CISC 530
Computer Architecture
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COURSE OVERVIEW

This course will provide:

- Detailed study concerning the functional elements and structures of digital computers.
- Detailed study concerning computer organization hardware at the register/memory transfer level, computer arithmetic, and I/O in relation to the architectural design to be implemented.

COURSE OBJECTIVES

The primary objectives of this course are:
- Introduce the most important system architecture approaches.
- Introduction of designing digital logic circuits using CAD tools.
- Give a wider understanding of how real systems operate and, from that understanding, the ability to optimize their use.

The emphasis of the course is on teaching the fundamentals, and not on providing a mastery of specific commercially available hardware or software tools or programming environments.

PREREQUISITES

- BS in computer information sciences, or another related BS.

TEXTBOOK and REFERENCES

- "The Essentials of Computer Organization and Architecture", 4th Edition, 2015, by Linda Null.
- "Fundamentals of Digital Logic with Verilog Design"3rd Edition ,2014,by Stephen Brown.

Note students with disabilities: Harrisburg University's policy is not to discriminate against qualified students with documented disabilities. It is also your instructor's policy to try and help students learn by

whatever reasonable means necessary. If you have a disability
related need that requires a modification in your testing situation, please notify your instructor a week before the first test or quiz so that your need can be accommodated. You may be asked to present documentation that describes the nature of your disability and the recommended remedy.

HU CORE COMPETENCIES

At the conclusion of this course a student will have met the following core competencies that reflect HU's mission:
- o   Critical Thinking and Problem-Solving skills are demonstrated by the student's ability to:
  - Identify and clarify the problem,
  - Gather information,
  - Evaluate the evidence,
  - Consider alternative solutions,
  - Choose and implement the best alternative.
- o   Communication - The core communication skills are demonstrated by the student's ability to:
  - Express ideas and facts to others effectively in a variety of formats, particularly written, oral, and visual formats,
  - Communicate effectively by making use of information resources and technology.
- o   Teamwork and Collaboration - The students will be working with others to increase involvement in learning and by sharing one's own ideas and responding to others' reactions to sharpen thinking and deepen understanding.
- o   Information Technology - The students will be making effective use of the .NET information r e s o u r c e s and technology.
- o   Competency Assessment: One assignment (Assignment 00) will be used to evaluate your level of proficiency in an HU core competency (Information Literacy) (http://www.harrisburgu.net/academics/core-competencies.php) directly connected to that assignment. This competency assessment will not impact your grade in this course, but can be used as a gauge for you to self- evaluate your progress in developing your skill level in specified core competencies attached to the assignment.

COURSE CONDUCT

A few rules will help us to get the most of our investment in CISC 530:
Classes will start on time and end as scheduled. Please take your seat prior to the start of class.
You will attend each class and actively participate in the discussions during class. If you are uncomfortable with public speaking, or if English is not your native language, please talk to the instructor in the first two weeks of the course to establish ways to make you more comfortable in speaking and interacting with other students (your peers).
For every hour of class time, I anticipate that you will need to budget about 3 hours of out-of-class time. This implies that you need to budget about 120 hours of out-of-class time over the course of the semester. This time estimate is a guide and you may need to budget more. For example, if the material is new to you or difficult to comprehend, it will require more of your time.

You are responsible for all the readings, even if the material is not explicitly covered in class. You should read the class materials prior

to class and be prepared to discuss and ask questions about the readings and quiz materials. You should also re-read the material after class as not every topic will be covered during class time. Many passages in the text may need to be read several times to gain clarity. Also, taking notes on the material you are reading and reflecting on the reading and these notes will help you better understand the issues, concepts and techniques that are being presented.

All work must be completed and turned in on or before the assigned date. No late work will be accepted. Late means after the due date and time. Note that a computer's failure is not an excuse (it represents poor p l a n n i n g on your part).

All written work must be done using a word processor. Carefully proofread your work since mistakes which include spelling errors, grammatical errors, and typos will affect your grade. Your work should be properly referenced and adhere to standards of both academic integrity and proper form. Generally, I p r e f e r the APA style (see www.apa.org).

All class credit-related electronic mail must be done using Harrisburg's electronic mail service and the s t u d e n t ' s assigned Harrisburg University ID. Students are welcome to use Gmail, Yahoo mail, Hotmail or any other service for their private non-class-related use. By 'credit-related' I mean all work to be e v a l u a t e d for credit. Any work submitted through a different mail system will not be accepted.

When individual work is assigned it should be done by you, alone. Students who participate in U n i v e r s i t y -sanctioned events (such as athletics) *must make prior arrangements and give the instructor a m p l e notice*. *Missing class for practice is not advised.*

Course Outline:

CISC 530			
Week	**Topic**	**Assignments**	**Book Referred**
1	Introduction to the Course Introduction to the course material, grading, assignments, due dates, and other logistics related to the course.		
2	Continue CH1: Introduction	**(Assignment 1)** **As posted in your Moodle Page**	"The Essentials of Computer Organization and Architecture", 4th Edition, 2015, by Linda Null
3	CH2: Data Representation in Computer Systems		

4	CH3: Boolean Algebra and Digital Logic & Focus on Karnaugh Maps		"The Essentials of Computer Organization and Architecture", 4th Edition, 2015, by Linda Null.
5	Introduction to Verilog/CAD Tools		"Fundamentals of Digital Logic with Verilog Design"3rd Edition ,2014,by Stephen Brown.
6	Design of Arithmetic Circuits using CAD tools		
7	Design of Combinational circuits Building blocks using Verilog		
8	Design of FlipFlops,Registers,counters and Synchronous Sequential Circuits using Verilog.		
MID TERM Examination		**See your Moodle page for date/time for this examination**	
9	**Cache Memory**		
10	CH5: A Closer Look at Instruction Set Architectures		
	CH6: Memory	**(Assignment 2)** **As posted in your Moodle Page**	"Essentials of Computer Organization and Architecture", 4th Edition, 2015, by Linda Null
11	CH7: Input/output and Storage Systems & Focus on Data Compression		
12	CH8: System Software		
13	CH9: Alternative Architectures		

14	CH10: Topics in Embedded Systems		
15	Revision /some practical projects in Verilog.		
16	**FINAL TERM Examination**	**See your Moodle page for date/time for this examination**	

Rubrics:

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For Assessment, the Following Rubrics Will Apply:

Performance Indicator	1: Beginning	2: Developing	3: Proficient	4: Exemplary
Organize material	• Little organization (paragraphs, sections) • Missing Problem Statement or Purpose • Missing Conclusion or Summary • Missing other major section • Missing References	• Confusing organization • Weak Problem Statement or Purpose • Weak Conclusion or Summary • Other sections are weak • Weak list of References	• Mostly logical and complete organization • Adequate Problem Statement or Purpose • Adequate Conclusion or Summary • Adequate list of References	• Excellent organization • Well-stated Problem Statement or Purpose • Strong Conclusion or Summary • Thorough list of References

Present content in own words to demonstrate comprehension	• Lacking information or information is inaccurate or irrelevant • Some text has been plagiarized • Presents little understanding of topic	• Some basic information, but some is inaccurate or irrelevant • Significant amount of text is copied verbatim from another source with citation • Presents basic understanding of some parts of topic	• Adequate information with a few minor errors or omissions • Adequate research • Text is mostly the author's own words; only a slight amount of copied and cited text • Presents general understanding of topic	• Exceptional information (accurate and relevant) • Careful and thorough research • All text is the author's own • Presents in-depth understanding and insight
Provide data to support claims or inform audience	• Ideas not expressed clearly nor supported by details • No interpretation of data • No illustrations, or they do not support core message(s)	• Ideas not expressed clearly or details are weak • Data analysis is weak • Illustrations are unrelated, confusing, or mislabeled	• Ideas are generally expressed clearly and details are adequate • Data analysis is adequate • Illustrations support ideas, but have some mislabeling or do not present data in best way	• Ideas are well- developed, expressed clearly with many appropriate details • Data analysis is thorough and clever • Illustrations clearly support core message(s), are properly labeled and captioned
Demonstrate proper use of English	• Numerous errors in grammar, punctuation, spelling • Many sentences have an awkward construction • Does not appear to have been proofread	• Several errors in grammar, punctuation, spelling • Several sentences have an awkward construction • Proofreading appears t o have been done hastily	• A few errors in grammar, punctuation, spelling • Sentences are mostly well- crafted • Appears to have been proofread, but further revision could improve text	• Minor errors, if any, in grammar, punctuation, spelling • Varied and creative sentence structure • Demonstrates thorough proofreading and revision

ASSIGNMENTS and EXAM DESCRIPTIONS

There are assignments, a mid-term exam, and a final t e r m exam. Please consult the s c h e d u l e , which is/will be posted on Moodle, to see when the assignments, presentations, and exams are scheduled.

Here is a brief description of each: (*Always Check Your Moodle Page & News Forum*)

1. Two (**2**) Assignments:
   a) Each student is responsible for completing the assignments in accordance with the specifications given by the instructor, *APA style* (see www.apa.org).
   b) Each assignment *is between 15 to 20 pages* and is worth a maximum of twenty (**15**) points, a total of **forty** (**30**) points.

2. Mid-Term Examination:
   Two hours Online Examination: This examination w i l l cover chapters 1,2,3,4, and 5, a total of **thirty** (**30**) points.

3. Final-Term Examination:
   Two hours Online Examination: This examination w i l l cover c hapters 6,7,8,9, and 10, a total of **thirty** (**30**) points.

STATEMENT ON ACADEMIC INTEGRITY

According to the University's Student Handbook: Academic integrity is the pursuit of scholarly activity free from fraud and deception, and is the educational objective of this institution. Academic dishonesty includes, but is not limited to cheating, plagiarism, fabrication of information or citations, facilitating acts of academic dishonesty by others, unauthorized possession of examinations, submitting work of another person, or work previously used without informing the instructor, or tampering with the academic work of other students. Any violation of academic integrity will be thoroughly investigated, a n d where warranted, punitive action will be taken.

Students should be aware that standards for documentation and intellectual contribution may depend on t h e course content and method of teaching, and should consult the instructor for guidance in this area.

HONOR CODE

We as members of Harrisburg University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work. As a Community of Learners, we honor and uphold the *HU Honor Code*.