

# CGS 1920 Introduction to Computing

Overview CS, CE, IT, MIS

# Content

- Overview of CS ,CE ,MIS ,IT.
- Curriculum of CS ,CE ,MIS,IT.
  - FIU CS and CE Course Comparison
  - MIS undergraduate and graduate level curriculum
  - IT curriculum and IT program objective
- Job of CS, CE, MIS, IT
  - Current report of U.S. Department of Labor
  - Job possibilities

# CS Overview

- CS is the study of theoretical computation and practical techniques used for implementation in a computer system.
- CS does not mean the activity of gaming or word-processing; instead, it is the understanding of concepts behind a program that can be used to implement new software or improve existing software like games or word-processors.

# CE Overview

- CE is a discipline that combines both Electrical Engineering and Computer Science.
- CE provides training in electrical engineering, software design, and hardware-software integration instead of only software engineering as in CS.

# MIS Overview

- The group of information management methods tied to the automation or support of human decision making
- Combines tech with business to get people the information they need to do their jobs better/faster/smarter
- Take business courses and approach computing from a management perspective
- Wherever IT is used in society, you will find an IS(CIS and MIS) professional

# MIS Overview (cont.)

- Emphasizes the application of computing technology in business settings
- Focuses on the business processes of organizations and the information technology utilized in those organizations.
- MIS students learn to design, implement, and maintain effective information systems in organizations.

# IT Overview

- Focus not on creating the technology, but on empowering the end user.
- It is concerned about applying technology to solve problems for people.
- All about combining the power of computing with the study of managerial know-how and social issues to strategically solve current problems and to creatively research future IT solutions.

# IT GOALS

- Focus on improving the usability and efficiency of technological systems and processes.
- Their goal is a smoothly functioning computer network—free of bugs, glitches, and interruptions—that provides an effective flow of information so the company can keep on improving its work processes, customer retention and acquisition, and other aspects of its business.

# FIU CS and CE Course Comparison

CS

# Non-Core Courses

CE

- MAC 2311 Calculus I
- MAC 2312 Calculus II
- PHY 2048(L) Physics with Calc I and Lab
- PHY 2049(L) Physics with Calc II and Lab
  - MAD 2104 Discrete Math
- COM 3110 Business & Professional Communication
- ENC 3211 Report & Technical Writing
- STA 3033 Probability & Statistics
- CHM 1045(L) Chemistry I and Lab
- MAC 2313 Multivariable Calculus
  - or
  - MAD 3401 Numerical Analysis
- MAP 2302 Differential Equations
- EEL 2880 Software Techniques

Red – CS Only

Blue – CE Only

Purple – Both CS and CE

# Non-Core Courses Cont.

- Both degrees require Calc I and Calc II.
- Both degrees require Physics with Calc I and Calc II which involve derivation of equations.
- CS focuses on communication in the business world and technical writing.
- CE focuses highly on advanced mathematics with multivariable Calc and differential equations.

CS

# Software Curriculum

CE

- COP 2210 Programming I
- COP 3337 Programming II
- COP 3402 Fundamentals of Computer Systems
- CGS Ethics in CS
- CDA 4101 Computer Organization
- COT 3420 Logic for CS
  - COP 3530 Data Structures
- MAD 3512 Algorithms
- COP 4540 Database
- COP 4338 Programming III
- COP 4555 Programming Languages
  - COP 4610 Operating Systems
  - CEN 4010 Software Engineering

Red – CS Only

Blue – CE Only

Purple – Both CS and CE

# Software Curriculum Cont.

- CS goes much more in depth into basic computer programs like machine language.
- CE only covers object-oriented programming in Java while CS covers C++ and functional programming in F#.

# Electrical Engineering/Hardware Curriculum

CS

CE

- EEL 3110 Circuit Analysis
  - EEL 3111L Circuits I Lab
- EEE 3303(L) Electronics I and Lab
- EEL 3514 Communication Systems
  - EEL 3657 Control Systems I
- EEL 3712(L) Logic Design I and Lab
- EEE 4343 Intro to Digital Electronics
- EEE 4314(L) Integrated Circuits and Lab
- EEL 4746(L) Microcomputers I and Lab
  - EEL 4747C Microcomputers II
    - EEL 4611L Systems Lab
    - EEL 4920 Senior Design I
    - EEL 4921 Senior Design II

Red – CS Only

Blue – CE Only

Purple – Both CS and CE

# Electrical Engineering/Hardware Curriculum Cont.

- CS does not cover any hardware or circuit analysis.
- CE covers from basic AND/OR gates to advanced microcomputers involving RAM, ROM, and CPU architecture.
- CE also covers circuit analysis using resistors, capacitors, inductors, Op-Amps etc. but not as detailed as the Electrical Engineering degree.

# CS

# Electives

# CE

CS - Choose two from the following:

- CAP 4710 Principle Computer Graphics
- CEN 4500 Data Communications
- CDA 4400 Computer Hardware Analysis
  - COP 4225 Advanced UNIX Programming
  - COP 4226 Advanced Windows Programming
- COP 4XXX Computing and Network Security
- COP 4009 Windows Component Technology
- CEN 4021 Software Engineering II

CS - Choose one from the following:

- MAD 3305 Graph Theory
- MAD 3401 Numerical Analysis
- MAD 4203 Intro to Combinatorics
- MHF 4302 Math Logic

CE – Choose one from the following:

- EEL 4006 Development of Dynamic Web Systems
  - EEL 4510 Intro to Digital Signal Processing
  - EEL 4714 Digital Logic Design II
- TCN 4081 Telecommunication Network Security
  - TCN 4211 Telecommunication Networks

Red – CS Only

Blue – CE Only

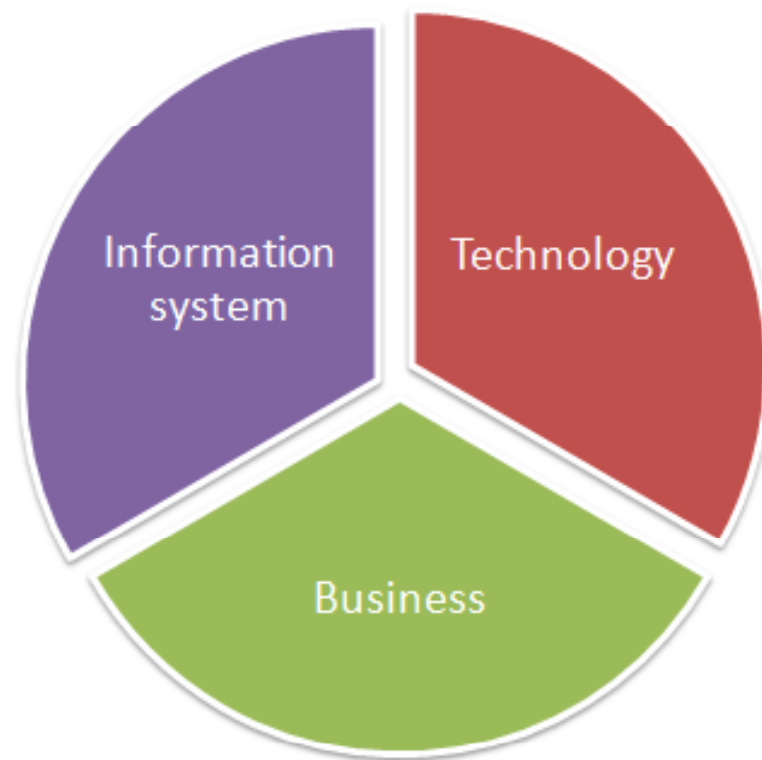
Purple – Both CS and CE

# Electives Cont.

- CS requires three electives; one is a mathematical course like graph theory or numerical analysis, the other two can vary from computer graphics to UNIX programming.
- CE requires one elective which relates to networks, digital signals, or web systems.

# MIS courses

The proportions of these three components depends on what does the university focus on.



# MIS courses (under graduate level)

from Oregon State University curriculum

- MIS students complete two sets of "core" requirements
  - The Baccalaureate Core of arts, sciences, writing, etc.
  - The Business Core of math, computing, accounting, marketing, management, finance, and management science courses.

# MIS courses (under graduate level)

from Oregon State University curriculum

- Specialization within the field of MIS is then achieved through the following courses:

## **Sophomore Year**

[CS 151 - Introduction to C Programming](#)

## **Junior Year**

[BA 370 - Introduction to MIS](#)

[BA 371 - Systems Analysis and Design](#)

[BA 372 - Business Software Development](#)

## **Senior Year**

[BA 462 - Project Management](#)

[BA 479 - Current Topics in MIS](#)

[BA 483 - Information Resource Management](#)

# MIS courses(graduate level)

from FIU curriculum

- Web Management
- Database Management
- Knowledge Management
- Enterprise Information Systems
- Telecommunication Networks
- Information Security
- Systems Analysis and Design
- Information Systems Policy and Strategy
- E-commerce Management
- Project Management of Information Systems
- Special Topics in Information Systems (Health Care Information Management)
- Business Intelligence Application
- Professional Development Seminars

# IT course

## Prerequisites

from FIU curriculum

|  |
|--|
| <a href="#">COP 2250</a> - Programming in Java                                       |
| PSY 2020 - Introductory Psychology or equivalent                                     |
| <a href="#">CGS 2060</a> - Introduction to Microcomputers<br>or                      |
| <a href="#">CGS 2100</a> - Introduction to Microcomputers for Business               |
| MAC 2147 - Pre-calculus Mathematics  |
| <a href="#">MAD 1100</a> - Mathematic Concepts for Information Technology            |
| <a href="#">CGS 3092</a> - Professional Ethics and Social Issues in Computer Science |

## Required course

|   |       |
|---|-------|
| <a href="#">COP 3804</a> - Intermediate Java                    | 3 cr. |
| <a href="#">CGS 3260</a> - Microcomputer Organization           | 3 cr. |
| <a href="#">CGS 3760</a> - Computer Operating Systems           | 3 cr. |
| <a href="#">CGS 4283</a> - Applied Computer Networking          | 3 cr. |
| <a href="#">CGS 4825</a> - Web Site Construction and Management | 3 cr. |
| <a href="#">CGS 4366</a> - Information Storage and Retrieval    | 3 cr. |
| ENC 3211 - Report & Technical Writing                           | 3 cr. |

# IT Program Objective

## 1. Develop Computer Applications

- Develop fundamental programming skills
- Program effectively within the student's specialty area
- Apply a development life cycle to a problem
- Design and develop a software prototype
- Use multiple computer hardware platforms
- Comprehend system integration and architecture principles

# IT Program Objective

## 2. Develop Database Applications

- Design a relational database
- Implement a relational database
- Query a relational database

## 3. Implement and Maintain Networking & System Infrastructure

- Demonstrate knowledge and application of protocols
- Demonstrate competence through implementation of networks

# IT Program Objective

4. Design and Implement Computer-Mediated Experiences
  - Design & implement a website using appropriate design guidelines
  - Develop scripts to control and use media types
  - Develop scripts for interaction with time-based media
  
5. Practice User-Centered Design and Deployment
  - Identify needs, analyze tasks, and develop profiles of users
  - Develop and evaluate effective user interaction designs
  - Evaluate usability of an application

# IT Program Objective

## 6. Communicate Effectively

- Make effective oral presentations
- Communicate effectively in written form
- Develop information architectures to facilitate graphical and media-based interaction and navigation

## 7. Interact Effectively within the Organization

- Participate effectively as a team member
- Be able to work effectively with end users
- Be a change agent within an organization

# IT Program Objective

8. Comprehend and Apply Project Management Principles
  - Follow a project plan developed by instructor
  - Develop portions of a project plan
  - Develop Gantt & PERT charts and critical path analysis
  
9. Practice Ethical and Professional Behaviors
  - Describe ethical and professional behaviors
  - Explain the rationale for security practices
  - Apply accepted security practices
  - Recognize the need for continued learning throughout a career

# IT Program Objective

10. Apply Appropriate Problem Solving Skills in:

- Web Site Development
- Interactive Multimedia Development
- Game Development
- Database
- Web-Database Integration
- Windows Application Development
- Learning and Performance Technology
- Network and System Administration



# CS Employment

- Computer Scientists held about 542,000 jobs in 2006 with the following detailed occupations [1]:
  - Network systems and data communication analysts 262,000
  - Computer specialists, all other 136,000
  - Database administrators 119,000
  - Computer and information scientists, research 25,000

# CE Employment

- Computer software engineers held about 857,000 jobs in 2006 with the following detailed occupations [2]:
  - Computer applications software engineers 507,000
  - Computer systems software engineers 350,000

# MIS Employment

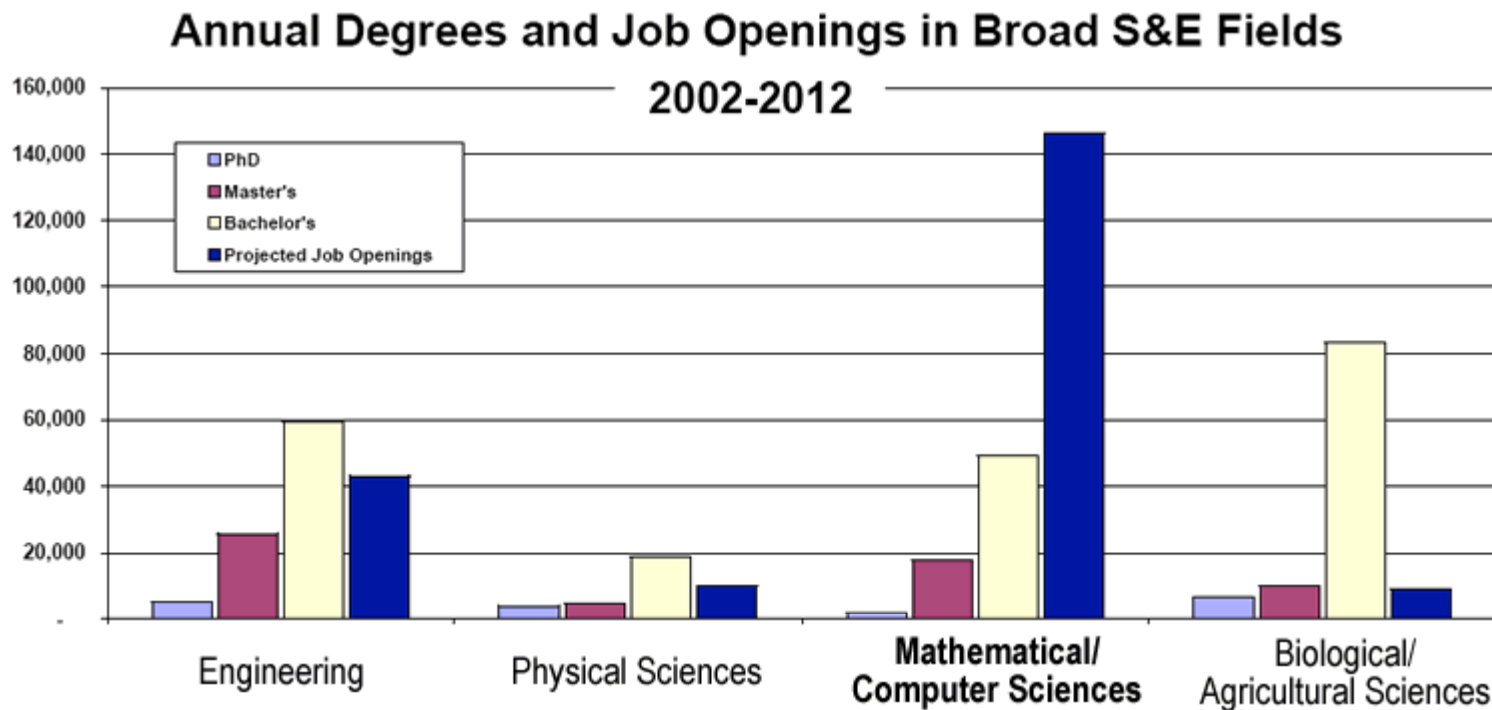
- Computer and information systems managers held about 264,000 jobs in 2006[3]:

# IT Employment

- Computer support specialists and systems administrators held about 862,000 jobs in 2006 with the following detailed occupations [4]:

|   |         |
|---|---------|
| ➤ Computer support specialists                | 507,000 |
| ➤ Network and computer systems administrators | 350,000 |

# Job Openings



SOURCES: Tabulated by National Science Foundation/Division of Science Resources Statistics;  
Degree data from Department of Education/National Center for Education Statistics: Integrated Postsecondary Education Data System Completions Survey;  
and NSF/SRS: Survey of Eamed Doctorates; Projected Annual Average Job Openings derived from Department of Commerce  
(Office of Technology Policy) analysis of Bureau of Labor Statistics 2002-2012 projections

# CS Job Possibilities

## Occupation Titles:

- Computer Systems Analyst
- Network systems and data communication analyst
- Network and computer systems administrator
- Computer Programmer
- Database administrator
- Software Engineer
- Web Developer

## Possible Companies:

The Microsoft logo, featuring the word "Microsoft" in a blue, sans-serif font.The ORACLE logo, featuring the word "ORACLE" in a bold, red, sans-serif font.The amazon.com logo, featuring the word "amazon.com" in a black, sans-serif font, with a yellow smile arrow underneath the word "amazon".The Google logo, featuring the word "Google" in its characteristic multi-colored, sans-serif font.The GEICO logo, featuring the word "GEICO" in a bold, blue, sans-serif font.

# CE Job Possibilities

- Systems Developer
- Communication System Manager
- Hardware Analyst
- Network Specialist

Possible Companies:



# MIS Jobs

- jobs of Business Analyst (Software Implementation)
- Software Designer/Developer
- To grow into jobs such as Systems Administrator or Database Administrator
- Information Systems, Business/Systems Analyst, Database Administrator, Network Administrator, Network Designer, Data Communication Analyst, Web Designer, Technical Support, Programmer Analyst, Information Technology Architect and Enterprise Systems Implementer.

# IT Jobs

- Approximately 10.1 million people earn their living from **information technology** jobs
  - **IT Association of America**
- **Information Technology** jobs are predicted to grow through 2010. This increase can be promising for Computer and Information Systems Managers, Operations Research Analysts, and Management and Data Analysts.
  - **U.S. Department of Labor**

# IT Jobs

- Application developer
- Global IT business planning & development  
Field Control Systems
- IT Service Management Analyst
- IT Desktop/Server/Network/Security Analyst
- Web/Online Designer/Developer

# Commercial game industry

- **Computer engineer**
  - Design the game platform(hardware and low-level software)
- **Software engineer**
  - Build the software architecture
- **Computer science**
  - Develop underlying algorithms for the game engines.
- **IT**
  - Comes at technology from the other end-player's perspective.
  - build software applications and programming.
  - Adapt technologies to enhance the lives of end users.

# JOBS

|                                  | IT | CS | CE | IS |
|----------------------------------|----|----|----|----|
| IT Management                    | @  |    |    | @  |
| Application Development          |    | @  | @  |    |
| Web and multi-media Development  | @  | @  |    |    |
| Telecommunication and Networking |    |    | @  |    |
| Database                         |    | @  |    |    |
| System programming               |    | @  | @  |    |
| System operations                | @  |    |    |    |
| Hardware Support                 |    |    | @  |    |
| IT Education and Training        | @  |    |    |    |
| Product Research & Development   |    | @  | @  |    |

# Graduate Study

- MS degree
  - Undergraduate CS or IT degree can help you to get a job.
  - The graduate degree can help you to build up your career.
- Ph.D. degree
  - Research Scientist
  - Professor
  - Industry

# Graduate Study (Cont.)

- You can get a graduate degree without spending a lot of money.
  - Teaching Assistant
  - Research Assistant
- Why School of Computing and Information Sciences at FIU?

# References

- [1] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2008-09 Edition*, Computer Scientists and Database Administrators, <http://www.bls.gov/oco/ocos042.htm>
  
- [2] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2008-09 Edition*, Computer Software Engineers, <http://www.bls.gov/oco/ocos267.htm>

# References

- [3] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2008-09 Edition*, Computer and information systems managers,  
<http://www.bls.gov/oco/ocos258.htm>
- [4] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2008-09 Edition*, Computer support specialists and systems administrators ,  
<http://www.bls.gov/oco/ocos268.htm>