Scheduled meeting times:
Monday (Lecture) Noon – 1 PM, Monday (Laboratory) 4-6:30 PM,
Room = Higgins 156
or
Monday (Lecture) Noon – 1 PM, Thursday (Laboratory) 3-5:30 PM,
Room = Higgins 156


Instructor:
Fr. Cyril P. Opeil, S.J., Ph.D.
Assistant Professor
Office: Higgins Hall 330K, 617-552-8450
Experimental Laboratory: Higgins Hall 130, 617-552-3589
Office Hours: As posted at 330K, Tuesday and Wednesday 10 AM-Noon and by appointment. If I am not in my office, look in Higgins 130.

To contact Fr. Opeil, S.J. outside of class the most efficient way is via email: opeil@bc.edu, please feel free to call at 2-8450 or 2-3589 but do not leave a phone message.

Graduate Assistants:
Marco Almeida, email: ALMEIDME@bc.edu, 552-3589, Office: Higgins Hall 130
Claudiu Hapenciuc, email: Hapenciuc@bc.edu, 552-1821, Office: Higgins Hall 328

**Course Description:** This course (2 credit) is designed as an introduction into the basics of contemporary electronics (resistors, capacitors, transistors, integrated circuits, etc.). The primary focus of this course is a series of laboratory exercises created to give a hands-on building of analogue and digital circuits along with a knowledge of their integrated function. Additionally, this course content will include instruction and use of LabView computer programming that features automated experimental data input, recording, retrieval and analysis. Lectures, scientific article reading assignments, textbook readings, homework problems are provided to aid the student in understanding the "physics behind" and "application of" electronic components in circuits.

**Attendance, Participation and Academic Honesty:** Continuity and active participation are crucial to the success of this course. You are responsible for all information from each class session (lecture or laboratory) whether you attend or not. Since this is a laboratory course, all laboratory assignments must be performed at the assigned times or
during the two "laboratory make-up days" included in the schedule. The laboratory exercises are designed to be completed in a 2-2.5 hours period. Missing laboratory exercises beyond this accommodation will negatively effect your grade in the course. Absences due to excused absence sports activities are to be discussed with the instructor prior to the planned absence. Academic honesty is expected at all times in accordance with published Boston College policies.

**Textbook Reading Assignments:** Members of this course are responsible for reading particular pages in the textbook on a weekly basis. Textbook pages will be assigned as we proceed through the course.

**Homework Exercises:** Occasionally homework problems will be assigned, usually on a Monday, throughout the course to emphasize certain skills. The Course Schedule below lists when assignments are due.

**Notebooks:** All work in the laboratory should be appropriately recorded in your notebook. A Xerox copy of your notebook work from the previous week's laboratory exercise is due on the following Monday. Please, put your name on all assignments before submitting them. Notebooks will be provided to the students.

**Answers to the Questions:** At the end of the laboratory exercise there should be a series of questions or an assignment. Answers to the questions are due at the same time as the copy of your note book, but separate from it. These will be graded separately from the notebook copies. Typed answers are preferred, but neatly hand written responses will be acceptable.

**Laboratory Exercises:** Always bring your lab books to the laboratory. All work is to be recorded in the lab book. At the beginning of each laboratory period an exercise will be distributed. The exercises have been tailored to be accomplished by one student in our given laboratory time period (2.5 hours). All equipment: OCR, voltmeters, circuit components, wires, breadboards, wire connectors etc. will be supplied by the Instructor. Students should try to accomplish the laboratory exercise by themselves, but should feel free to ask questions of the Instructor and the TA to facilitate progress.

**Reading Assignments:** Short scientific articles are scheduled to be read throughout this course. A short multiple choice question quiz will be given on each reading according to the Course Schedule and Reading Assignments List below.

**Midterm and Final Exams:** A written midterm and oral final exam are to be given according to the Course Schedule listed below. These exams will not include anything from the weekly scientific articles.

**Eating and Drinking:** Absolutely no food or beverages are to be brought into or consumed in the lecture room or into the laboratory. Consumption of food and or beverages in the laboratory is absolutely forbidden because of accidents that might
cause harm to persons or to equipment. Not consuming of food and or beverages in the lecture hall is a matter of simple courtesy and civility.

Disabilities: If you have a disability and will be requesting accommodations for this course, please register with Kathy Duggan [kathleen.duggan@bc.edu], Associate Director, Academic Support Services, The Connors Family Learning Center (learning disabilities and ADHD) or Suzy Conway [suzy.conway.1@bc.edu], Assistant Dean for Students with Disabilities (all other disabilities). Advanced notice and appropriate documentation are required for accommodations.

Course Grading:
Reading Assignments: 15%
Midterm Exam: 20%  Final Exam: 20%
Lab Reports: 25%  Questions/Homework Prob.: 20%

PH409 Course Schedule Fall 2008
M September 1  Labor Day  no class
T September 2  Classes begin at BC
Th September 4  LEC 01, Introduction, Roster, Syllabus, Expectations, Components, & Laboratory Safety
M September 08  LEC 02, LAB A01: Measuring R, AC Volts (RMS) and DC Volts
   Homework: Kaleidagraph and Origin Laboratory Exercise Due by email
Th September 11  LAB B01: Measuring R, AC Volts (RMS) and DC Volts
   Homework: Kaleidagraph and Origin Laboratory Exercise Due by email
M September 15  LEC 03, LAB A02: R-L//C Resonance Circuit
   Reading Assignment: RA01 quiz
Th September 18  LAB B02: R-L//C Resonance Circuit
M September 22  LEC 04, LAB A03: Diodes, P-N Junction & LEDs
   Reading Assignment: RA02 quiz
Th September 25  LAB B03: Diodes, P-N Junction & LEDs
M September 29  LEC 05, LAB A04 Transistor Gate
   Reading Assignment: RA03 quiz
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Th October 02  LAB B04: Transistor Gate
M October 06  Mid-term exam, LAB A05: Transitors/Operational Amplifier
Th October 09  LAB B05: Transitors/Operational Amplifier
M October 13  Columbus Day  no class
Th October 16  Make up lab day.
M October 20  LEC 06, LAB A06: Operational Amplifier
   Reading Assignment: RA04 quiz
Th October 23  LAB B06: Operational Amplifier
M October 27  LEC 07, LAB A07: Boolean Logic Gates
   Reading Assignment: RA05 quiz
Th October 30  LAB B07: Boolean Logic Gates
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M November 03  LEC 08, LAB A08: The 555 Timer
   Reading Assignment: RA06 quiz
Th November 06  LAB B08: The 555 Timer
M November 10  LEC 09: LAB A09: LabView1 T/Cs and Specific Heat of Metals
   Reading Assignment: RA07 quiz
Th November 13  LAB B09: LabView1 T/Cs and Specific Heat of Metals
M November 17  LEC 10, LAB A10: LabView2 P-N Junction & LEDs
   Reading Assignment: RA08 quiz
Th November 20  LAB B10: LabView2 P-N Junction & LEDs
M November 24  LEC 11: LAB A11- LabView3: Operational Amplifier
   Reading Assignment: RA09 quiz
Th November 27  Thanksgiving Holiday  no class
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M December 01  LEC 12, Make up lab day
   Reading Assignment: RA10 quiz
Th December 04  LAB B11- LabView3: Operational Amplifier
M December 08  LEC 13 – Review for final exam.
   Reading Assignment: RA11 quiz
T December 09  Study day
W December 10  Study day-- Special Lecture: by Dr. Peter Littlewood at 4PM
Choose one of the following days on which to schedule your final oral exam.
   December 11  Exam day
   December 12  Exam day
   December 15  Exam day
   December 16  Exam day
   December 17  Exam day
   December 18  Exam day

PH409 Reading Assignment List Fall 2008

These readings are available on cd, extra copies are available upon request from Fr. Opeil, S.J. Students will note that several articles have been taken from: Scientific America: The Solid-State Century, Special Issue Vol. 8, No. 1, 1997. Both the separate articles and the whole issue are provided for your convenience.


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—from The Dance of the Solids

The Solid State, however, kept its grains
Of Microstructure coarsely veiled until
X-ray diffraction pierced the Crystal Planes
That roofed the giddy Dance, the taut Quadrille
Where Silicon and Carbon Atoms will
Link Valencies, four-figured, hand in hand
With common Ions and Rare Earths to fill
The lattices of Matter, Glass or Sand,
With tiny Excitations, quantitatively grand.

by John Updike (collected in Midpoint and Other Poems, Alfred A. Knopf, 1969)