Philadelphia University
Faculty of Information Technology
Department of Computer Science
----- Semester, 2007/2008

Course Syllabus

Course Title: Computer Logic Design	**Course code: 750131**
Course Level: 1	**Course prerequisite(s) and/or corequisite(s): 710101**
Lecture Time:	**Credit hours: 3**

Academic Staff Specifics

Name	Rank	Office Number and Location	Office Hours	E-mail Address

Course Description:
This module introduces the concepts of the design and implementation of digital circuits. Laboratory experiments will be used to reinforce the theoretical concepts discussed in lectures. The lab experiments will involve the design and implementation of digital circuits. Emphasis is on the use computer aided tools in the design, simulation, and testing of digital circuits.

Course Objectives:
The aim of the module is to introduce to the students the topics that include combinational and sequential circuit analysis and design, digital circuit design optimization methods using random logic gates, multiplexers, decoders, registers, counters and programmable logic arrays.

Course Components
- Introduction to Digital logic Design
- Binary Systems and Codes
- Binary Codes: BCD, Gray, ASCII and EBCDIC
- Binary Logic and Logic Gates: AND, OR and NOT
- Boolean Algebra and Logic Gates
- Integrated Circuits
- Gate-Level Minimization
- Analysis and Synthesis of Combinational Circuits
- Analysis and Synthesis of Sequential Circuits
- Registers and Counters
- Sequential Circuits with Programmable Logic Devices

Textbook:
Title: Digital Logic
Author: Morris Mano
Publisher: Prentice Hall, 1991 or 2002

In addition to the above, the students will be provided with handouts by the lecturer.

Teaching Methods:
Duration: 16 weeks, 48 hours in total
Lectures: 41 hours (2-3 per week)
Tutorial: 4 hours (1 every 3 weeks)
Laboratory: 3 hours.

Learning Outcomes:

- **Knowledge and understanding**
  - Minimize functions using any type of minimizing algorithms (Boolean algebra, Karnaugh map or Tabulation Method).

- **Cognitive skills (thinking and analysis).**
  - Define the problem (Inputs and Outputs), write its functions.
  - Implement functions using digital circuit (Combinational or Sequential).

- **Communication skills (personal and academic).**
  - Have knowledge in analyzing and designing procedures of Combinational and Sequential circuits.

- **Practical and subject specific skills (Transferable Skills).**
  - Work effectively with others.
  - Use simulation software, for testing the designed circuit.

Assessment Instruments

Allocation of Marks	
Assessment Instruments	**Mark**
First examination	**15%**
Second examination	**15%**
Final Exam (written unseen exam)	**50%**
Reports, assignments, Quizzes, Home works, Tutorials	**20%**
Total	**100%**

** Make-up exams will be offered for valid reasons only with consent of the Dean. Make-up exams may be different from regular exams in content and format.*

Practical Submissions
The assignments that have work to be assessed will be given to the students in separate documents including the due date and appropriate reading material.

Documentation and Academic Honesty

Submit your home work covered with a sheet containing your name, number, course title and number, and type and number of the home work (e.g. tutorial, assignment, and project).

Any completed homework must be handed in to my office (room IT…) by 15:00 on the due date. After the deadline "zero" will be awarded. You must keep a duplicate copy of your work because it may be needed while the original is being marked.

You should hand in with your assignments:

1- A printed listing of your test programs (if any).
2- A brief report to explain your findings.
3- Your solution of questions.

- **Protection by Copyright**

1. Coursework, laboratory exercises, reports, and essays submitted for assessment must be your own work, unless in the case of group projects a joint effort is expected and is indicated as such.
2. Use of quotations or data from the work of others is entirely acceptable, and is often very valuable provided that the source of the quotation or data is given. Failure to provide a source or put quotation marks around material that is taken from elsewhere gives the appearance that the comments are ostensibly your own. When quoting word-for-word from the work of another person quotation marks or indenting (setting the quotation in from the margin) must be used and the source of the quoted material must be acknowledged.
3. Sources of quotations used should be listed in full in a bibliography at the end of your piece of work.

- **Avoiding Plagiarism**.

1. Unacknowledged direct copying from the work of another person, or the close paraphrasing of somebody else's work, is called plagiarism and is a serious offence, equated with cheating in examinations. This applies to copying both from other students' work and from published sources such as books, reports or journal articles.
2. Paraphrasing, when the original statement is still identifiable and has no acknowledgement, is plagiarism. A close paraphrase of another person's work must have an acknowledgement to the source. It is not acceptable for you to put together unacknowledged passages from the same or from different sources linking these together with a few words or sentences of your own and changing a few words from the original text: this is regarded as over-dependence on other sources, which is a form of plagiarism.
3. Direct quotations from an earlier piece of your own work, if not attributed, suggest that your work is original, when in fact it is not. The direct copying of one's own writings qualifies as plagiarism if the fact that the work has been or is to be presented elsewhere is not acknowledged.
4. Plagiarism is a serious offence and will always result in imposition of a penalty. In deciding upon the penalty the Department will take into account factors such as the year of study, the extent and proportion of the work that has been plagiarized, and the apparent intent of the student. The penalties that can be imposed range from a minimum of a zero mark for the work (without allowing resubmission) through caution to disciplinary measures (such as suspension or expulsion).

Course Academic Calendar

Week	Basic and support material to be covered	Homework/reports and their due dates
(1)	Introduction to Digital logic Design.	
(2)	Binary Systems and Codes: Binary Numbers. Octal and Hexadecimal Numbers. Number Base Conversions. Arithmetic Operation with different Bases	
(3)	Complements. Signed Binary Numbers. Binary Codes: BCD, Gray, ASCII and EBCDIC. Binary Logic and Logic Gates: AND, OR and NOT	Tutorial 1
(4)	Boolean Algebra and Logic Gates: Basic Definition. Basic Theorems. Boolean Functions.	Lab 1
(5)	Standard Forms: Minterm and Maxterm. Simplification of Boolean Functions using SOP and POS.	
(6)	Logic Operations: NAND, NOR, Exclusive-OR and Equivalence. Integrated Circuits	Tutorial 2
(7) **First Exam**	Gate-Level Minimization: The Map Method. Two- and Three-Variable Map. Four-Variable Map. Product of Sums Simplification. Don't-Care Conditions.	
(8)	NAND and NOR Implementation. The Tabulation Method. Simplification of Boolean Functions using Tabulation Method.	Lab 2
(9)	Analysis and Synthesis of Combinational Circuits: Combinational Circuits. Analysis and Design Procedure.	Tutorial 3
(10)	Binary Adders-Subtractor. Decoders and Multiplexers.	
(11) **Second Exam**	Analysis and Synthesis of Sequential Circuits: Sequential Circuits. Latches. Flip-Flops: RS, D, JK and T.	
(12)	Analysis of Clocked Sequential Circuits. Design Procedure	
(13)	Registers and Counters: Registers.	Tutorial 4

	Shift Registers.	
(14)	Synchronous Counters. Ripple Counters.	Lab 3
(15) Specimen examination (Optional)	Sequential Circuits with Programmable Logic Devices: Introduction. • Random-Access Memory. • Memory Decoding. • Read-Only Memory. • Programmable Logic Array.	
(16) Final Examination	Review	

Expected Workload:
On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance Policy:
Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Module References
Students will be expected to give the same attention to these references as given to the Module textbook(s)

1. Morris Mano, Charles R. Kime, Logic and computer design fundamentals, Pearson Prentice Hall, 2004
2. Basavaraj,B., Digital fundamentals, New Delhi: Vikas Publishing House, 1999.
3. Kandel Langholz, Digital Logic Design, Prentice Hall, 1988.
4. Rafiquzzaman & Chandra, Modern Computer Architecture, West Pub. Comp., 1988.