td>
<td>Readings and/or on-line activities via Blackboard</td>
</tr>
<tr>
<td>12</td>
<td>Disease prevention</td>
<td>Lecture, on-line activities</td>
<td>Readings and/or on-line activities via Blackboard</td>
</tr>
<tr>
<td>13</td>
<td>Screening programmes</td>
<td>Lecture, computer lab activities or on-line activities</td>
<td></td>
</tr>
</tbody>
</table>

Please note that the course activities may be subject to variation.

**8. What resources do I need to undertake this course?**

Please note that course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Blackboard site. Please log in as soon as possible.

**8.1 Prescribed text(s)**

Please note that you need to have regular access to the resource(s) listed below:

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Title</th>
<th>Publisher</th>
</tr>
</thead>
</table>
8.2 Required and recommended readings


SPSS has also been known as PASW and IBM SPSS, so any of these names may appear in book titles. At the time of writing, the version of SPSS used in the USC computer labs is Version 19, and the most current SPSS version in Version 20. By the time this course runs, the versions may differ. All recent versions of SPSS (say, version 17 and upwards) are all very similar:


8.3 Specific requirements

You need access to a basic calculator.

You need access to IBM SPSS. If you do not have access to SPSS elsewhere (for example, at your workplace), you will need to purchase SPSS. Unfortunately, student editions of SPSS are no longer available, and the USC licensing arrangements do not allow SPSS to be loaded onto student computers. However, you can access the software online through anywhere.usc.edu.au. You may be able to purchase SPSS from the USC Co-op bookshop. You may also wish to explore purchasing an SPSS license from (for example) www.onthehub.com. (At the time of writing, a six-month licence for IBM SPSS Statistics Base GradPack is about $60.)

9. Risk management

Health and safety risks for this course have been assessed as low.

It is your responsibility as a student to review course material, search online, discuss with lecturers and peers, and understand the health and safety risks associated with your specific course of study. It is also your responsibility to familiarise yourself with the University's general health and safety principles by reviewing the online Health Safety and Wellbeing training module for students, and following the instructions of the University staff.

10. What administrative information is relevant to this course?

10.1 Assessment: Academic Integrity

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.
In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Blackboard, are electronically checked through SafeAssign. This software allows for text comparisons to be made between your submitted assessment item and all other work that SafeAssign has access to.

10.2 Assessment: Additional requirements
Eligibility for Supplementary Assessment
Your eligibility for supplementary assessment in a course is dependent on the following conditions applying:
   a) The final mark is in the percentage range 47% to 49.4%
   b) The course is graded using the Standard Grading scale
   c) You have not failed an assessment task in the course due to academic misconduct

10.3 Assessment: Submission penalties
Late submission of assessment tasks will be penalised at the following maximum rate:
   • 5% (of the assessment task’s identified value) per day for the first two days from the date identified as the due date for the assessment task.
   • 10% (of the assessment task’s identified value) for the third day
   • 20% (of the assessment task’s identified value) for the fourth day and subsequent days up to and including seven days from the date identified as the due date for the assessment task.
   • A result of zero is awarded for an assessment task submitted after seven days from the date identified as the due date for the assessment task.

Weekdays and weekends are included in the calculation of days late.
To request an extension, you must contact your Course Coordinator and supply the required documentation to negotiate an outcome.

10.4 Study help
In the first instance, you should contact your tutor, then the Course Coordinator. Additional assistance is provided to all students through Academic Skills Advisers. To book an appointment or find a drop-in session go to Student Hub.
Contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au

10.5 Links to relevant University policy and procedures
For more information on Academic Learning & Teaching categories including:
   • Assessment: Courses and Coursework Programs
   • Review of Assessment and Final Grades
   • Supplementary Assessment
   • Administration of Central Examinations
   • Deferred Examinations
   • Student Academic Misconduct
   • Students with a Disability

Visit the USC website:
http://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching
10.6 General Enquiries

In person:
- **USC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **USC SouthBank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **USC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **USC Fraser Coast** - Student Central, Student Central, Building A, 161 Old Maryborough Rd, Hervey Bay

Tel: +61 7 5430 2890
Email: studentcentral@usc.edu.au