

# CSE 5043 (Approved): Overview of Computer Systems For Non-Majors

## Course Description

Introduction to computer architecture and organization at machine and assembly level; pointers and addressing using C programming; introduction to operating system concepts: process, memory management, file system and storage, and multi-threaded programming.

**Transcript Abbreviation:** SystemsForNonMjrs

**Grading Plan:** Letter Grade

**Course Deliveries:** Classroom

**Course Levels:** Undergrad, Graduate

**Student Ranks:** Junior, Senior, Masters, Doctoral

**Course Offerings:** Autumn, Spring, Summer

**Flex Scheduled Course:** Never

**Course Frequency:** Every Year

**Course Length:** 14 Week

**Credits:** 3.0

**Repeatable:** No

**Time Distribution:** 4.0 hr Lec

**Expected out-of-class hours per week:** 5.0

**Graded Component:** Lecture

**Credit by Examination:** No

**Admission Condition:** No

**Off Campus:** Never

**Campus Locations:** Columbus

**Prerequisites and Co-requisites:** Prereq: 5022 or equivalent, and 5032 or equivalent

**Exclusions:** Not for CSE/CIS majors.

Not open to students with credit for CSE 2421 or 5042 or 2431 or 3430 or 360 or 660

**Cross-Listings:**

**Course Rationale:** Combined "systems" course for students pursuing a minor in CIS or in related programs.

**The course is required for this unit's degrees, majors, and/or minors:** No

**The course is a GEC:** No

**The course is an elective (for this or other units) or is a service course for other units:** Yes

**Subject/CIP Code:** 14.0901

**Subsidy Level:** Baccalaureate Course

## Programs

Abbreviation	Description
BS CSE	BS Computer Science and Engineering

## General Information

Not for CSE/CIS majors.
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## Course Goals

To be competent programming with pointers in C
To be competent with application development and debugging in Unix environments
To be familiar with overall organization and design of computer systems
To be exposed to representation and manipulation of information in computer systems
Be competent with process concepts
Be familiar with memory hierarchy, storage, and I/O
Be familiar with process synchronization and threads.
Be familiar with multi-threaded programming.

## Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Transitioning from Java/C++ to C, Basic C syntax, working in Unix Environments	6.0							
C pointers and memory allocation/deallocation and programming dynamic data structures with C	8.0		2.0					
Other misc C features: I/O operations, bit operations, function pointers, command line argument passing	3.0		1.0					
Debugging in Unix with gdb/xgdb, Use of Makefile, Other Unix features	2.0							
Introduction to Computer Systems Organization	4.0							
Integer representation and arithmetic, floating point	8.0		2.0					
Memory hierarchy (including basics of virtual memory)	8.0							
Process management	8.0							
Process synchronization and concurrent programming	8.0							
Input/output	4.0							

## Representative Assignments

Two labs on C programming (one simple, one with pointers)
One lab with memory hierarchy (file manipulation)
One lab with simple system calls (fork/join, or similar)
One lab on process/thread synchronization
One lab on multi-core parallelization

## Grades

Aspect	Percent
Programming Assignments (3-5)	35%
Written Assignments	10%
Mid-term	20%
Final Exam	35%

## Representative Textbooks and Other Course Materials

Title	Author
<i>Computer Systems: A Programmer's Perspective</i>	Bryant and O'Hallaron

Title	Author
<i>Pointers with C</i>	Kenneth Reek

### ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
*	a	An ability to apply knowledge of mathematics, science, and engineering.
*	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
**	c	An ability to design a system, component, or process to meet desired needs.
	d	An ability to function on multi-disciplinary teams.
***	e	An ability to identify, formulate, and solve engineering problems.
	f	An understanding of professional and ethical responsibility.
	g	An ability to communicate effectively.
	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
**	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

### BS CSE Program Outcomes

Course Contribution		Program Outcome
	a	an ability to apply knowledge of computing, mathematics including discrete mathematics as well as probability and statistics, science, and engineering;
	b	an ability to design and conduct experiments, as well as to analyze and interpret data;
	c	an ability to design, implement, and evaluate a software or a software/hardware system, component, or process to meet desired needs within realistic constraints such as memory, runtime efficiency, as well as appropriate constraints related to economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability considerations;
	d	an ability to function on multi-disciplinary teams;
	e	an ability to identify, formulate, and solve engineering problems;
	f	an understanding of professional, ethical, legal, security and social issues and responsibilities;
	g	an ability to communicate effectively with a range of audiences;
	h	an ability to analyze the local and global impact of computing on individuals, organizations, and society;
	i	a recognition of the need for, and an ability to engage in life-long learning and continuing professional development;
	j	a knowledge of contemporary issues;
	k	an ability to use the techniques, skills, and modern engineering tools necessary for practice as a CSE professional;
	l	an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;
	m	an ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;
	n	an ability to apply design and development principles in the construction of software systems of varying complexity.

### Additional Notes or Comments

This course is NOT intended for CSE/CIS majors. That is why for each BS-CSE Program Outcome, it lists "no contribution".

**Prepared by:** Kathryn Reeves