Course Syllabus
EGCI 331 Introduction to IC Design

1. Program of Study Bachelor of Engineering Program in Computer Engineering (International Program)

2. Course Code/Title EGCI 331 Introduction to IC Design

3. Number of Credits 4 (4-0-8) Credit (Lecture-Lab-Research)

4. Prerequisites EGCI 231

5. Type of Course Major Course (Required Major)

6. Session / Academic year

This course will be offered every the third trimester starting from the academic year 2008.

7. Course Conditions Class size will be in the range of 5-40 students.

8. Course Description

NMOS and CMOS integrated circuit technologies; properties of NMOS and CMOS circuits; calculation of parameters in circuits, static and dynamic MOS circuits; system design; circuit layout drawing and testing; computer arithmetic; performance evaluation; synthesis of digital circuits from models; modeling and simulation; fault models and testing the use of CAD tools in circuit design.

9. Course Objectives

After successful completion of this course, students will be able to

9.1 Gain an in-depth understanding of theories related to digital IC design.

9.2 Understand steps and procedure of circuit design.

9.3 Implement IC for industrial and engineering applications related to IC development tools.

10. Course Outline

week	Topics	Hours			Teaching methods/multi media	Instructor
		Lecture	Lab	Self-Study		
1	History and overview. Integrated Circuit (IC) technology developments.	4	0	8	Lecture	Asst.Prof. Decha Wilairat
2	Introduction to MOS transistors : characteristic and operation.	4	0	8	Lecture, exercises	
3-4	Introduction to CMOS digital ICs such as gates and flip-flops.	8	0	16	Lecture, exercises and case studies	
5	NOS and CMOS IC fabrication processes overview.	4	0	8	Lecture and exercises	

week	Topics	Hours			Teaching methods/multi media	Instructor
		Lecture	Lab	Self-Study		
6	Introduction to CAD tools for IC design with basic layout rules (MOSIS).	4	0	8	Lecture, exercises and case studies	Asst.Prof. Decha Wilairat
	Midterm Examination				**TBA**	
7	CMOS component design procedures.	4	0	8	Lecture and exercises	
8-9	Digital IC design and synthesis with CAD tools.	8	0	16	Lecture, exercises and case studies	
10	Modeling, simulation , fault models and testing	4	0	8	Lecture and exercises	
11	Digital application circuits : project assignments	4	0	8	Lecture, exercises and case studies	
12	**Final Examination**				**TBA**	
	Total	44	0	88		

11. Teaching Method

Lecture, group discussion, and oral presentation.

12. Teaching Media

Lecture handouts, transparency notes, multimedia, CAI, etc.

13. Measurement and Evaluation of Student Achievement

Evaluate student's achievement from:

13.1 Ability to apply the knowledge to solving engineering problems.

13.2 Ability to analyze engineering problem systematically.

Student's achievement will be evaluated according to the faculty and university standard, using the symbols: A, B, B+, C, C+, C, D+, D and F.

Weight:

1. Midterm exam	30 %
2. Final exam	35 %
3. Homeworks and quizzes	15 %
4. Assignments and Project	20 %
Total	100 %

Grading scale	Grade	Point
90 - 100	A	4.0
85 - 89	B+	3.5
80 - 84	B	3.0
75 - 79	C+	2.5
70 - 74	C	2.0
65 - 69	D+	1.5
60 - 64	D	1.0
Below 60	F	0

Notes for more grading policy :

a) For those students who receive the total score below 60% will get a grade "F" and above 90% will be an "A". The other grades depend on an average of the class like the tentative scale above.
b) Both exams are close book, no calculator. But you are allowed to use the "formula sheet" (size A4 – one side) attached with the exam paper during the test.
c) Please come on time to the lecture. I will randomly check your attendance. You are able to absent the lectures three times. Your grade will be deducted 1% for each lecture you missing the class (if you have more than three times). There are no make-up with the lab/quiz in classes for the students who miss them.

14. Course Evaluation

14.1 Evaluate as indicated in number 13 above.
14.2 Evaluate student's satisfaction towards teaching and learning of the course using a questionnaire.

15. References

Neil Weste, David Harris, "CMOS VLSI Design: A Circuits and Systems Perspective", 4th Edition, Addison Wesley, 2011, ISBN 978-0-321-54774-3

16. Instructors

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17. Course Coordinator

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