

COMPUTER SCIENCE

Dr. Ilhyun Lee

Associate Professor

Dr. Ilhyun Lee is an Associate Professor of Computer Science. He received his Ph.D. degree from Illinois Institute of Technology, Chicago, Illinois (1996). He was selected as Who's Who Among America's Teachers in 2006. His research interests include developing an Object-Oriented Scheduler in real-time environments. His research results have been published in the Journal of Computational Methods in Science and Engineering, and many refereed conference proceedings of the international computer science conferences sponsored by the well-known professional societies such as IEEE, ACM, and ISCA.

Administered by the Department of Mathematical and Computing Sciences within the College of Arts and Sciences.

The Bachelor of Science degree in Computer Science gives students the opportunity to obtain a thorough understanding of computers and their applications, and in the design and analysis of software and hardware systems for use in scientific and/or business environments.

Degree Requirements

The total credits required for a B.S. in Computer Science are **120**.

General Education

Students must complete the requirements shown in the General Education Requirements section of this catalog. The courses in laboratory sciences (as part of the General Education Core) must form a two-course sequence.

Computer Use

All majors must demonstrate a basic use of JAVA through completion of COSC 1430 and COSC 2430.

Major Requirements

All beginning students are expected to take COSC 1430 and 2430 or the equivalent before starting the major courses. These courses introduce general computer concepts and applications and develop programming skills. To complete the major program language requirements, the student will be expected to demonstrate programming competence in a second general purpose high level language. This competency can be demonstrated through the successful completion of a course in an approved language.

All plans of study in Computer Science include a common core of courses:

COSC 3310	Digital Computer Organization
COSC 3312	Discrete Mathematics
COSC 3315	Information Systems Design
COSC 3420	Data Structures

In addition to the common core, the student majoring in Computer Science is required to complete five advanced Computer Science courses including 3-6 hours of COSC 4395. These courses will be determined in consultation with the Computer Science faculty. In support of the major courses, the student is required to complete the Calculus sequence through MATH 2415, MATH 3301, and at least one additional mathematics course selected from MATH 3305, 3310, 3315 and 3320. Students at U. T. Permian Basin majoring in Computer Science are required to have a minor. The choice of the minor is up to the student but should be selected to further the student's education objectives.

No more than 45 semester credit hours of Computer Science may be applied toward the 120 semester hour minimum required for a degree.

Additional requirements:

1. The courses in laboratory sciences (as a part of the General Education Core) **must** form a two semester sequence.
2. One additional English Literature course (2000 or 3000 level).
3. Two capstone courses: NTSC 4301 and NTSC 4311.

Computer Science as a minor

Students seeking a minor in computer science must complete the courses listed below, or equivalent courses as approved by a computer science advisor.

COSC 1430 Introduction to Computer Science I	4
COSC 2430 Introduction to Computer Science II	4
COSC 2420 C Programming, or another course in a high level Language approved by the advisor	3/4
COSC 3310 Digital Computer Organization	3
COSC 3315 Information Systems Design	3
COSC 3xxx or 4xxx	$\frac{3}{4}$
TOTAL	20/22

Faculty in Computer Science may allow transferred credits to count towards a major or a minor in Computer Science. The number of credit hours required, at the upper-level or in total, cannot be reduced except by academic petition.

Teacher Certification and TExES Requirements

Candidates for TExES tests in Computer Science must complete the courses listed below, or equivalent courses as approved by a computer science advisor.

COSC 1430 Introduction to Computer Science I	4
COSC 2430 Introduction to Computer Science II	4
COSC 2420 C Programming, or another course in a high level Language approved by the advisor	3/4
COSC 3310 Digital Computer Organization	3
COSC 3312 Discrete Mathematics	3
COSC 3315 Information Systems Design	3
COSC 3420 Data Structures	$\frac{4}{4}$
TOTAL	24/25

Course Listing

COSC 1335 Computers and Problem Solving (3)

Introduction to basic issues related to computer aided problem solving. Computational problems will be studied using software packages, including spreadsheets and database systems. Use of the Internet and the World Wide Web, as problem solving resources is introduced. Basics of computer systems will be introduced. Same as Business Field of Study course COSC/BCIS 1305. Prerequisites: College Algebra or equivalent. FS

COSC 1430 Introduction to Computer Science I (4)

Computer organization, algorithm design, programming, and elementary data structures. Introduction to programming in a high-level language. Prerequisite or Corequisite: Math 1332 or 1324 or 2412 or equivalent. FS

COSC 2420 C Programming (4)

Programming in C, investigating the characteristics and implementation. Prerequisite: COSC 1430. S

COSC 2430 Introduction to Computer Science II (4)

Continuation of COSC 1430. Data structures, data abstraction, information hiding. Advanced programming in the language of the current COSC 1430. Prerequisite: COSC 1430. FS

COSC 3310 Digital Computer Organization (3)

Design of arithmetic, control, and memory units, binary data representation, error-detecting and error-correcting codes. Prerequisite: COSC 2430. F

COSC 3312 Discrete Mathematics (3)

Elementary logic, sets, functions, relations, permutations and combinations, modular arithmetic, graph theory and its applications. Prerequisite: MATH 2414. F

COSC 3315 Information Systems Design (3)

Computer systems and relationships between hardware and software components. Emphasis on business system design and analysis. Prerequisite: COSC 2430. S

COSC 3360 Computer Ethics (3)

An introduction to the responsibilities generally, and the ethical behavior specifically, expected of the computer and information systems professional. Includes the philosophical bases of ethical decision-making and the application of these principles to issues that arise in computing and information systems. Discussion of ethical standards as established by governmental bodies and professional organizations. Prerequisite: COSC 3315.

COSC 3420 Data Structures (4)

Design and implementation of algorithms for handling data structures such as linear lists, linked lists, stacks, queues, graphs, trees and strings. Prerequisites: COSC2430 and COSC3312. S

COSC 4330 Operating Systems (3)

Resource allocation including processors, main memory, I/O subsystems, and software resources. Prerequisites: COSC 3310, 3420.

COSC 4370 Data Communications (3)

Theory and techniques related to signal transmission, transmission media, signal encoding, interfacing, data link control and protocols. Prerequisites: COSC 3310 and permission of the instructor.

COSC 4389 Multi Listing (3)

Undergraduate courses which will be offered only once or will be offered infrequently or which are being developed before a regular listing in the catalog and may be acceptable for graduate credit.

COSC 4390 Theory of Computation (3)

Turing machines, Church's thesis, recursive functions, computability, and computational complexity. Prerequisite: COSC 3312 or MATH 3315.

COSC 4391 Contract Study (3)

Advanced independent study or research (equivalent to senior level course). These courses will not count for graduate credit

COSC 4395 Research (1-3)

Research in a selected field of computer science. Prerequisite: consultation with the major advisor and permission of the research sponsor. May be repeated for credit. FS

COSC 4415 Database Systems (4)

Introduction to database design and implementation using the ER model. Relational model concepts, constraints and relational algebra. Normalization, optimization and concurrency. Prerequisite: COSC 3315

COSC 4425 Programming Algorithms (4)

Investigation of programming strategies, and the analysis of sequential and parallel algorithms to optimize them from memory and time constraints. Prerequisite: COSC 3420.

COSC 4455 Multimedia and Web Development (4)

Use of software development tools for construction of multimedia and Web pages, including an introduction to HTML and XML. Students will utilize industry standard tools for processing graphics, animation, audio, and video. Prerequisite: COSC 3315.

COSC 4460 Software Engineering (4)

Fundamental Concepts and General Principles for software systems development. Visual modeling, software development life cycles, CASE tools, Web-based information systems. Prerequisite: COSC 3315. F

COSC 4475 Distributed Systems (4)

An introduction to the concepts of distributed processing. Topics include distributed architectures, distributed operating systems and programming languages, and distributed algorithms. Prerequisite: COSC 3310, 3420

COSC 4480 Programming Languages (4)

Fundamental concepts and general principles underlying the structure of high level programming languages in current use. Prerequisites: COSC 3420, knowledge of two high level programming languages. COSC 3310 is recommended.

Computer Science Degree Plan

Name _____

UID _____

Entered _____

This is a degree plan only. Teacher certification requires a separate certification plan.

	Date	Credits	Grade		Date	Credits	Grade
Gen Ed Core				Major			
UNIV 1101		1		COSC 1430		4	
ENGL 1301		3		COSC 2430		4	
ENGL 1302		3		COSC 2420		3	
HIST 1301		3		COSC 3310		3	
HIST 1302		3		COSC 3312		3	
PLSC 2305 (nat'l)		3		COSC 3315		3	
PLSC 2306 (st & loc)		3		COSC 3420		4	
ENGL 23xx (lit)		3		COSC 3/4xxx		3 or 4	
ENGL 2/3xxx (lit)		3		COSC 3/4xxx		3 or 4	
Fine Arts		3		COSC 3/4xxx		3 or 4	
COMM		3		COSC 3/4xxx		3 or 4	
Social Science		3		COSC 4395		3	
MATH 2412		4					
MATH 2413		4		Mathematics			
SCI w/ LAB, I		4		MATH 2414		4	
SCI w/ LAB, II		4		MATH 2415		4	
				MATH 3301		3	
Capstone Courses				One of:			
				MATH 3305, 3310,		3	
NTSC 4311		3		3315, 3320			
Minor				Electives			
		3 or 4					
		3 or 4					
		3 or 4					
		3 or 4					
		3 or 4					
		3 or 4					

Degree plan must include at least 48 upper level semester credit hours

Degree plan must include at least 120 total semester credit hours

Advisor signature

Date