University/Academy:	Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute:	College of Engineering & Technology
Program:	B.Sc Computer Engineering

Form no. (12): **Course Specification**

1- Course Data

Course Code: **CC527**	Course Title: **Computer Aided Design**				Academic Year/Level: year **4,5** / semester **7,8,9,10**
Specialization: **Computer Engineering**	**Credit Hours**: 3	**Lecture**: 2	**Tutorial**: 0	**Lab:** 2	**Prerequisite** --------------------

2- Course Aim

To learn new design technologies, large-scale designs using VLSI technology and modern computer techniques used in Digital circuit designs & implementation.

3- Intended Learning Outcomes

a- Knowledge and Understanding	[a1] Concepts and theories of mathematics and sciences, appropriate to the computer engineering. • Describe the switching circuit of CMOS Transistor. • Describe the implementation of logic gates using CMOS Technology. • Understanding the RC equivalent circuit of CMOS technology. • Design subsystems using CMOS Transistor Technology. [a5] Engineering principles in the fields of logic design, circuit analysis, machine and assembly languages, computer organization and architectures, memory hierarchy, advanced computer architectures, embedded systems, signal processing, operating systems, real-time systems and reliability analysis. • Estimate the delay time for each circuit. • Describe the Stick diagram and Layout diagram. • Design the combinational logic circuits using CMOS Transistor Technology. • Design the sequential circuits using CMOS Transistor Technology.
b- Intellectual Skills	[b2] Think in a creative and innovative way in problem solving and design using the latest technologies and solve engineering problems, often on the basis of limited and possibly contradicting information while identifying symptoms in problematic situations. • Calculate the equivalent resistance and capacitance of CMOS circuit. • Calculate the delay time for the certain CMOS circuit. • Draw the Stick diagram and Layout diagram for the Schematic CMOS diagram. [b4] Assess and evaluate the characteristics and performance of components, systems and processes and investigate their failure. • Draw Schematic CMOS diagram for combinational logic gates. • Draw Schematic CMOS diagram for sequential logic circuit. • Draw Schematic CMOS diagram for subsystems.

c- Professional Skills	[c2] Create and/or re-design a process, component or system, and carry out specialized engineering designs with neatness and aesthetics in design and approach.
	• Design Combinational Logic Circuit using CMOS Transistor Technology.
	[c3] Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment, wide range of analytical tools, techniques, and software packages pertaining to the computer engineering to design experiments, collect, analyze and interpret results and develop required computer programs.
	• Design Sequential Logic Circuit using CMOS Transistor Technology. • Design subsystems using CMOS Transistor Technology.
	[c8] Use appropriate specialized computer software, computational tools and design packages throughout the phases of the life cycle of system development.
	• Implement the CMOS systems on the simulation software.
d- General Skills	[d2] Work in stressful environment and within constraints, communicate effectively, lead and motivate individuals and effectively manage tasks, time, and resources.
	• Verify theory with practice.

4- Course Content

Week No.1	Introduction to CMOS Circuits.
Week No.2	Circuit & system Representation.
Week No.3	Circuit Characterization.
Week No.4	Circuit performance estimation.
Week No.5	Interconnect and Wiring.
Week No.6	Combinational Circuit Design.
Week No.7	7th Week Exam
Week No.8	Sequential Circuit Design.
Week No.9	Design methodology and Tools.
Week No.10	Datapath subsystems – part 1.
Week No.11	Datapath subsystems – part 2.
Week No.12	12th Week Exam
Week No.13	Design tools I.
Week No.14	Design tools II.
Week No.15	Revision.
Week No.16	Presentation of projects and Final Exam.

5- Teaching and Learning Methods

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

6-Teaching and Learning Methods for Students with Special Needs

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

The academic advisors of each student, as well as dedicated department TAs monitor the students' progress and solve any problem he/she may encounter.

7- Student Assessment

a-Procedures used	1-Written Examinations to assess The Intended Learning Outcomes. 2-Class Activities (Reports, Discussions, ------) to assess The Intellectual Skills.
b- Schedule:	Assessment 1 7th Week Written Exam Assessment 2 12th Week Written Exam Assessment 3 Continuous Assessments Assessment 4 16th Week Final Written Exam
c- Weighing of Assessment	7th Week Examination 30 % 12th Week Examination 20 % Final-term Examination 40 % Oral Examination 0 % Practical Examination 0 % Semester Work 10 % Total 100%

8- List of References:

a- Course Notes	
b- Required Books (Textbooks)	Weste, Neil H. E, "CMOS VLSI Design: A Circuits and Systems Perspective", Addison-Wesley 3ED
c- Recommended Books	• Computer Aids for VLSI Design , Rubin S., Addison –Wesley 1994. • Basic VLSI Design, Systems and Circuits , Pucknell D. and Eshraghian K. ,Third Edition ,Prentice Hall , 1994.
d- Periodicals, Web Sites, etc.	N/A

Course Instructor: **Head of Department:**
Dr. Hala Farouk   **Prof. Dr. Mohamad AbouEl-Nasr**

Program Manager:
Prof. Dr. Mohamad AbouEl-Nasr