

## Announcements

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### Finishing Up

- **Submit a course evaluation**
  - Will get an e-mail for this
  - Part of the “participation grade” (e.g. clicker grade)
- **Final, Dec 12<sup>th</sup> 2-4:30 pm**
  - Study guide is posted
- **Conflict with Final Exam?**
  - e.g. > 2 finals in 24 hours
  - Submit conflicts **TODAY**

### Review Sessions

- **Wednesday 1-4 (Call Aud)**
  - Call frames & diagramming
  - Classes, try-except
- **Thursday 1-4 (Call Aud)**
  - **Generators, coroutines**
  - Open question session
- **Friday 2-5 (Call Aud)**
  - Lists, recursion
  - Open question session

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1

## Obvious Next Step: CS 2110

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- **Programming in Java**
  - Basic Java syntax
  - Static vs. Dynamic Types
  - Adv. Java Topics (e.g. Threads)
- **OO Theory**
  - More design patterns
  - Interface vs. Implementation
- **Data Structures**
  - Binary Trees
  - Linked Lists
  - Graphs

Java Specific

Language Independent

Major CS Topic

12/7/21 Future Courses 2

2

## CS 2800: The Other Important Course

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- CS requires a lot of math
  - Analyzing code performance
  - Analyzing data
  - Proving code correctness
- Calculus is “wrong math”
  - Data is rarely “continuous”
  - Limited to specific uses (e.g. spatial data)
- “Grab-bag” course
  - All math needed for CS
  - **Includes writing proofs**

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3

## Higher Level Computer Science Courses

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• Programming Languages	x1xx (e.g. 1110, 2110)
• Scientific Computing	x2xx (e.g. 4210)
• Data Management	x3xx (e.g. 3300, 4320)
• Systems	x4xx (e.g. 3410, 4410)
• Computational Biology	x5xx (e.g. 5555)
• Graphics and Vision	x6xx (e.g. 4620)
• Artificial Intelligence	x7xx (e.g. 4758, 4700)
• Theory	x8xx (e.g. 4810, 4820)
• Research	x9xx (e.g. 4999)

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4

## Programming Languages

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- **Adv. Language Topics**
  - Functional languages
  - Streaming languages
  - Parallel programming
- **Language Theory**
  - New languages/compilers
  - Software verification
- **Software Engineering**
  - Design patterns
  - Architecture principles

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5

## Scientific Computing

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- **Calculus + Computing**
  - Problems from other science domains
  - Process with computer
- **Applications**
  - Complex simulations
  - Physics (games!)
- **Challenge: Performance**
  - Programs can run for days!
  - How do we make faster?

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6

### Data Management

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- **Modern Web Apps**
  - Storing user/session data
  - Coordinating users
- **Databases**
  - Query languages
  - Database optimization
  - Organizing your data
- **Information Retrieval**
  - Searching
  - Data analysis

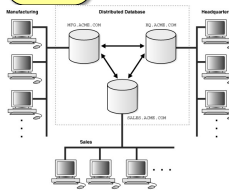
CS 3300

CS 4300

CS 5300

CS 3110

CS 4320



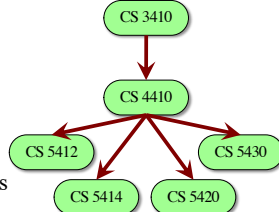
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7

### Systems

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- **Building BIG software**
  - Operating systems
  - Distributed applications (e.g. online, networked)
  - Cloud computing
- **Also System Security**
  - Though that is spread about
- **Senior/masters level classes**
  - Bulk of the 5xxx courses
  - But great project courses!



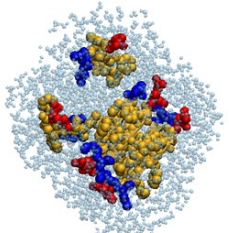
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8

### Computation Health/Biology

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- **No undergrad classes**
  - Used at CornellTech
  - Too much to learn
- **Once hoped for Ithaca**
  - But hard to hire in CS
  - Faculty better fit for Bio
- **BSCB took over area**
  - Now Dept of Comp Bio
  - But part of CIS school



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9

### Graphics and Vision

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- **Not modeling/art!**
- **Rendering & Animation**
  - Illumination/reflection
  - Cloth/hair simulation
  - Water and fluids
- **Processing Images**
  - Recognizing shapes
  - Assembling 3D models from 2D pictures
  - Smart cameras

CS 4620

CS 5625

CS 5643

CS 4670



12/7/21 Future Courses 10

10

### Artificial Intelligence

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- **Not sentient computers**
- **Machine learning**
  - Discovering patterns
  - Making predictions
- **Natural Language Proc.**
  - Automatic translation
  - Searching text/books
  - Voice-control interfaces
- **Robotics**
  - Autonomous control

CS 4700

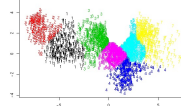

CS 4780

CS 4740

CS 4758

CS 4750

CS 4755

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11

### Theory

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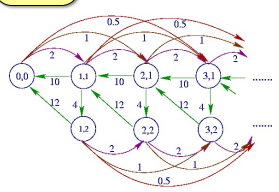
- **Analysis of Algorithms**
  - What is *possible*?
  - What is *feasible*?
- **Analysis of Structures**
  - Social network theory
  - Complex data structures
- **Cryptography**
  - Theory side of security
- Area responsible for founding dept. in 1965

CS 4810

CS 4820

CS 4830

CS 4860



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12