USC School of Pharmacy

Fall 2020:
RXRS 304: Mysterious Deaths: From Poisons in Literature and History to Forensic Toxicology

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Course Weight: 4 Units

Days/Time/Location: Wednesday 2:00- 4:50 VKC 161

Course catalogue description: The story of poisons and their deliberate use told through the prism of history and literature, as a fun way to discover forensic toxicology

Introduction
The use of poisons is weaved into human history, from the natural substances humans learned to use for healing to criminal purposes, to the man-made chemicals of the 20th century purposely designed for biological or chemical warfare. Poisons have fascinated and inspired story tellers and writers, occupying a prominent place in historical and fictional stories, in books and in movies. Sadly, the topic of poisons has not faded in time, as we are regularly reminded through the recounting of recent poisoning events, accidental or deliberate, by the media. This course will take advantage of this rich (but sometimes shameful) heritage to introduce students to major
classes of poisons, and to the basic concepts of forensic toxicology, balancing them against the beneficial (medicinal) use of some of these substances. The goal of the course is to expose students to a serious topic in a fun and entertaining manner, and trigger their curiosity for learning more on this topic in more advanced courses.

Objectives
The course is designed for undergraduates of both scientific and non-scientific majors with an interest in understanding how poisons are an integral part of human history. This will be done through topics such as the inclusion of poisons in cultural traditions and beliefs around the world; the intentional poisoning of American citizens by the government during the Prohibition in the 1920s-1930s, leading to the emergence of forensic toxicology in USA; and many more puzzling mysteries that have inspired writers such as Agatha Christie. Chapters from the required textbook will be supplemented with a variety of source materials, including passages of mystery novels, historical documentaries, media articles and book chapters. Selected cases studies will be critically reviewed and emerging “hot” topics in poisoning incidents discussed.

Upon successful completion of this course a student should be able to:
• Understand and discuss how poisons have influenced history and literature
• Understand the major reasons behind the danger of classical and novel poisons
• Understand the basic principles of forensic toxicology
• Know the history of forensic toxicology

Assignments and Grading:

Class participation: 20 pts (8%)
4 quizzes @ 10 pts each 40 pts (16%)
2 midterm exams @ 40 pts each: 80 pts (32%)
1 written report due on the day of the exam 50 pts (20%)
1 final exam (partially cumulative): 60 pts (24%)
Total: 250 pts.

Class Participation and Attendance (20 pts): On a scale of 10, 0-indicating no participation, 10-indicating best participation. You can therefore increase the probability of getting a higher mark by being proactive in terms of asking (relevant) questions in class and/or contributing to discussions.

Attendance at all classes is expected. Participation will include asking and answering questions and being actively involved in the discussion. It is expected that the students read the assigned papers prior to the lecture and be prepared to discuss background, current understanding, treatments, and gaps in knowledge for the topic in each lecture.

Written report: The class deliverable will be a 5 page write up on one of the chapters of the required text “The Poisoner's Handbook” by D Blum, or one of the extra class sources of information based on a toxin or poison of choice. On a scale of 50, 0-no deliverable turned in, 50-an excellent synopsis of the extracurricular source of information. It is expected that the students will engaged one of the extracurricular sources of information (one of the cited videos of 45
minutes or longer, reading of one of the recommended or suggested sources, or reading of one of
the reviewed pieces of literature [e.g. a book by Agatha Christie]) of a subject of interest.

The quizzes (10 points each) include 10 questions (multiple choice questions, T/F questions, fill-
in the blank questions). One of the quizzes will consist of short student oral presentations on a
topic of their choice.

The midterms (40 points each) will include multiple choice questions, and T/F questions and
fill-in the blank or short answer questions.

The final exam (60 points) will be similar format as the midterms. The final exam will be
cumulative, but will emphasize material covered after the 2\textsuperscript{nd} midterm.

There are no make-up exams. If exceptional circumstances prevent you from attending an exam,
your reason for missing it must be accompanied by a written statement from a third party (e.g. a
note from a medical doctor).

Notes, books, calculators, electronic dictionaries, regular dictionaries, cell phones or any other
aids are not allowed during exams.

Students will be asked to complete an anonymous critical evaluation of the course at its
completion.

Required Text:
The Poisoner's Handbook: Murder and the Birth of Forensic Medicine in Jazz Age New
York
Deborah Blum
ISBN-10: 014311882X
Available on Amazon for ~ $9.00 - $15.00

We will supplement the reading with segments from videos/movies on the poisons
discussed in class.

Course Readings

Required Readings (selected, short, easy to read chapters)

  Graham House, Science Park, Milton Road, Cambridge CB4 0WF, UK
  Great Claredon Street, OX2 6DP
- Kathryn Harkup. A is for Arsenic: The Poisons of Agatha Christie. (2015) Bloomsbury Sigma,
  1385 Broadway, New York, New York 10018.

Although not mandatory, it is strongly suggested that the students purchase these books for this course, as
it will provide a resource to reinforce and supplement the lectures on the use of poisons throughout literature
and history. The students will be able to use identified chapters in the text to support their learning process throughout the semester.

**Suggested articles to read:**

Holzman, RS. The Legacy of Atropos, the Fate Who Cut the Thread of Life. 89:241-249, 1998.


Other course materials including but not limited to the syllabus, supplemental reading assignments and additional handouts will be posted on [http://blackboard.usc.edu/](http://blackboard.usc.edu/). Students are encouraged to use the online discussions among students via Blackboard.

**Course Outline**

This course will be in the format of lectures given by instructors on specific topics. During each weekly session the instructor will engage the students with questions and draw comments or interpretations primarily based on the assigned reading. Students are expected to ask questions and participate in an interactive fashion.

**Course schedule is as follows:**
<table>
<thead>
<tr>
<th>Week &amp; Date</th>
<th>Topic</th>
<th>Subtopics to be Included</th>
<th>Assigned and Supplemental Reading</th>
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<tbody>
<tr>
<td><strong>Introduction and Background</strong></td>
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<tr>
<td>August 26 DD</td>
<td>Introduction; expectations and goals of this class. General overview of toxicology</td>
<td>● Basic principles of toxicology - Hazard, risk and exposure - Dose response</td>
<td>Website for those who want to know more about toxicology: <a href="https://toxtutor.nlm.nih.gov/index.html">https://toxtutor.nlm.nih.gov/index.html</a></td>
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<tr>
<td>Sep 2 MEC</td>
<td>Milestones in Forensic Analysis of Poisons</td>
<td>● Understand the development of assays to measure poisons ● Understand how forensic toxicology has progressed over time</td>
<td>- Introductory Chapter, Emsley, 2008 - Langman and Kapur, 2006 - Norris &amp; Gettler, NY Coroner's Office, 1918</td>
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<td>Sep 9 MC Quiz 1</td>
<td>History of the Use of Poisons: Overview</td>
<td>● Learn about famous poison victims ● Understand poison use in politics ● Understand how chemicals can be used as both medicines and poisons</td>
<td><a href="https://toxlearn.nlm.nih.gov/Module1.htm">https://toxlearn.nlm.nih.gov/Module1.htm</a></td>
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<tr>
<td>Sep 16 MC</td>
<td>Ricin</td>
<td>● Understand the use of ricin in history and literature ● Learn how ricin works and its use in political poisonings</td>
<td>Chapter 1, Emsley, 2008 Chapter R, Harkup, 2015 The Umbrella Assassin <a href="https://www.youtube.com/watch?v=b2Qwo8Utis">https://www.youtube.com/watch?v=b2Qwo8Utis</a></td>
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<tr>
<td><strong>MIDTERM 1 (first hour)</strong></td>
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<td>Sep 23 MC (Midterm1)</td>
<td>Cyanide: Nazi Regime, Tylenol, Jonestown Massacre and others</td>
<td>● Understand the historical uses of cyanide ● Learn about natural cyanides ● Understand how cyanide works</td>
<td>Chapter 8, Emsley, 2008 Chapter C, Harkup, 2015 Cyanides in Excedrin <a href="https://www.youtube.com/watch?v=0FQrGvAUs18">https://www.youtube.com/watch?v=0FQrGvAUs18</a> Hermann Goring <a href="https://www.youtube.com/watch?v=B6yn2eBSb2A">https://www.youtube.com/watch?v=B6yn2eBSb2A</a></td>
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<tr>
<td>Sept 30 MC</td>
<td>Environmental poisoning, Mercury and Lead</td>
<td>● Learn about poisons you are exposed to from the environment ● Learn about the history, medicinal use and toxicity of mercury and lead ● Learn about historical toxic accidents that affected humans</td>
<td>Chapters 2-4; 12-14, Emsley, 2005 Chapter A, Harkup, 2015 Kinter Lecture Arsenic <a href="https://www.youtube.com/watch?v=e1SsqUjKMFU">https://www.youtube.com/watch?v=e1SsqUjKMFU</a></td>
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<td>Oct 7 MEC Quiz 2</td>
<td>Arsenic</td>
<td>● Learn about the use of arsenic as a medicine and a poison in history and literature ● Lean about natural forms &amp; industrial use of arsenic</td>
<td>Chapters 2-4; 12-14, Emsley, 2005 One Man's Experience with Methyl Mercury Poisoning <a href="https://www.youtube.com/watch?feature=player_embedded&amp;v=e2Nsy0c22R8">https://www.youtube.com/watch?feature=player_embedded&amp;v=e2Nsy0c22R8</a> Website: <a href="http://www.environmentalhealthnews.org/">http://www.environmentalhealthnews.org/</a> Reference Movie: a civil action</td>
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<td>Oct 14 MC</td>
<td>Morphine and Morphine Like Compounds</td>
<td>● Understand the historical uses of opiates ● Review the use of opiates in literature ● Understand the medicinal uses and abuses of opiates</td>
<td>Chapter 4 Emsley, 2008 Chapter O, Harkup, 2015 Opioid Nation: The Making of an Epidemic <a href="https://www.youtube.com/watch?v=ygqalpOT3Tw">https://www.youtube.com/watch?v=ygqalpOT3Tw</a></td>
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<td><strong>MIDTERM 2 – Oct 21 (first hour)</strong></td>
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<td>Oct 21 MEC (Midterm2)</td>
<td>Methanol poisoning</td>
<td>● Understand the use of methanol in improper alcoholic drink production ● Understand how methanol and ethanol toxicities differ</td>
<td>Methanol poisoning <a href="https://www.youtube.com/watch?v=PsVwJBSfBAY">https://www.youtube.com/watch?v=PsVwJBSfBAY</a></td>
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<td>Oct 28 MC</td>
<td>Food as poison in the 1800-1900s and the birth of the</td>
<td>● Learn how people were exposed to various toxicants via the food they ate</td>
<td>“The Poison Squad” book by Deborah Blum</td>
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### Quiz 3 (short presentations)
**FDA in America**
- Learn how Wiley and his team of chemists fought to insure good quality food in USA.

**Nov 4 MC & TC**
- Renaissance poisons: Belladona, Henbane and Mandrake
- Poison Hemlock
- The Borgia Game!
- Understand the historical and cultural uses of plant alkaloids
- Understand the medicinal uses of materials derived from these plants
- Understand how they work

**Nov 11 MEC**
- Polonium and Thallium
- Understand the use of polonium and thallium in history and literature
- Understand how polonium and thallium kill

**Nov 18 MC Quiz 4**
- Carbon Monoxide
- Understand the toxicity of carbon monoxide
- Understand sources of carbon monoxide
- Understand how CO works

**Dec 2 MC**
- Botulinum toxin and BOTOX
- Understand how botulinum toxin works and historical poisonings
- Learn about the history and cosmetic and therapeutic uses of Botox

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### Statement on Academic Conduct and Support Systems

#### Academic Conduct:

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” [policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, [policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct).

#### Support Systems:

*Counseling and Mental Health* - (213) 740-9355 – 24/7 on call  
[studenthealth.usc.edu/counseling](http://studenthealth.usc.edu/counseling)  
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

*National Suicide Prevention Lifeline* - 1 (800) 273-8255 – 24/7 on call  
[suicidepreventionlifeline.org](http://suicidepreventionlifeline.org)  
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

*Relationship and Sexual Violence Prevention Services (RSVP)* - (213) 740-9355(WELL), press “0” after hours – 24/7 on call  
[studenthealth.usc.edu/sexual-assault](http://studenthealth.usc.edu/sexual-assault)
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

**Office of Equity and Diversity (OED)** - (213) 740-5086 | **Title IX** – (213) 821-8298  
equity.usc.edu, titleix.usc.edu  
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

**Reporting Incidents of Bias or Harassment** - (213) 740-5086 or (213) 821-8298  
usc-advocate.symplicity.com/care_report  
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

**The Office of Disability Services and Programs** - (213) 740-0776  
dsp.usc.edu  
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

**USC Campus Support and Intervention** - (213) 821-4710  
campussupport.usc.edu  
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

**Diversity at USC** - (213) 740-2101  
diversity.usc.edu  
Information on events, programs and training, the Provost’s Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

**USC Emergency** - **UPC**: (213) 740-4321, **HSC**: (323) 442-1000 – 24/7 on call  
dps.usc.edu, emergency.usc.edu  
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

**USC Department of Public Safety** - **UPC**: (213) 740-6000, **HSC**: (323) 442-120 – 24/7 on call  
dps.usc.edu  
Non-emergency assistance or information.