# CSIS 2226: Foundations of CS

Course Overview

# CSIS 2226: Foundations of CS

- A few things first:
  - Hand out syllabus
  - Brief introductions
  - What's the course all about

# Days / times / locations / etc

- Course meets:
  - TR 12:30-2:20
  - D003 on T; and D027 on R
- Office Hours (K-140):
  - TR: 11am-12noon
  - Will schedule alternate times if you need me to

# Communication outside of class

- **If you need to contact me about the course outside of class time:**
  - ☐ E-mail: log into Blackboard and use the e-mail there
  - ☐ Phone: 609-626-3526
- **If you need to contact me about something other than this course**
  - ☐ E-mail: cicirelv@stockton.edu

# Course Objectives

- Gaining knowledge of applied discrete mathematics including the field's terminology and methods, and in particular in relationship to computer science

- Learning the fundamental principles and theories of discrete mathematics and how they apply to computer science and information systems

- Learning to apply topics of discrete mathematics to solving computer science problems

# Pre-requisites

- MATH 2225 with a grade of C or better
- Exception to pre-req:
  - Students who have completed MATH 3325 are also fine

# This is a 2<sup>nd</sup> course on Discrete Math

- CSIS 2226 is referred to by some informally as "Discrete 2"
- The course will cover:
  - A review of some topics from Discrete 1
  - Coverage of additional topics of Discrete Math
  - Emphasis placed on computer science applications

# ISETL: Interactive Set Language

- ISETL:
  - □ A relatively small programming language
  - □ Entire ISETL system can fit on (and run from) a floppy disk (if anyone still uses them)
- "Interactive"
  - □ ISETL is not a compiled language
  - □ System interprets one statement at a time as you type them
- "Set"
  - □ "Set" as in the discrete math concept
  - □ Fundamental type of data in ISETL is the Set
- "Language"
  - □ Well…. in the programming sense

# Prolog: **Pro**gramming in **Log**ic

- Prolog:
  - A mathematically-oriented programming language
  - Considered by some as a "traditional A.I. language"
  - Name means "programming in logic"
- A Prolog program consist of:
  - A set of **facts** and a set of **rules** encoded as Horn clauses in First Order Logic
  - We call this a knowledge-base
- Running a Prolog program consists of:
  - Posing a query statement (specified in first order logic)
  - Prolog then performs automated theorem proving using the knowledge-base to prove or disprove your query statement.

# Required Textbook

- Discrete Mathematics and Its Applications (Rosen, 6$^{th}$ Edition)
- Other recent editions are **probably** O.K.
  - I have a listing that supposedly maps problem numbers, etc between recent editions
  - If you used an earlier edition in Discrete 1, don't buy a new book (assuming you still have it)
  - If you don't still have it, get the 6$^{th}$ edition

# Thursdays in the lab D027

- On Thursdays, we'll meet in D027
- Bring an easily transportable storage device with you (e.g., a flash drive)
  - I recommend keeping a copy of ISETL and Prolog on it (once I tell you where to obtain it)
- In addition to ISETL and Prolog, I may introduce other useful tools of mathematics for CS in the lab

# Blackboard (formerly known as WebCT)

- I will be using Blackboard to:
  - Communicate with you electronically
  - Collect some **homework** assignments
  - Provide you with useful items
- You can access it through the Go Portal
- You can also bypass the portal through: http://skimmer.stockton.edu

# Grading

- Exam 1: 12%
- Exam 2: 12%
- Exam 3: 12%
- Problem Sets / Homework: 60%
- Participation: 4%

- 90 or better: A
- 80 or better: at least B
- 70 or better: at least C
- 60 or better: at least D
- 0 or better: at least F ;)
- "at least"
  - There are + and – grades that I might use
  - There's also the possibility that I might adjust the grade boundaries to give you next higher letter

# Exams

- Not cumulative
- Closed Book
- Allowed 1 sheet of notes
- Allowed (and recommended) a calculator
  - Note: No cell phones or other communications devices for calculator purposes

# Homework / Problem Sets

- Largest part of your grade (60%)
- Most individual
- A few in small groups
- What?
  - Sets of problems (this is essentially a math course after all)
    - E.g., problems from the textbook
    - Other similar problems
  - Small bits of programming in ISETL or Prolog or some other system to be announced
  - Other computer exercises in other tools as assigned

# Duedates and late policy

- If due on paper (e.g., most problem sets)
  - Will be due in class at the beginning of class
- If due electronically
  - Will be due by midnight on day due via Blackboard
- Late penalty:
  - 50% if less than one week late
  - 0 if more than one week late
  - Waived first time late if less than one week late

# Makeup Exams and Incompletes

- ## Makeup Exams:
  - ☐ There won't be any, except for:
    - Documented medical excuses (provide doctor's note upon return
    - Other appropriately documented institutional excuses
      - ☐ In most cases, this will require documentation before hand (e.g., if you play sports, you should know when your games on before they happen)

- ## Incomplete Grades
  - ☐ Highly unlikely there will ever be one with my incomplete policy (see syllabus)

# Schedule of Topics

- Last page of syllabus
  - □ Subject (and likely) to change
  - □ Just an approximation
- Will warn you a week or so ahead of time if Exam dates change

# Course Topics

- **Topic 1: (review topic)**
  - A review of logic, sets, functions from Discrete 1 (parts of Chapters 1 and 2)
  - Mostly a review to prepare you for later topics
  - Will highlight CS applications as we review
- **Topic 2: (new topic)**
  - Combinatorial Optimization (not in book)
- **Topic 3: (new topic)**
  - Boolean algebra, logic gates, and circuits
  - Chapter 11 (we're obviously jumping around in the book

# Course Topics

- Topic 4: (new for most of you)
    - Algorithms, Growth of Functions, and Complexity of Algorithms (Chapter 3)
- Topic 5: (mostly new, but part review)
    - Review of induction and recursion (chapter 4)
    - Recursive algorithms (chapter 4)
    - Program correctness (chapter 4)
- Topic 6: (new topic)
    - Relations and closures (chapter 8)
    - Application to database queries

# Course Topics

- Topic 7: (new topic)
  - Graphs (chapter 9)
  - Both theory and applications
- Topic 8: (new topic)
  - Trees (chapter 10)
  - Both theory and applications

# Do you need the book with you?

- You will definitely need it for homework purposes
- Could be useful to have with you in class, but not requiring you to bring it with you
  - i.e., if we do any problems from the book in class, I'll have the details either projected or on paper