

Introduction to Electrical & Computer Engineering



Associate Professor: Xingwei
Wang

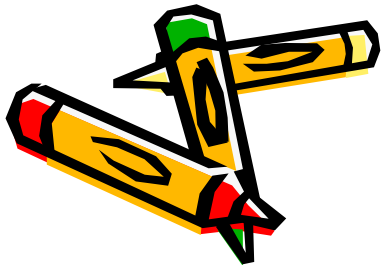
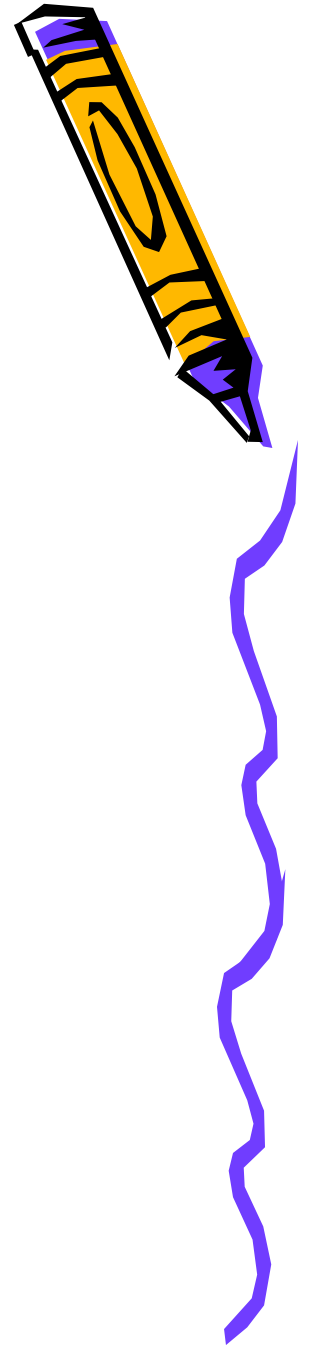


Who is in ECE?

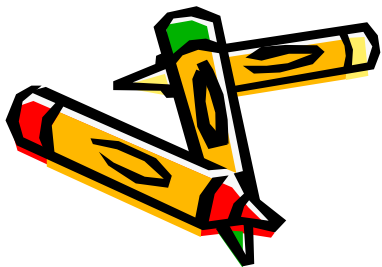
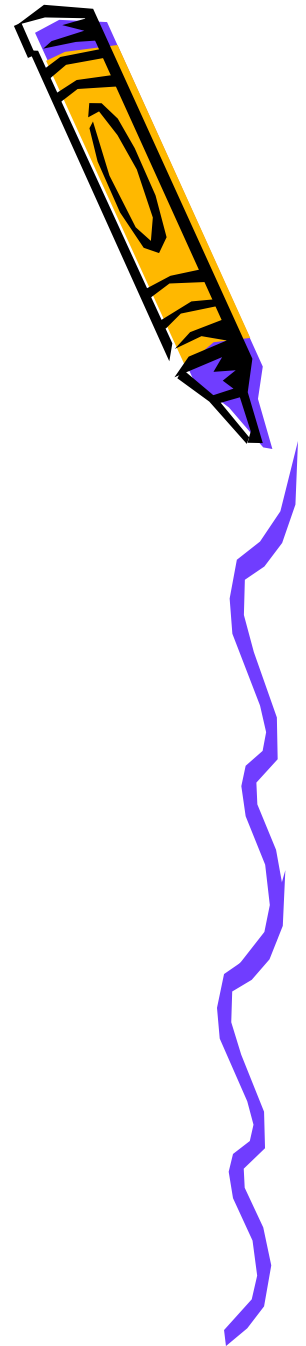


Who is in ECE?

- Creative people



What is ECE?



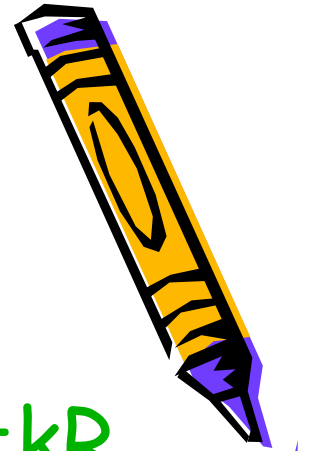
What is ECE?

- <http://www.youtube.com/watch?v=kRjpFY7ctpQ&mode=related&search=>

(1:10)

- <http://www.youtube.com/watch?v=uN5USQw3kvQ&mode=related&search=>

(1:30)





Beginning in the 1850s, scientists such as Michael Faraday and James Clerk Maxwell of England, Joseph Henry and Nikola Tesla of the United States and Heinrich Hertz of Germany made great discoveries leading to the invention of the radio.

This cartoon is full of static.

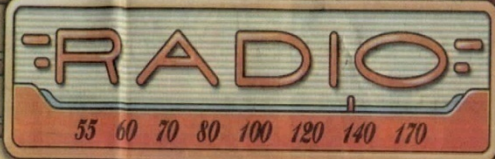
Shortcuts

by Jeff Harris

This edition of Shortcuts is sponsored by Carson Dial-a-Video.

Video made this radio star.

The importance of radio communication for ships at sea became apparent in 1909 when radio distress signals helped speed the rescue of more than 500 passengers of a sinking ocean liner.



It was discovered that radio signals traveled in the form of electromagnetic waves. Today, radio waves are used for a wide variety of purposes, including scientific study, national defense, communication and entertainment.

What do you call a radio with legs? A walkie-talkie.

In most countries, radio stations are owned by the government.

For more information on radio, go to your local library and check out these books:

"Radios: Wireless Sound" by Roger Barr and Rudolf Steiner (Lucent Books) or "Sounds in the Air" by Norman Finkelstein (Atheneum).

The height or depth of a radio wave is its "amplitude." The number of waves produced in a given amount of time is the "frequency" of the radio signal.

Radio waves are used to study and predict weather patterns.

To broadcast sound from a radio station, low-frequency audio waves need to be combined with a powerful, high-frequency "carrier" wave. This can either be done through "amplitude modulation" (AM) or "frequency modulation" (FM).

For AM broadcasts, the amplitude (or strength) of the carrier wave is altered to match the audio waves. For FM broadcasts, the frequency (or number) of vibrations is altered to match the audio waves.

Radio waves are used in remote controls that operate thousands of devices such as garage door openers, model airplanes and television sets.

REMOVING THE STATIC

In 1895, Guglielmo Marconi of Italy became the first person to transmit radio communication signals through the air.

In 1906, Reginald Fessenden became the first to broadcast a human voice using a radio transmitter.

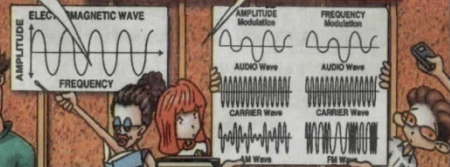
Radio stations WWJ in Detroit and KDKA in Pittsburgh became two of the first commercial radio stations in the world when they began broadcasting in 1920.

What radio network do fish listen to? Sea-B-S.

Radio waves move at the speed of light.

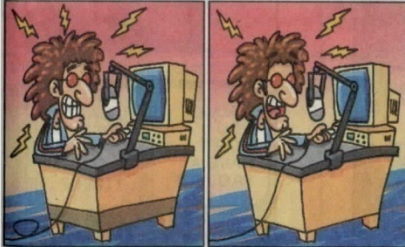
Microwave ovens use high-powered radio waves to cook food.

Objects in the universe such as stars and galaxies emit radio waves.



SHOCK JOCK

Can you spot all six differences between these two scenes?



ANSWERS: 1. Bolt is missing. 2. Mouth is different. 3. Spoken are higher. 4. Cord is different. 5. Disk is different. 6. Back of monitor is smaller.

GOLDEN YEARS

The period from about 1925 through the 1950s is often called the "Golden Age of Broadcasting." During this time, radio was an extremely popular source of entertainment and news for millions of people.

AM radio broadcasts travel farther at night than they do during the day.

How do you greet a ham radio operator? With a short wave.

E-mail us at: jdharris@verizon.net

What do pigs listen to? Ham radio.

To download a Shortcuts teacher's guide or view a list of upcoming topics, go to www.comics.com/shortcuts

WORD SEARCH

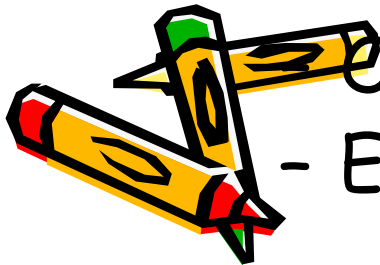
Can you find the hidden words? Search carefully because some words are backward or diagonal.

BROADCAST BOB AUDIO
 FREQUENCY AGE RADIO
 AMPLITUDE STATION AM
 MODULATE GOLDEN FM
 TRANSMIT STEREO WAVE
 CARRIER SIGNAL TUNE
 AM FITS ALL GOOD
 CAFEMOCNRTHEN
 THEREOASADOT
 AGREEDARUDIP
 AONGTQCUTRMIL
 AUEAODUILSIAO
 TUTRALLNANE
 BSDOEPDANGTVR
 OURIMTREICAE
 BBOAOTSSNWYOU



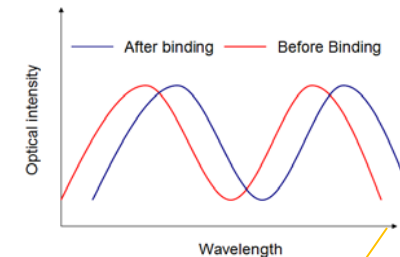
Who I am?

- Education
 - MS, Ph.D., Electrical Engineering Virginia Tech
 - Certificate, Future Professoriate Virginia Tech
- <http://faculty.uml.edu/xwang/>
- Contact
 - Office Hours: make an appointment
 - Phone: 978-934-1981
 - Office: BL 403
 - Email: Xingwei_Wang@uml.edu



Miniature Label-free Biosensing Probes for Rapid Detection of Virus, Bacteria, and Cells

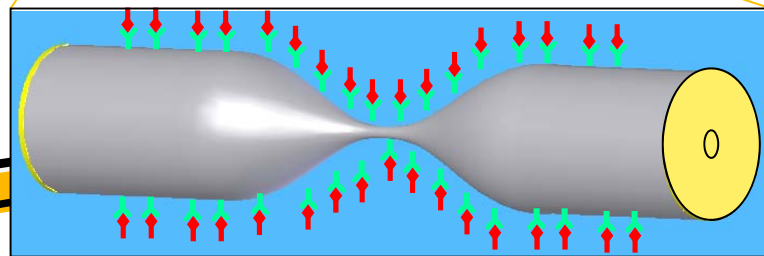
Recipient of \$300K Young Investigator Research Matching Grant from Massachusetts Life Sciences Center



Tapered fiber sensor Coupler From laser

↓ Antigen, such as bacteria

γ Specific Antibody



Spectrum monitoring system



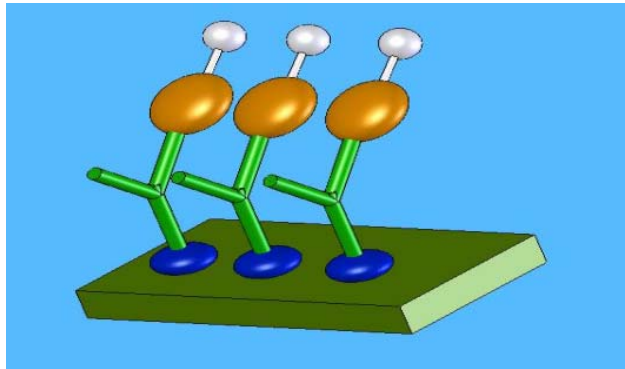
Tapered sensor photo

Xingwei Wang, Department of ECE, Xingwei_Wang@uml.edu, tel: 978-934 1981

Biosensors

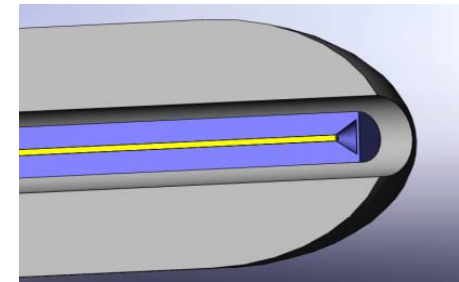
Worcester Campus

- *Point-of-care biosensor for early detection of HIV virus*

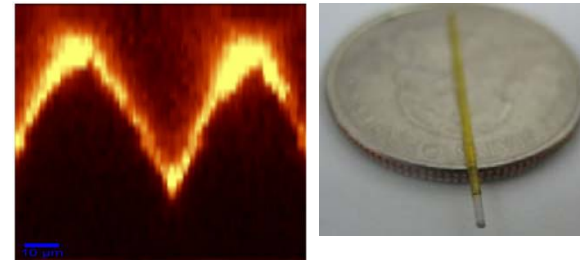
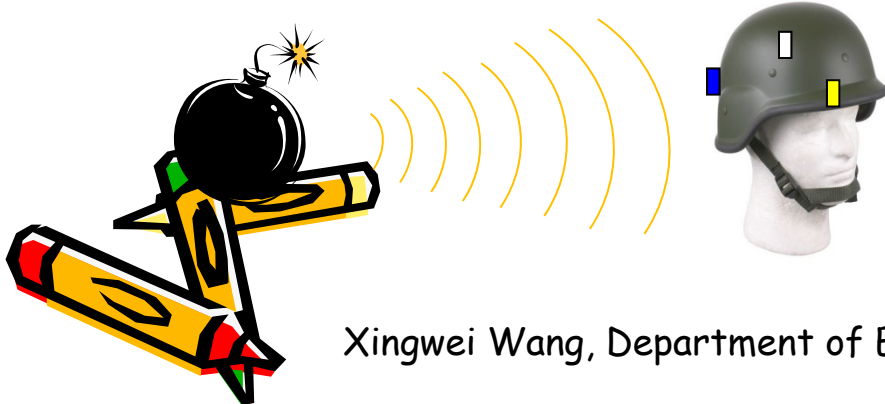


VasoTech, incubator company located in M2D2

- *Miniature blood pressure sensor for cardiologist uses*

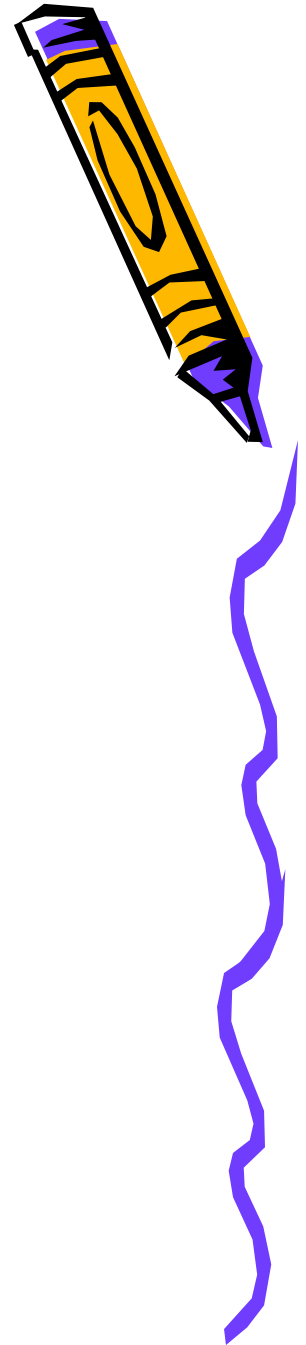


- *Interdisciplinary projects in UML (ME; Chemistry; Work Environment; Physics; Plastics Eng.;*



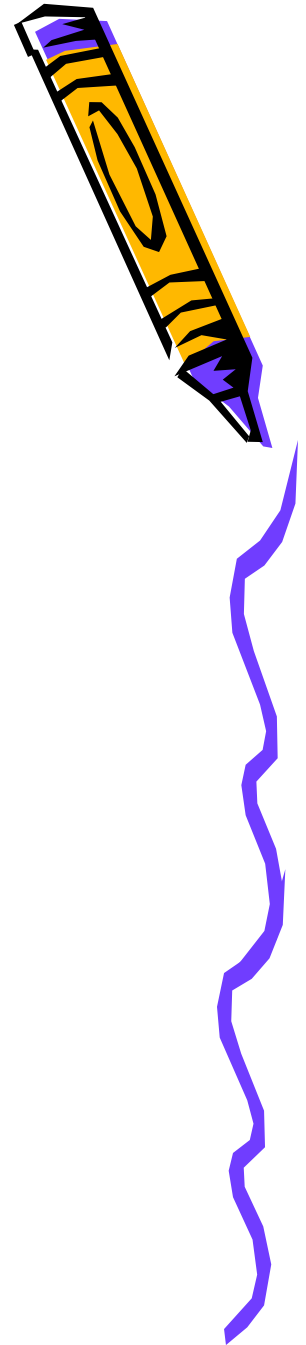
Advice

- **A**djust to the new environment
- **B**e independent
- **C**ommunicate with instructors/TAs/classmates:
- **D**o it efficiently (good planner)
- **E**njoy your study: more time and efforts (Calculus/Physics)



This Class

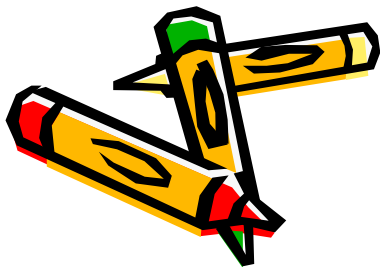
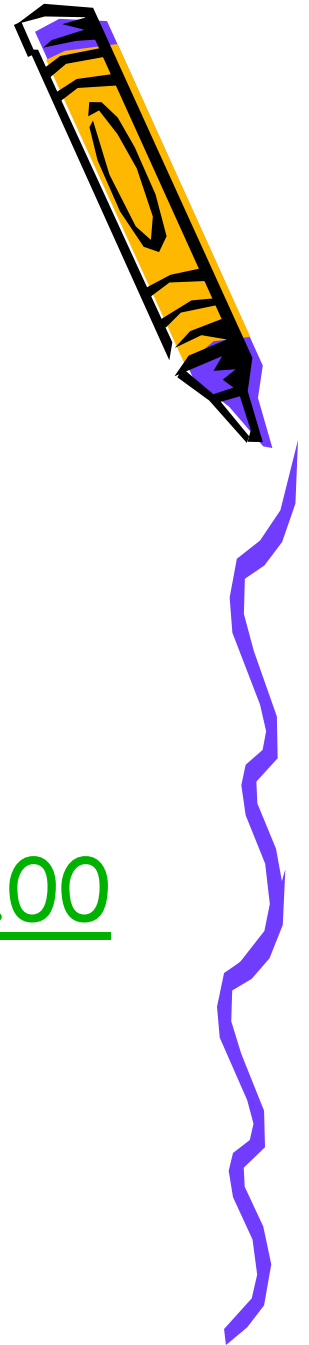
- Projects
- Talks
 - Professors
 - Engineers
 - Senior students
- Lectures



Requirements

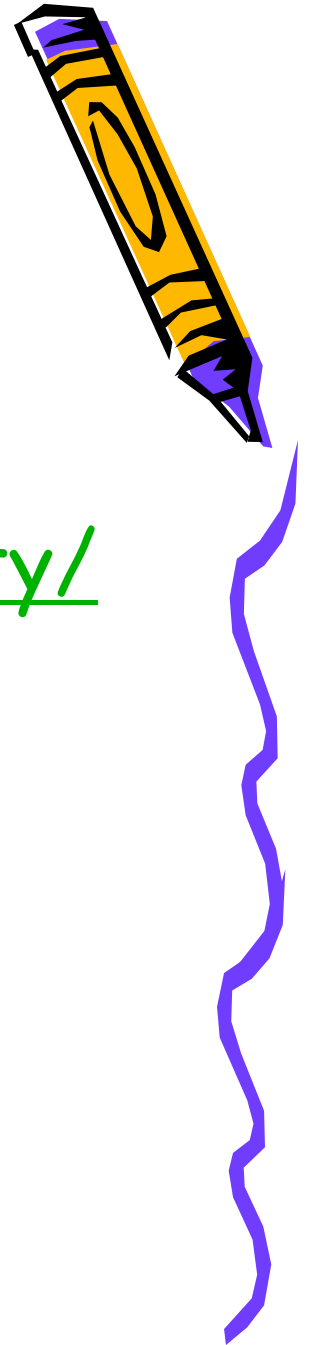
- Actively participate in classes and labs
- Keep experiment log book
- Frequently check

<http://Faculty.uml.edu/xwang/16.100>



Learning Style

- What's your learning style?
- <http://iweb.tntech.edu/rclougherty/workshop/index.html>



Enjoy the semester~

