Philadelphia University
Faculty of Engineering
Department of Communications & Electronics
First semester, 2010/2011

Course Syllabus

Course Title: Digital Electronics	Course code: 650421
Course Level: 4year	Course prerequisite (s) and/or corequisite (s): Logic Circuit Design (650261) & Electronics (650221)
Lecture Time: 10;10 - 11;10	Credit hours: 3

Academic Staff Specifics

Name	Rank	Office	Office Hours	E-mail Address
Dr. Wagah F Mohammed	Associate Prof.	813	9 - 10 Sa - Th 12 - 14 Mo &We	wfarman@philadelphia.edu.jo

Course module description:
This course aims to provide students with all information about:
Digital signals and systems, pulse waveforms, switching circuits, pulse distortion, RC circuits, Exponential form RC and periodic pulse waveforms.
Switching devices, diodes and transistors as switching devices, analysis of switching circuits and switching times.
Logic technologies and families, digital integrated circuits terminology, TTL family, TTL loading rules, open collector, tri-state, ECL family, MOS technology, operation and types, MOS inverter, NMOS, PMOS, CMOS, dynamic MOS, CMOS transmission circuits.
Interfacing, TTL driving CMOS, flip-flops, multivibraters, monostables, astables, Schmitt trigger, bistables, 555 IC timer, memory elements and types, programmable logic devices.
Analog to digital converter and digital to analog converter,
Visual displays

Course module objectives:
At completing this course the student should be able to:
- Know the operation and the structure of switching circuits.
- Design and use of diodes and transistors as a switching circuits.
- Design and construct the logic families, TTL, ECL, and MOSFET
- Have an idea about multivibraters circuits and memory elements.
- Be able to covert the analog signal to digital and vice versa. And be able to design the electronic circuits for signal conversion.

Course/ module components:

- Books (title , author (s), publisher, year of publication)
  Title: Digital Electronics.
  Author: Roger L. Tokheim.
  Publisher: 5th edition, McGraw-Hill

Teaching methods:

Lectures, discussion groups, tutorials, problem solving, debates, etc.
Lectures, discussion in class, tutorials, and problem solving.
Duration: 16 weeks, 48 hours in total
Lectures: 48 hours, 3 per week + two exams (two hours)

Learning outcomes:

Knowledge and understanding.

1) Introduction to signals, switching and digital terminologies.
2) Basic knowledge about logic technologies and families.
3) Discussions and construction of TTL, ECL, MOSFET Circuits.
4) Understanding the integrated circuits interfacing and be able to use multivibraters and memory elements.
5) Be able to covert the analog signal to digital and vice versa. And be able to design the electronic circuits for signal conversion.

Cognitive skills (thinking and analysis).

1) Develop a strong grounding in the fundamentals of digital electronics
2) Understanding, designing and construction different digital circuits.

Communication skills (personal and academic).

1) Clarify personal values and objectives.
2) Work with a variety of people.
3) Manage tasks and solve problems.

Practical and subject specific skills (Transferable Skills).

1) Use appropriate mathematical skills to describe , analyze, and solve problems in digital electronic circuits.
2) Evaluate and test the electronic circuits using laboratory and demonstrations.

Course Intended Learning Outcomes								
A - Knowledge and Understanding								
A1.	A2.	A3.	A4	A5	A6			
B - Intellectual Skills								
B1.	B2.	B3	B4	B5				
C - Practical Skills								
C1.	C2	C3	C4	C5				
D - Transferable Skills								
D1.	D2.	D3.	D4	D5				

Assessment instruments

Allocation of Marks	
Assessment Instruments	Mark
First examination	15 %
Second examination	15 %
Final examination: 50 marks	50%
Reports, research projects, Quizzes, Home works, Projects	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*

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 821) by 13:00 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.

For the research report, you are required to write a report similar to a research paper. It should include:

- Abstract: It describes the main synopsis of your paper.
- Introduction: It provides background information necessary to understand the research and getting readers interested in your subject. The introduction is where you put your problem in context and is likely where the bulk of your sources will appear.
- Methods (Algorithms and Implementation): Describe your methods here. Summarize the algorithms generally, highlight features relevant to your project, and refer readers to your references for further details.
- Results and Discussion (Benchmarking and Analysis): This section is the most important part of your paper. It is here that you demonstrate the work you have accomplished on this project and explain its significance. The quality of your analysis will impact your final grade more than any other component on the paper. You should therefore plan to spend the bulk of your project time not just gathering data, but determining what it ultimately means and deciding how best to showcase these findings.
- Conclusion: The conclusion should give your reader the points to "take home" from your paper. It should state clearly what your results demonstrate about the problem you were tackling in the paper. It should also generalize your findings, putting them into a useful context that can be built upon. All generalizations should be supported by your data, however; the discussion should prove these points, so that when the reader gets to the conclusion, the statements are logical and seem self-evident.
- Bibliography: Refer to any reference that you used in your assignment. Citations in the body of the paper should refer to a bibliography at the end of the paper.

• **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/module academic calendar

week	Basic and support material to be covered	Homework/reports and their due dates
(1)	Introduction and definitions	
(2)	Pulse waveforms and Switching circuits	H.W. 1
(3)	Switching devices, diodes	Quiz-1
(4)	Transistors as a switch	H.W. 2
(5)	Logic families and terminologies	Quiz-2
(6) .	TTL logic family	First Exam
(7)	TTL loading rules	
(8)	ECL logic family	
(9)	MOSFET digital circuits	H.W. 3
(10)	NMOS & PMOS	Quiz-3

(11) .	CMOS & Transmission gate	Second Exam
(12)	Multivibraters	
(13)	Memory Elements &PLDs	H.W. 4
(14)	Signal conversion	Project
(15)	Visual displays	
(16)	Final Examination	Final Examination

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.

Course references
Books

1. Adel &. Sedra and Kenneth C. Smith; Microelectronic circuits; 3rd Ed; Saunders College Pub.; 1991.
2. Jacob Milkman and Arvin Grabel; Microelectronics; 2nd Ed; McGraw - Hill Pub.; 1988.
3. Ronald J. Tocci; Fundamental of pulse and Digital circuit; 3rd Ed; Charlees E. Merrill Pub.; 1983.