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👤 “Please remember me and my family in your prayers.” 🌸

📖 Bachelor of Science in Computer Science

🎓 University of the People

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Here you will find the syllabi and primary textbooks for all UoPeople courses. The Disclaimer for Use of the Repository can be found [here](#).

Computer Science

CS 1105 Digital Electronics & Computer Architecture



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CS 1105 Digital Electronics & Computer Architecture

Prerequisites: None

Course Description:

This course covers digital electronics, logic design, computer arithmetic, memory systems, programmable logic devices, and computer architecture. Students will be able to explain the principles of digital circuits and logic. We will use an online hardware simulator to actually “build” a computer and develop an assembler from the ground using concepts we will learn in class. Topics include number systems, Boolean logic, combinational and sequential circuits, computer arithmetic, memory hierarchies, and CPU (Central processing unit) design. By course completion, students will be equipped to contribute to the field of digital design, with skills in circuit design and microprocessor understanding.

Required Textbook and Materials: UoPeople courses use open educational resources (OER) and other materials specifically donated to the University with free permissions for educational use. Therefore, students are not required to purchase any textbooks or sign up for any websites that have a cost associated with them. The main required textbooks for this course are listed below and can be readily accessed using the provided links. There may be additional required/recommended readings, supplemental materials, or other resources and websites necessary for lessons; these will be provided for you in the course's General Information and Forums area, and throughout the term via the weekly course Unit areas and the Learning Guides.

- This course does not contain a main textbook; resources for all required reading will be provided in the course Learning Guide for each week.
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Software Requirements/Installation:

This course will require the use of two software packages: Logism and TECS. Both require that your computer have a Java v1.5 JRE (Java Run Time) installed.

Note that the information on how to install the software has been included in the Learning Guide of Unit 1, under the heading "Download and Install Software."

Learning Objectives and Outcomes:

By the end of this course students will be able to:

1. Explain the principles of Digital Circuits Logic, Boolean Algebra, and concepts of number systems.
2. Analyze the principles of logic gate combinations and sequential logic design.
3. Describe the basic principles of memory and the ALU (Arithmetic and Logic Unit) within a computer system.

4. Recognize the relationship between machine language and the functioning of a computer system.
 5. Examine basic assembler coding techniques.
 6. Explain the concept of computer language hierarchy.
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Course Schedule and Topics: This course will cover the following topics in eight learning sessions, with one Unit per week. The Final Exam will take place during Week/Unit 9 (UoPeople time).

Week 1: Unit 1 - Introduction to Digital Design

Unit Learning Outcomes:

By the end of this Unit, you will be able to:

1. Explain about basic logic gates.
2. Apply Boolean algebra and logic gates to construct digital circuits.

Week 2: Unit 2 - Combinational Logic Design

Unit Learning Outcomes:

By the end of this Unit, you will be able to:

1. Explain the concept of combinational circuits and their applications.
2. Demonstrate the ability to design combinational circuits using logic gates.

Week 3: Unit 3 - Sequential Logic Design

Unit Learning Outcomes:

By the end of this Unit, you will be able to:

1. Compare and contrast the functionality and characteristics of flip-flops.
2. Apply sequential circuit design with registers and counters.

Week 4: Unit 4 - Computer Arithmetic

Unit Learning Outcomes:

By the end of this Unit, you will be able to:

1. Identify different number systems and perform arithmetic operations.
2. Demonstrate an understanding of principles of adders, subtractors, multipliers and dividers.
3. Explain the implementation and design of adders, subtractors, multipliers, and dividers to perform mathematical operations.

Week 5: Unit 5 - Memory and Programmable Logic

Unit Learning Outcomes:

By the end of this Unit, you will be able to:

1. Explain memory hierarchy in computers.
2. Discuss the memory type performance benefits and trade-offs.
3. Compare and contrast programmable logic devices (PLDs) to design digital circuits.

Week 6: Unit 6 - Computer Architecture

Unit Learning Outcomes:

By the end of this Unit, you will be able to:

1. Determine computer architecture types for specific applications and understand real-world impacts.
2. Examine machine languages for Z80 microprocessor.
3. Summarize the importance of interrupt handling.

Week 7: Unit 7 - Assembler Language: Concepts and Techniques

Unit Learning Outcomes:

By the end of this Unit, you will be able to:

1. Develop high-level data structures using assembly language to solve complex programming problems.
2. Identify differing coding practices and design principles in Python and Java.
3. Explain program translation among different programming languages to illustrate semantic differences.

Week 8: Unit 8 - Compiler Process Overview

Unit Learning Outcomes:

By the end of this Unit, you will be able to:

1. Determine the significance of accurate symbol placement for the effective functioning of computing systems.
2. Explain the symbol resolution methods in digital logic, microprocessor, and assembly programming.

Week 9: Unit 9 - Course Review and Final Exam

Course Requirements:**Discussion Assignments & Response Posts/Ratings**

Some units in this course require that you complete a Discussion Assignment. You are required to develop and post a substantive response to the Discussion Assignment in the Discussion Forum. A substantive response is one that fully answers the question that has been posed by the instructor. In addition, you must extend the discussion by responding to at least two (2) of your peers' postings in the Discussion Forum. Discussion Forums are only active for each current and relevant learning week, so it is not possible to contribute to the forum once the learning week has come to an end.

Assignment Activity

Assignment Activity is graded by your instructor. The grading rubric is listed under the assignment instructions. The grading rubric is a document that outlines the criteria that your instructor will use to grade your work.

Quizzes

This course will contain three types of quizzes – the Self-Quiz, the Graded Quiz, and the Review Quiz. These quizzes may contain multiple choice, true/false, or short answer questions. The results of the Self-Quiz will not count towards your final grade. However, it is highly recommended that you complete the Self-Quiz to ensure that you have adequately understood the course materials. Along with the Reading Assignments, the results of the Self-Quiz should be used as part of an iterative learning process, to thoroughly cover and test your understanding of course material. You should use the results of your Self-Quiz as a guide to go back and review relevant sections of the Reading Assignments. Likewise, the Review Quiz will not count towards your final grade, but should also be used to assist you in a comprehensive review and full understanding of all course material, in preparation for your Final Exam. Lastly, the results of the Graded Quiz will count towards your final grade. Specific instructions on the format and content of the Graded Quiz will be provided by your instructor.

Final Exam

The Final Exam will take place during the Thursday and Sunday of Week/Unit 9, following the completion of eight units of work. The format of the Final Exam is similar to that of the quizzes and may contain a combination of different question types. You will have one attempt to take the exam, and it will be graded electronically. Specific instructions on how to prepare for and take the Final Exam will be provided during Week 8 (located inside the Unit 9 Learning Guide). Final Exams must be taken without the use of course learning materials (both those inside and outside the course). If particular materials are allowed for use during the exam, these will be noted in the exam's instructions.

Course Forum

The Course Forum is the place to raise issues and questions relating to the course. It is regularly monitored by the instructors and is a good place to meet fellow students taking the same course. While it is not required to participate in the Course Forum, it is highly recommended.

Class Introductions

This section is your opportunity to introduce yourself to your classmates and create a vibrant learning community. By sharing your background, interests, and goals, you can create meaningful connections and discover commonalities with your peers

Course Policies:

Grading Components and Weights

Each graded component of the course will contribute some percentage to the final grading scale, as indicated here:

Grade Components

Course Requirements	Number of Items	Percentage
Discussion Forum	8	25%
Assignment Activities	8	40%
Graded Quizzes	2	20%
Final Exam	1	15%
Total		100%

Grading Scale

This course will follow the standard 100-point grading scale defined by the University of the People, as indicated here:

Letter Grade	Grade Scale	Grade Points
A+	98-100	4.00
A	93-97	4.00
A-	90-92	3.67
B+	88-89	3.33
B	83-87	3.00
B-	80-82	2.67
C+	78-79	2.33
C	73-77	2.00
C-	70-72	1.67
D+	68-69	1.33
D	63-67	1.00
D-	60-62	0.67
F	Under 60	0.00

Grade Appeal

If you believe that the final grade you received for a course is erroneous, unjust, or unfair, please contact your course instructor. This must be done within seven days of the posted final grade. For more information on this topic, please review the Grade Appeal Procedure in the University Catalog.

Participation

Non-participation is characterized by a lack of any assignment submissions, inadequate contributions to the Discussion Forums, and/or lack of peer feedback to Discussion Assignments. Also, please note the following important points about course participation:

- Assignments must be submitted on or before the specified deadline. A course timeline is provided in the course schedule, and the instructor will specify deadlines for each assignment.
- Occasionally there may be a legitimate reason for submitting an assignment late. Most of the time, late assignments will not be accepted and there will be no make-up assignments.
- All students are obligated to inform their instructor in advance of any known absences which may result in their non-participation.

Academic Honesty and Integrity

If and when you submit any work that requires research and writing, it is essential to cite and reference all source material. Failure to properly acknowledge your sources is known as “plagiarism” – which is effectively passing off an individual's words or ideas as your own. University of the People adheres to a strict policy of academic honesty and integrity. Failure to comply with these guidelines may result in sanctions by the University, including dismissal from the University or course failure. For more information on this topic, please review the Academic Integrity Policy in the University Catalog.

Any materials cited in this course should be referenced using the style guidelines established by the American Psychological Association (APA). The APA format is widely used in colleges and universities across the world and is one of several styles and citation formats required for publication in professional and academic journals. Refer to the [UoPeople APA Tutorials in the LRC](#) for help with APA citations. For help with using the library, kindly refer to [UoPeople Library](#).

Code of Conduct

University of the People expects that students conduct themselves in a respectful, collaborative, and honest manner at all times. Harassment, threatening behavior, or deliberate embarrassment of others will not be permitted.

Any conduct that interferes with the quality of the educational experience is not allowed and may result in disciplinary action, such as course failure, probation, suspension, or dismissal. For more information on this topic, please review the Code of Conduct Policy in the University Catalog.

Submitting Assignments

Please note that accepted formats for assignments are Microsoft compatible format, PDF, or any other file format that is specified in the course and activity instructions. These files should not be password-protected. Additionally, unless otherwise stated in assignment instructions, screenshots of computer coding, mathematical formulas, or images with sentence structures (typed or in handwriting) are not allowed when you submit your assignments in this course.