Syllabus
This 3-credit course conveys the molecular mechanisms by which drugs act in the body and the principles of drug design. It highlights the importance of medicinal chemistry as it overlaps with the disciplines of chemistry, biochemistry, microbiology, cell biology, and pharmacology.
Most lectures are split into two parts. Part 1 lasts 40-45 minutes and loosely follows the flow of the textbook. Following a short questions/answers break, Part 2 will be more relaxing, and we will take a trip back in time and review an example of the “Most important drugs in history”. These are world changing, famous compounds that have had a significant impact on civilization.

Prerequisites
Organic Chemistry and Background in Biology or Biochemistry or Permission

Lecturers
Dr. Wolfgang Dostmann, Larner College of Medicine, wdostman@uvm.edu
Dr. Brent Osborne, Larner College of Medicine, bosborne@uvm.edu

Format
Windows Teams (details will be announced on Blackboard shortly). All lectures will be live and fully remote. All lecture materials (recorded lectures, ppt files, handouts, etc) will be made available through Blackboard.
Note: attendance during the live Teams lectures is not mandatory (you can watch the lectures later, should you have time conflicts).

Time
Tuesdays and Thursdays 11:40 am – 12:55 pm, remotely on Teams

Discussion Forum
Thursdays, 2-3 pm, remotely on Teams

Required Textbook
An Introduction to Medicinal Chemistry (6th Ed), Graham L. Patrick, Oxford Press, 2017
The textbook is an essential component of the course. You will be using it a lot! It is a “fun” book too.

Examination Format
Throughout the course students will be taking four, 75-minute exams. Exams will be given remotely through Blackboard. All exams are essentially cumulative.
Extra Credit
All Students who wish to obtain extra credit can do so by submitting up to two papers on a subject approved by the course director. Each paper is approximately worth an additional 5-7% of any of your exams (equivalent of a full letter grade bump up). Details on deadlines, paper format and topics will be posted on Blackboard before the first exam. The additional term paper(s) need to be on a drug considered to be one of the “most important drugs in history”. The paper(s) should include the drug’s discovery, structure, chemical properties, synthesis, biological effects and historical significance. Students will be graded 0-10 points on the thoroughness and quality of their paper. Graduate Students taking the course for graduate school credit will have to submit an additional term paper on a drug considered to be one of the most important drugs in history. Students will be graded (pass/fail) on the thoroughness and quality of their paper.

Course Schedule

Part I: Drug Targets
09/01 Lecture 1: Dostmann
   Introduction
   Intermolecular bonding forces
   *Most important drugs in history: Salvarsan*
09/03 Lecture 2: Dostmann
   Proteins: Structure/Function
   Enzymes: Structure/Function
   *Most important drugs in history: Penicillin*
09/08 Lecture 3: Dostmann
   Receptors: Structure/Function
   Receptors: Signal Transduction
   *Most important drugs in history: 6-Mercaptopurine*
09/10 Lecture 4: Dostmann
   Nucleic acids: structure and function
   *Most important drugs in history: Thalidomide*
09/15 Lecture 5: Dostmann
   Enzymes and Receptors as drug targets
09/17 **EXAMINATION 1**
09/22 Lecture 6: Dostmann
   Nucleic acids as drug targets
   *Most important drugs in history: Ivermectin*
09/24 Lecture 7: Pharmacokinetics I
   *Most important drugs in history: Hydrocortisone*

09/29 Lecture 8: Pharmacokinetics II
   *Most important drugs in history: Librium*

**Part II: Drug discovery, design and development**

10/01 Lecture 9: Drug discovery: finding a lead I
   *Most important drugs in history: AZT*

10/06 Lecture 10: Drug discovery: finding a lead II
   *Most important drugs in history: Cyclosporine I*

10/08 Lecture 11: Rational Approaches to Lead Discovery I
   *Most important drugs in history: Thorazine*

10/13 Lecture 12: Rational Approaches to Lead Discovery II

10/15 **EXAMINATION 2**

10/20 Lecture 13: Drug design: optimizing target interactions
   *Most important drugs in history: Sumatriptan I*

10/22 Lecture 14: Drug design: optimizing access to the target I
   *Most important drugs in history: Sumatriptan II*

10/27 Lecture 15: Drug design: optimizing access to the target II
   *Most important drugs in history: Quinine I*

10/29 Lecture 16: Drug Design: Novel design strategies
   *Most important drugs in history: Quinine II*

**Part III: Selected topics in medicinal chemistry**

11/03 Lecture 17: Anti-ulcer agents I
   *Most important drugs in history: Cimetidine*
11/05 Lecture 18: Anti-ulcer agents II
   Most important drugs in history: Omeprazole

11/10 Examination 3

11/12 Lecture 19: The challenges of getting a drug to the market I

11/17 Lecture 20: The challenges of getting a drug to the market II

11/19 Lecture 21: Antibiotics

11/24 No Class - Thanksgiving Recess

11/26 No Class - Thanksgiving Recess

12/01 Lecture 22: Opioid analgesics I
   Most important drugs in history: Methadone

12/03 Lecture 23: Opioid analgesics II
   Most important drugs in history: Artemisinin

12/8 Examination 4 - Final 1:30pm-4:15pm