**B.S. in COMPUTER AND INFORMATION SCIENCE**  (120 credits)  

Computer Science Concentration – CIS-CS

Curriculum Sheet for Fall 2007 Catalog  (Side 1, see also reverse side)

**CECS DISTRIBUTION Requirements 24**

**ENGLISH COMPOSITION (6)**
Composition Placement Exam required, and Take both COMP 105 (3) & COMP 270 (3)

**ECONOMICS (3)**
ECON 201 (3) Macroeconomics

**HUMANITIES** (See Notes * & **) Two courses, 100- to 400-level, 6 credits, from AFRICAN/AFRICAN-AM, HUM (AAAS) AAAS 239, 275, 333, 385, 389, 469, 470 ART HISTORY (ARTH) COMMUNICATIONS (COMM) COMM 220, 300/400-level COMPARATIVE LITERATURE (COML) ENGLISH (ENGL) FILM STUDIES (FILM or JASS) FOREIGN LANGUAGE MUSIC HISTORY (MHIS) PHILOSOPHY (PHIL) SCIENCE/TECH STUDIES, HUM (STS) STS 300, 307, 312, 403, 410, 485, 488 WOMEN/GEN STUDIES, HUM (WGST) WGST 303, 385, 386, 387, 416, 425, 445, 487

**BEHAVIORAL SOCIAL SCIENCES ** Two courses, 100- to 400-level, 6 credits, from AFRICAN/AFRICAN-AM, SSCI (AAAS) AAAS 106, 275, 312, 325, 345, 349, 368, 369, 371, 386, 387, 403, 404 ANTHROPOLOGY (ANTH) ECONOMICS (ECON) ECON 202, ECON 300-level only GEOGRAPHY (GEOG) GEOG 201, 205, GEOG 300-level only HISTORY (HIST) POLITICAL SCIENCE (POL) PSYCHOLOGY (PSYC) SCIENCE/TECH STUDIES, SSCI (STS) STS 300, 305, 308, 309, 321, 325, 340, 345, 349, 365, 374, 383, 385, 386, 409, 421, 430, 441, 442, 464 SOCIOLOGY (SOCI) WOMEN/GEN STUDIES, SSCI (WGST) WGST 303, 325, 326, 338, 362, 370, 405, 406, 407, 420, 446, 455, 3955

**UPPER-LEVEL COURSE** (3 credits)
One upper-level course, 300- or 400-level, in same discipline as a course already taken in Humanities or Behavioral/Social Sciences.

**MATHEMATICS and SCIENCE 36**

**MATHEMATICS & STATISTICS (21)**
MATH 115 (4) *Calculus I*
MATH 116 (4) *Calculus II*
CIS 275 (4) *Discrete Structures I*
CIS 306 (4) *Discrete Structures II*
IMSE 317 (3) *Probability/Statistics*

One of the following two (Linear/Matrix Alg)

MATH 227 (3) or MATH 217 (2)

**LABORATORY SCIENCE SEQUENCE (8)**
Two courses, 8 credits, in a sequence from:
- BIOL 130 (4) and BIOL 140 (4)
- or CHEM 134 (4) and CHEM 136 (4)
- or CHEM 144 (4) and CHEM 146 (4)
- or GEOL 118 (4) and GEOL 218 (4)
- or PHYS 125 (4) and PHYS 126 (4)
- or PHYS 150 (4) and PHYS 151 (4)

**ADDITIONAL SCIENCE Course (4)**
Four additional science credits from:
- BIOL 130 BIOL 140
- CHEM 134 CHEM 136 CHEM 144
- CHEM 146 CHEM 225 CHEM 226
- CHEM 227 GEOL 118 GEOL 218
- PHYS 125 PHYS 126 PHYS 130/131
- PHYS 150 PHYS 151

**Game Design Track MUST TAKE:**
PHYS 125 (4) *Intro Physics I*
or PHYS 150 (4) *General Physics I*
as 4 of the 12 credits of required lab science

**BUSINESS COURSE** (3 credits)
ENGR 400 (3) Applied Bus Techniques

**CIS COURSES & ELECTIVES 60**

**CIS CORE** – 7 courses (28 credits)
CIS 150 (4) Computer Science I
CIS 200 (4) Computer Science II
CIS 310 (4) Computer Organization & Assembly Language
CIS 350 (4) Data Structures
CIS 375 (4) Software Engineering
CIS 427 (4) Computer Networks & Distributed Systems
CIS 450 (4) Operating Systems

**CIS-CS Required** (4)
CIS 4951 (2) Design Seminar I
CIS 4952 (2) Design Seminar II

**CHOOSE ONE TRACK** from:
A) ENGINEERING SYSTEMS
B) GAME DESIGN
C) NETWORKING
D) SYSTEMS FOUNDATIONS
E) INDIVIDUALIZED COMPUTER SCIENCE

The Track courses, CIS-CS Electives, and General Electives must total **28 credits**
See reverse side for specific requirements.

**CIS-CS ELECTIVES**
Zero to 12 credits (depending on which Track is chosen) from:
CIS 285 (3) Software Eng Tools

Only 1 of the following 3 courses may used towards the 120 credits of the degree:
CIS 294, or CIS 296, or CIS 297 (3)

CIS 376 (4) Software Engineering II
CIS 381 (3) Industrial Robotics
CIS 387 (4) Digital Forensics I
CIS 400 (4) Programming Langu
CIS 405 (3) Algorithm Analysis/Design
CIS 421 (4) Database Systems
CIS 423 (3) Decision Support & Expert Systems
CIS 4261 (4) Information Sys Desgn I
CIS 4262 (4) Information Sys Desgn II
CIS 435 (3) Web Technology
CIS 437 (3) Advanced Networking
CIS 447 (3) Compt & Network Security
CIS 451 (3) Computer Graphics
CIS 452 (3) Computer Animation
CIS 467 (4) Digital Forensics II
CIS 474 (3) Compiler Design
CIS 476 (3) Softw Arch/Design Patterns
CIS 479 (3) Artificial Intelligence
CIS 487 (3) Computer Game Design I
CIS 488 (3) Computer Game Design II
CCM 404 (3) Dynamical Systems
CCM 472 (3) Numerical Analysis
CCM 473 (3) Matrix Computation
ECE 372 (4) Microprocessors
ECE 473 (4) Embedded Systems

**GENERAL ELECTIVES** (7-10 credits) depending on which Track is chosen. At least 6 credits must be outside CIS, math, nat science, & engin. See also notes. **

**Avoid NO-CREDIT courses.**

NO-CREDIT courses DON’T count for the degree. NO-CREDIT courses include ARTH 105, ECON 305, POL 300, PSYC 381, SOC 383, STAT 325, and many others.

Check the list!

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**Game Design Track**: for the 15 credits of Hum and Beh or Social Sciences MUST TAKE:

- a) 3 courses (9 credits) from: JASS 240, 248, 315, 345, 350, 370, 403, or 410
- b) 2 courses (6) in Behavioral/Social Sciences

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* Note: AAAS, STS, and WGST disciplines have different courses for Hum & BS/SS.
CHOSE ONLY ONE CIS-CS TRACK, from below. (Track courses and appropriate electives must add up to 28 credits)

A) **ENGINEERING SYSTEMS (Engineering Applications) Track** (28 credits) \[21 + 7 = 28\]
   One course (3 credits) from: CIS 294 (3) Visual Basic, or CIS 296 (3), Java Programming or, CIS 297 (3), C# Programming
   CIS 381 (3) Industrial Robotics
   CIS 400 (4) Programming Languages
   CIS 435 (3) Web Technology
   ECE 372 (4) Microprocessors
   ECE 473 (4) Embedded Systems
   General Electives (7 credits) [At least 6 credits must be outside CIS, mathematics, natural science, and engineering.]**

B) **GAME DESIGN Track** (28 credits) \[18 + 10 = 28\]
   CIS 297 (3) C# Programming
   CIS 451 (3) Computer Graphics
   CIS 452 (3) Computer Animation
   CIS 479 (3) Artificial Intelligence
   CIS 487 (3) Computer Game Design I
   CIS 488 (3) Computer Game Design II
   General Electives (10 credits) [At least 6 credits must be outside CIS, mathematics, natural science, and engineering.]**

   - As part of the 24 credits of required distribution (first page), Game Design students **must take** the following 15 credits:
     Three courses (9 credits) from: JASS 240, 248, 315, 345, 350, 370, 403, 410
     Two courses (6 credits) in the Behavioral or Social Sciences, from the choices listed on page 1, Column I.
   - As part of the 12 credits of required science courses (first page), Game Design students must take the following 4 credits:
     Either PHYS 125 (4) OR PHYS 150 (4), as part of the 2-course lab science sequence or as the 3rd laboratory science course.

C) **NETWORKING Track** (28 credits) \[20 + 8 = 28\]
   One course (3 credits) from: CIS 294 (3) Visual Basic OR, CIS 296 (3), Java Programming OR, CIS 297 (3), C# Programming
   CIS 400 (4) Programming Languages
   CIS 421 (4) Database Systems
   CIS 435 (3) Web Technology
   CIS 437 (3) Advanced Networking
   CIS 447 (3) Introduction to Computer and Network Security
   General Electives (8 credits) (At least 6 credits must be outside CIS, mathematics, natural science, and engineering.)**

D) **SYSTEMS FOUNDATIONS (Computer Science Foundations) Track** (28 credits) \[20 + 8 = 28\]
   One course (3 credits) from: CIS 294 (3) Visual Basic or, CIS 296 (3), Java Programming or, CIS 297 (3), C# Programming
   CIS 400 (4) Programming Languages
   CIS 405 (3) Algorithm Analysis and Design
   CIS 421 (4) Database Systems
   CIS 474 (3) Compiler Design
   CIS 479 (3) Artificial Intelligence
   General Electives (8 credits) [At least 6 credits must be outside CIS, mathematics, natural science, and engineering.]**

E) **INDIVIDUALIZED (Computer Science) Track** (28 credits) \[7 + 12 + 9 = 28\]
   One course (3 credits) from: CIS 294 (3) Visual Basic, or CIS 296 (3), Java Programming, or CIS 297 (3), C# Programming
   CIS 400 (4) Programming Languages
   CIS-CS ELECTIVES (12 credits) from side 1
   General Electives (9 credits) [At least 6 credits must be outside CIS, mathematics, natural science, and engineering.]**

**Avoid NO-CREDIT courses.** List of NO-CREDIT courses is posted outside 2000 HPEC and listed at end of the CECS Handbook: [www.engin.umich.edu/SRA/pdf/Student_Handbook.pdf](http://www.engin.umich.edu/SRA/pdf/Student_Handbook.pdf) NO-CREDIT courses DON’T count for the degree.

NO-CREDIT courses include ARTH 105, ECON 305, POL 300, PSYC 381, SOC 383, STAT 325, and many others. **Check the list!**

[See reverse side – OVER]