

## RTA321, Introduction to Tangible Media.

### Semester & Year

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Office Location: IMA-403

Office Hours: Tuesday, 9am – 4pm (by appointment)

### About the Course

*This course is designed for students with no or little previous experience with electronics, and no particular aptitude at mathematics. Starting with fundamental concepts of voltage, current, and resistance, the course engages students in a series of hands-on labs. Each lab builds upon the information covered in previous labs. These exercises demonstrate in detail how to design and build simple control and sensing circuits useful in a wide range of artistic projects. Emphasis is placed upon digital technologies which can be utilized cheaply and with minimal tools and equipment.*

### Course Goals

*To become familiar with the basic principles of electronics, and develop a pragmatic sense of how circuits are designed, tested, and incorporated into a variety of art-forms. Topics covered are series and parallel circuits, prototyping basics, digital and analog phenomena, alternating vs. direct current, resistors, capacitors, light-emitting diodes, oscillators, sensors, sequencers, embedded controllers, motors and motor control.*

### Teaching Mode

*This course makes use of the "bottom up" approach, whereby the student first becomes familiarized with a range of tools and techniques, and then uses those techniques as sources of inspiration for art-making. At the beginning of each class, the instructor will deliver a lecture on the week's topic, and the rest of the class will be devoted to students assembling actual circuits. Laptops must remain closed during the lecture segment unless otherwise specified. Students are encouraged to continue working on their circuits outside of class.*

## Weekly Outline

Week	Topic/Activities:
	<b>NOTE: The instructor may deviate somewhat from the following schedule if he feels the class needs more or less time for a given project.</b>
1	"HELLO, MY NAME IS _____" <ul style="list-style-type: none"> <li>* Course mechanics: scope of course, course supplies, general course strategy and philosophy.</li> <li>* Voltage, Current, and Resistance.</li> <li>* The common sense of Ohm's Law.</li> </ul>
2	"What? You still haven't bought your lab kit?" <ul style="list-style-type: none"> <li>* Introduction to soldering ("wall wart" modification)</li> <li>* Breadboarding basics.</li> <li>* Resistor colour-coding.</li> <li>* Light emitting diodes (LEDs).</li> </ul>
3	"Flash It!" <ul style="list-style-type: none"> <li>* Series and Parallel circuits.</li> <li>* Digital vs. Analog phenomena.</li> <li>* What is an oscillator?</li> <li>* Capacitors.</li> <li>* Building an LED-flasher using the 555 integrated circuit.</li> </ul>
4	"The Soft Life" <ul style="list-style-type: none"> <li>* Intro to the Arduino embedded controller system and the 'C' programming language.</li> <li>* Using the Arduino's digital inputs and outputs.</li> <li>* Emulating last week's LED-flasher using software.</li> <li>* Trade-offs between hardware and software solutions.</li> </ul>
5	"Driving the Neighbors Crazy, Part 1" <ul style="list-style-type: none"> <li>* Variable resistors, including Photo-cells, Thermistors, and Pots (Potentiometers).</li> <li>* Using a Pot and a 555 to alter the LED-flasher's frequency.</li> <li>* Electromagnetism, Microphones, and Loudspeakers.</li> <li>* Converting the LED-flasher to a variable tone generator.</li> </ul>
6	"Killing Me Softly" <ul style="list-style-type: none"> <li>* Emulating last week's tone generator using software.</li> </ul>
7	"Driving the Neighbors Crazy, Part 2" <ul style="list-style-type: none"> <li>* Frequency Modulation (FM).</li> <li>* Demonstrating FM using two 555 oscillators.</li> <li>* Transistor basics.</li> <li>* The TIP-120 all-purpose transistor.</li> <li>* Increasing the volume of the tone generator by adding a transistor.</li> </ul>
8	"Driving the Neighbors Crazy, Part 3" <ul style="list-style-type: none"> <li>* Emulating last week's project using software.</li> </ul>
9	"Moving Day, Part 1" <ul style="list-style-type: none"> <li>* Introduction to Sequencers.</li> <li>* Intro to the 4017 (Divide-by-10 Counter) chip.</li> <li>* Electromechanical Devices: DC Motors, Solenoids and Relays.</li> <li>* Using a 555 + 4017 + TIP-120 to sequence these devices.</li> </ul>
10	"Moving Day, Part 2" <ul style="list-style-type: none"> <li>* Solid-State Relays.</li> <li>* Using a 555 + 4017 + SSR to sequence 110 vac devices.</li> </ul>
11	"Moving Day, Part 3" <ul style="list-style-type: none"> <li>* Software-based Sequencers</li> </ul>
12	"Zap.. you're converted!" <ul style="list-style-type: none"> <li>* Digital-to-Analog and Analog-to-Digital Conversion, using the Arduino.</li> </ul>
13	Class #13: Fall Term Final Exam

## Assessment of Student Performance

Class participation is a critical requirement of the course. This is understood to be not only attendance but also the demonstration of active interest in the weekly projects and an overall positive contribution to the classroom environment.

At the end of the Fall Semester, there will be an open-book Final Exam. Also, from time to time, unannounced in advance, there will be brief open-book quizzes.

Marks for the entire course will be allocated on the following basis:

Weekly class participation: 50%  
Quizzes: 20%  
Final Exam, Fall Semester: 30%

For those students who feel their energies would be better spent designing web-sites, making videos, etc., I am offering them an option: In exchange for a locked-in mark of "C minus", they need not attend MPM308 classes for the rest of the Fall semester. Instead, they must write and present to me before the end of that semester a 1000+ word essay in hard copy form on a topic agreed upon by both the instructor and student. Requests for the "C minus" option must be in writing and handed to the instructor no later than the end of September.

Final Grades will be posted on the Ryerson Blackboard website.

## Course Supplies

"Norm" electronics lab kit, available from Above All Electronics, 635 Bloor St. West (about 2 blocks West of Bathurst) at a cost of approximately \$40. (The kits should be ready for pickup as of noon, Monday, Sept 9<sup>th</sup>).

A loose-leaf binder with 8-1/2 X 11 inch paper, for taking notes and storing hand-outs.

## Resources

CMOS Cookbook, by Don Lancaster, Revised by Howard M. Berlin. Published by Newnes.  
ISBN 0-7506-9943-4.

Inter/Access (artist run centre focusing on electronics and telecommunications)  
9 Ossington Ave., Toronto.  
Website: <http://www.interaccess.org>

Parts/tools retail:

Active Surplus	347 Queen St. West, Toronto	416-593-0909
Above All Electronics	635 Bloor St. West, Toronto	
Active Components	3790 Victoria Park, North York	416-498-9886
College Home Hardware	306 College St., Toronto	416-922-1158
Creatron Electronics	255 College St. West, Toronto	416-977-9258
Jacob's Hardware	410 Queen St. West, Toronto	516-504-7764
Atlas Machinery	233 Queen St. West, Toronto	416-588-3553

## Appendix (General information for all RTA students)

### **Student Codes of Conduct**

All students are required to adhere to all relevant University policies, such as the Student Code of Non-Academic Conduct (see <http://www.ryerson.ca/content/dam/senate/policies/pol61.pdf> ) and the Student Code of Academic Conduct (see <http://www.ryerson.ca/content/dam/senate/policies/pol60.pdf> ).

### **The Ryerson University Undergraduate Course Calendar**

This is your resource for all information relating to academics, including curriculum, course descriptions, significant dates (including last date to drop a course without academic penalty), academic standings, The Student Code of Academic & Non-Academic Conduct, etc. The Ryerson University Undergraduate Course Calendar is available online at <http://www.ryerson.ca/undergraduate/calendars/>.

### **RTA Website**

At [www.ryersonrta.com](http://www.ryersonrta.com) you will find information about the curriculum, course outlines, scholarships, student groups, staff & faculty, studios & facilities, etc.

### **Blackboard Course Website**

Blackboard is an online course tool which may include an online discussion board, course documents such as the syllabus and lecture notes, announcements, an area where your grades are posted, etc. If your professor has set up a Blackboard site for this course, you'll find it at <http://my.ryerson.ca>.

### **RTA Online**

RTA Online is an Organization on Blackboard that contains templates for storyboards, production paperwork, etc., as well as online tutorials for software and equipment used in classes and labs. Find it under 'Organizations' on your my.ryerson.ca homepage.

### **Your Ryerson Email Account:**

The RTA School of Media will often send you important information by email (e.g. scholarship information, reminders of important dates, notification of meetings and/or events, internship opportunities and job postings, etc.). Correspondence from RTA and from your professors will be sent ONLY to your Ryerson email account. It is your obligation to ensure that you activate your account and check it regularly, or have it forwarded to an account you check regularly. Please use only your Ryerson account for sending emails to staff & faculty. See below for accessing your Ryerson email account.

### **Activating Your Ryerson Online Identity**

To access many of Ryerson's online resources, you must first activate your Ryerson online identity by completing a series of web forms available via <http://www.ryerson.ca/accounts/>. During the activation process, you will obtain a username and create your initial password. Once activated, your Ryerson online identity provides you with access to:

- Google Apps
- Ryerson email
- The Central Computer Labs including the Library and KHW71
- The my.ryerson portal and learning system
- RAMSS (via <https://my.ryerson.ca>)
- Other servers and applications needed

### **Notice to Students with Disabilities:**

Students with any disability (e.g. learning, medical, physical, sensory), illness, or condition that requires academic adaptations should discuss the situation with the professor and/or contact the Access Centre (<http://www.ryerson.ca/accesscentre>).

### **Written Assignments:**

All written assignments are expected to be properly formatted and cited using **MLA style** (unless otherwise indicated by your professor). Guides and references for using MLA style can be found through the Ryerson University Library as well as the Writing Centre. See <http://writingcentre.blog.ryerson.ca/files/2012/05/MLA.pdf>

### **Fact-Based Media Assignments**

For assignments or projects in which real people and/or real events are to be featured (e.g. news stories, features, documentaries, interviews, etc.), students are expected to adhere to the highest standard of truth in reporting: all information included should be checked for accuracy and any guests/interviews/sound clips/etc. used must be real. Fabricating interviews or information, or using actors/friends to pose as someone they are not, etc. for the sake of an assignment are serious transgressions of media ethics and will not be tolerated.

### **English as a Second Language:**

Ryerson University offers support to students who may require improvement in their overall English language communication skills. Please visit **English Language Support** at [www.ryerson.ca/student-services/els/](http://www.ryerson.ca/student-services/els/)

### **Accommodation of Student Religious Observance:**

At the start of the term, students who have religious observance obligations which will lead to absences from campus or academic activities during the semester should download the "Student Declaration of Religious Observance" form from <http://www.ryerson.ca/senate/forms/reobservforminstr.pdf>. Present a copy of the form to the professor **within the first two weeks of classes**. The professor and student will then consult to reach an agreement on a reasonable means to address the situation.

### **Learning Success**

Learning Success (<http://www.ryerson.ca/learningsuccess>) helps students make the transition to university learning, develop sound learning strategies through tutoring options and course-based study groups, and achieve their academic potential by providing services in both traditional and virtual learning environments. Learning Success offers free workshops for students such as: Note-taking, Managing Tasks and Time, Ways of Learning, Critical Reading, Test Preparation and Test Anxiety, etc.

### **Plagiarism:**

Plagiarism is defined by the University as "claiming the words, ideas, artistry, drawings, images or data of another person as if they were your own." (Student Code of Academic Conduct, Ryerson University, 2006, p. 2). According to the Code, plagiarism includes:

- i. copying another person's work (including information found on the Internet and unpublished materials) without appropriate referencing;
- ii. presenting someone else's work, opinions or theories as if they are your own;
- iii. presenting another's substantial compositional changes to an assignment as your own;
- iv. working collaboratively without permission of the instructor on an assignment, and then submitting it as if it was created solely by you; or
- v. submitting the same work, for credit, in two or more courses without the prior written permission of the instructor(s). (Student Code of Academic Conduct, Ryerson University, 2006, p. 2.)

Usually one associates plagiarism with written works but it can include any work such as photographs/artwork, Internet materials, video, audio, and digital media. **The University penalties for plagiarism can be severe, ranging from getting zero on the assignment up to, in cases of prior academic dishonesty, suspension or expulsion.** Please note that you may be required to submit some or all of your written assignments to [www.turnitin.com](http://www.turnitin.com). Students who do not want their work submitted to this plagiarism detection service must, by the end of the second week of class, consult with the instructor to make alternate arrangements.

### **Useful links to help you understand and avoid plagiarism:**

Ryerson's Academic Integrity web site: <http://www.ryerson.ca/academicintegrity/>  
Student Code of Academic Conduct policy: <http://www.ryerson.ca/senate/policies/pol60.pdf>

### **Cheating:**

Cheating is defined by Ryerson University as:

- i. using materials or aids not expressly allowed by the instructor in an examination or test;
- ii. copying another person's answer(s) to an examination or test question; copying another person's answers to individually assigned projects;

- iii. consulting with another person or unauthorized materials outside of an examination room during the examination period (e.g. discussing an exam or consulting materials during an emergency evacuation or when permitted to use a washroom);
  - iv. improperly submitting an answer to a test or examination question completed, in whole or part, outside the examination room unless specifically permitted by the examination format;
  - v. resubmitting altered test or examination work after it has already been evaluated;
  - vi. presenting falsified or fabricated material, including research results; or
  - vii. improperly obtaining, through deceit, theft, bribery, collusion or otherwise, access to examination paper(s) or set of questions, or other confidential information.
- (Student Code of Academic Conduct, Ryerson University, 2006, p. 2)

**The University penalties for cheating can be severe, ranging from getting zero on the assignment or test up to, in cases of prior academic dishonesty, suspension or expulsion.**

#### **Use of Laptops, Cell Phones, and Other Mobile Electronic Devices in the Classroom**

Students are advised that because various learning & teaching activities may be enhanced or diminished by use of mobile devices, it is up to each professor to determine when & how such devices can or should be used by students during any given class.

Students may not take pictures, video recordings, or sound recordings in class without express permission from the professor.

#### **RTA Policy on Offensive Materials**

RTA School of Media desires to foster an environment that promotes and embraces the principles of freedom of expression, academic inquiry, and creativity. Within this context we all have a responsibility to respect the rights and freedoms of others, including the right to study and work in an environment which is free of offensive materials.

The term offensive may be used to refer to material that:

- is overtly sexual, and/or
- contains profanity, and/or
- perpetuates stereotypes (e.g. racial, gender, sexual, religious, etc.), and/or
- depicts violence, and/or
- denigrates members of marginalized groups based on various factors such as sexual orientation, race, ethnicity, class, gender, disability, etc.

Should you not be sure if your content is offensive, please follow up with your instructor before proceeding with your project. Please review the full policy which can be found in the RTA Student Handbook on our website:

[www.ryersonrta.com](http://www.ryersonrta.com)