

Computer Engineering Program

Computer Engineering Program

Department of Electrical, Computer and Biomedical Engineering

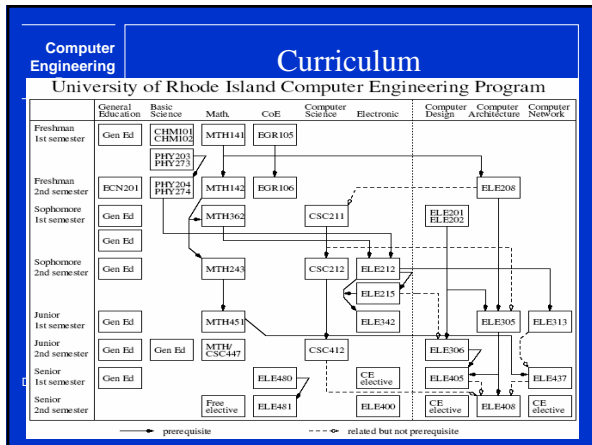
Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Outcomes

- To Understand
- To Question
- To Design
- To Lead
- To Communicate

Dept. of Electrical, Computer and Biomedical Engineering



Computer Engineering Program

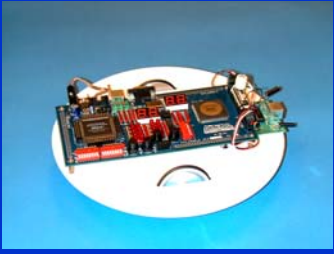
Fun Projects!

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

ELE 306
Computer Engineering Lab

The UP-1 Robot



A Design Example Developed for Computer Engineering Embedded Systems Labs


Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

ELE 306
Computer Engineering Lab

Altera UP-1 Development Board

- Contains two programmable logic devices that can be programmed using a PC's printer port
- 20,000 Gate FLEX and 2,500 Gate MAX chips
- Three DIP switches
- Seven segment displays
- Four pushbuttons
- PS/2 Keyboard, Mouse, and VGA ports



Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

ELE 306
Computer Engineering Lab

UP-1 Robot Design

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

You can be an architect !!

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

What is Computer Architecture?

- **Hardware Designer**
 - thinks about circuits, components, timing, functionality, ease of debugging

“construction engineer”
- **Computer Architect**
 - thinks about high-level components, how they fit together, how they work together to deliver performance.

“building architect”

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Why should you care?

- You may actually do computer architecture someday
- You may actually care about software performance someday

More

- to become a more effective programmer
- to learn how to evaluate the suitability of a given computer for a given task
- because it is an interesting and rapidly developing area

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Not just computers

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Communication Networks

Samples of student projects

- Remote Camera
- Whiteboard Sharing Application
- Real Time Streaming Video
- Active Flood Response Firewall
- Chat Application which uses Blue Tooth Technology
- Wireless Temperature Sensor Using ZigBee

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Information & Network Security

Sample of Project Topics

- Implementation of security services on sensors
- Security mechanisms at EBay
- On-line shopping security
- Video scrambling in Cable TV
- Jamming and anti-Jamming techniques for wireless networks
- Digital rights management solutions
- Virus, worm and spyware
-

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

So what's in it for me?

ELE 408
Computer Organization Lab

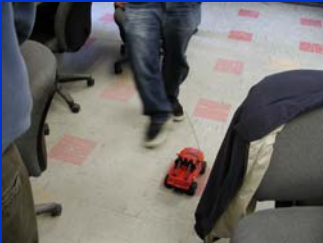


Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

So what's in it for me?

ELE 408
Computer Organization Lab





A Computer Controlled Car Using Wireless Remote: It works!

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Designing Network Routers and Bridges

ELE 408
Computer Organization Lab

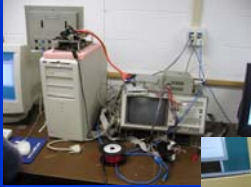




Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Implementing Disk Controller and Network Interface

ELE 408
Computer Organization Lab

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Job Opportunities

- Our graduates have the necessary background and technical skills to work professionally in one or more of the following areas:
 - Computer hardware and software design
 - Computer-based systems
 - Computer network design
 - System integration
 - Electronic design automation

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Down the road

The following materials are borrowed from Dr. Bruce Jacob's talk "career path in computer engineering".

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

The Scene

OPEN CURTAIN: *Engineer* -- talented, motivated, hard-working, comfortable with the college thing, is accosted by *Parents, D and M*

D: *Hey — we know it's only Junior Year, but have you got the rest of your life planned out yet?*

M: *By the way, we're very proud of the grades and all, but — again — about your life ...*

Engineer: *Aaaaaaaaaaaaaaaaaaaaaaaaaaagh!*

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Careers in Engineering

YOUR OPTIONS:

College => **Industry**

=> Grad School => **Industry**

=> **Research**

=> **Academics**

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Big Picture

In Computer (& Electrical) Engineering:

- **Industry** **BS/MS DEVELOP**
- **Industry/Research** **PhD DESIGN**
- **Academics** **PhD RESEARCH TEACH**

DEVELOP == BUILD

DESIGN == JUSTIFY YOUR CHOICES

PhD's are paid to THINK

*MS's & BS's are paid to DO ****

*** Mitigated by **SIZE of COMPANY**

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Big Picture

	Industry/BS	Industry/PhD	Academia
Salary Range (0yrs - 10yrs)	\$50K - 100K	\$80K - 120K	\$70K - 120K (12-month)
Job Security	OKAY	GOOD	GREAT
Freedom	LITTLE	SOME	LOTS
Respect	LOTS	LOTS	LITTLE
Visibility	NONE	LITTLE	LOTS
Brief Job Description	DEVELOP	DESIGN	RESEARCH & TEACH
Perks of the Position	FREE COFFEE	STOCK OPTIONS	TALKING TO A CAPTIVE AUDIENCE :)

Dept. of Electrical, Computer and Biomedical Engineering

Computer Engineering Program

Start-Up Companies

	Start-Up Company
Salary Range	\$40K - 100K or more
Job Security	NONE (... to LOTS)
Freedom	LOTS
Respect	LOTS
Visibility	NONE
Brief Job Description	DESIGN, BUILD, TEST, MAINTAIN, WHATEVER ...
Perks of the Position	COOL ATMOSPHERE, INTRIGUING PROBLEMS, STOCK OPTIONS (maybe)

Dept. of Electrical, Computer and Biomedical Engineering

You do NOT have to figure it out NOW

**Where you are 10 years from now != where
you THINK you will be 10 years from now**

**No decisions are binding
(can always change paths)**

**STAY CURRENT IN FIELD ... makes
changing directions easy**

Enjoy yourself