**Quinnipiac University**

**Frank H. Netter MD School of Medicine**

**Evolutionary Medicine**

**COURSE SYLLABUS**

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| **Fall 2016** |

**I. SELECTIVE DESCRIPTION**

**Course Goal:**Darwin's theory of evolution by natural selection is the central tenet of modern biology. Evolutionary, or "Darwinian" medicine offers a new perspective on human health. Application of Darwin's ideas to the evolution of pathogenic organisms, and consideration of their coevolution with their human hosts, has given modern medicine new insights into why we get sick and the ways in which we heal. Traditional medicine has focused on the proximate causes of diseases and treatment for their symptoms. By considering human health and disease from an evolutionary perspective, modern medicine is gaining new insights into why diseases occur, and how the human body is adapted to respond to them. In reality, it is the complex interplay of genes, environment, and human behavior that affects much of our health and illness experience today. In this course, we will survey conditions ranging from neonatal jaundice and colic to lower back pain and menopause and examine how evolutionary mechanisms may have predisposed modern humans to these conditions and others. Students will be expected to participate in weekly discussion of original research, leading one or more of the sessions, and complete a paper reviewing the evolutionary hypotheses for a disease process of their choosing.

**Learning Activities:** Each week, the class will focus on two different topics: some basic information about evolutionary theory, human evolution or immunology, and a topic related to human disease from childhood, through middle age, into senescence. Lectures about the evolutionary theory, human evolution, or immunology topic will be available to view online before class meetings. These videos are optional, but highly recommended. Each discussion session will be lead either by me or by a student. Students will sign up for a session to lead on the first day of class. I will provide 10-12 readings to the leader, who will be responsible for reading them, exploring related literature, and choosing which readings to assign the class for discussion. Each week’s reading will be finalized at least one week in advance, and all readings will be available on Blackboard.

**Learning objectives and assessment:**

By the end of the course, students will be able to

1. Describe situations and conditions of health (or illness) that appear to require both proximate and ultimate explanations rather than simply one or the other.

Students will make progress toward this learning objective by preparing for the discussions that they will lead, as well as by participating in other discussions. Students will critically read provided articles and book chapters, find additional resources about a topic, write an annotated bibliography of their reading, lead class discussion, and then write a short review of the discussion for their classmates. On weeks that they don’t lead discussion, students are still expected to read critically and discuss original research into topics of evolutionary medicine and participate in discussion relating the readings to the lecture of the week.

1. Demonstrate the ability to deconstruct an evolutionary argument and offer support for or against evolutionary hypotheses for specific conditions.

Part of the preparation for class discussion will involve critical examination of original research. The class discussion will revolve around the strengths and weaknesses of the evolutionary arguments made in the papers. Students will all present a poster at the end of the semester reviewing a disease and evaluating the current evidence suggesting that it has been shaped by evolutionary forces.

**II. REQUIRED RESOURCES**

We will rely heavily on chapters from *Evolutionary Medicine* (Trevathan WR, Smith EO, McKenna, JJ. 1999), supplemented with review and original research articles when appropriate. All readings will be available in pdf form on Blackboard.

**III. STUDENT ASSESSMENT AND GRADING POLICY**

**Assessment:**

Grading will be based on your performance during your weeks of leading discussion (50%), participation during other discussions (25%), and poster presentation (25%). All final grades will be pass-fail for medical students and A-F for undergraduates and other graduate students.

**Presentations:**

As part of your presentation days, you should read the articles/book chapters that I provide you, and choose which 3-4 articles/chapters you would like to assign the class to read. The week before your presentation, you should provide me with a list of the resources you would like to require your classmates to read and/or watch for your day so I can post them on Blackboard.

On the days you present, you are responsible for leading a discussion on the readings/videos you assigned to the class. Where applicable, relate the readings to the video of the lecture topic and to previous discussions. After the discussion, you are expected to write a 1-2 paragraph summary of the topic and resulting discussion for the class. Email me your write-up, and I will post it on Blackboard.

**Poster:**

Each student will design a scientific poster to present in lieu of a final exam or paper. Presumably many students will pick the topic they led discussion about, but any evolutionary medicine topic is fair game. While scientific posters typically present the results of original scientific research, in this case, you will present a broad overview of what is known and unknown about your topic, and ways you suggest to further test evolutionary hypotheses about the subject. We will spend 15-20 minutes in class many weeks talking about the logistics of designing and presenting posters, and you will have the opportunity to see and critique plenty of examples. Please let me know what you’re thinking about focusing your poster on by 10/27/16. Your poster must be completed and ready to send to the printer by 12/1/16. You will present your poster to the medical school faculty and students on 12/8/16 (during a small reception). The school will cover the cost of printing your posters. Students in the past have been surprised at how time intensive making a poster is. You have the benefit of a week of Thanksgiving break immediately before the poster is due. I would advise you to start earlier than that! I am happy to provide feedback on poster drafts if you send them to me well in advance of the final submission deadline.

**Grading Policy:**

The School of Medicine grades students in Medical Selectives as Pass/Fail. Each student receives a mid-term grade of pass or fail for all selectives. Any student receiving a fail will be brought to the attention of the concentration coordinators and the SRCC course director for review. At the completion of the semester medical students will receive a grade of Pass, Fail, or Incomplete. Additional information about grading policies can be found in the SRCC Course Description. Please refer to the School of Medicine Student Academic Policies for details regarding academic remediation programs for students who do not pass a selective.

**IV. COURSE POLICIES**

SRCC Course policies regarding exams, grading, and appeals are as described in the School of Medicine Student Academic Policies. Students are expected to follow the Code of Conduct as found in the Student Academic Policies. Violations of the code will be handled as outlined in the Student Academic Policies. Students are expected to maintain academic integrity at all times and must acknowledge the work of others and not present the work of others as their own.

**V. COMMUNICATION BETWEEN FACULTY AND STUDENTS**

All course materials will be available on Blackboard in folders by week. Please email me any pdfs to post for the class at least one week before the day you are scheduled to lead discussion.

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| ***Core Faculty*** | **Contact Information** |
| **Lynn Copes** | Office: MNH 302E  Email: [lynn.copes@quinnipiac.edu](mailto:lynn.copes@quinnipiac.edu)  Office hours: 2-3 PM every Thursday |

**VI. WEEKLY SCHEDULE**

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| **Date** | **Topic** | **Guest (live or via Skype)** | **Notes** |
| 9/1/16 | Intro to subject and class; pick sessions to lead | None |  |
| 9/8/16 | Natural selection / Conception, morning sickness, and miscarriage | Dr. Rebecca Zucconi, Netter SOM |  |
| 9/15/16 | Genetic drift / Skin color, folate, vitamin D, and pregnancy | Dr. Nina Jablonski, Penn State |  |
| 9/22/16 | Mismatch / Placentas, pre-eclampsia, and postpartum hemorrhage | Dr. Julienne Rutherford, Univ. of Illinois, Chicago |  |
| 9/29/16 | Tradeoffs / Neonatal jaundice, otitis media, and colic |  |  |
| 10/6/16 | Adaptation / Breastfeeding, cosleeping, and SIDS | Dr. Katie Hinde, Arizona State Univ. |  |
| 10/13/16 | Hygiene hypothesis / Allergies, asthma, and autoimmune diseases | Dr. Moran-Crusio, Netter |  |
| 10/20/16 | Life history / Onset of puberty, incest avoidance, and reproductive choices | TBA |  |
| 10/27/16 | First hominins and bipedalism / Low back pain, chronic degenerative diseases, and birth | Dr. Holly Dunsworth, Univ. of Rhode Island |  |
| 11/3/16 | Pathogen evolution / Antibiotic resistance, infectious disease, and iron deficiency |  |  |
| 11/10/16 | NO CLASS: Dr. Copes is away |  |  |
| 11/17/16 | The Thrifty Geno/Phenotype Hypothesis / Paleolithic nutrition, obesity, and metabolic syndrome |  |  |
| 11/24/16 | NO CLASS – THANKSGIVING BREAK |  | |
| 12/1/16 | Cultural evolution / Stress, inflammation, society |  |  |
| 12/10/16 | POSTER DAY |  |  |