**King Saud University**

**College of Computer and Information Sciences**

**Department of Computer Engineering**

**CEN 214 – LOGIC DESIGN 1 3(3, 0, 1)**

**Semester I, Academic Year 2015-2016**

**Required Course: Time (Mon/Wed 13:00-15:00)**

**Course Description (catalog):**

This course provides students with basic knowledge on synchronous sequential machines. Topics include: Memory elements, Sequential circuits analysis, Sequential circuits design, Registers and Counters, Memory and Programmable Logic Devices, Register Transfers and Datapaths, Sequencing and Control.

**Prerequisites: - Courses** CEN 200

- **Topics**

* Combinational Logic Design

**Textbook(s) and/or Other Required Materials:**

***Primary:*** *M. Morris Mano and Charles R. Kime,* Logic and Computer Design Fundamentals, 4th *Ed, 2007, Prentice Hall*

**Supplementary**:

Morris Mano, *Digital Design*, 3rd Ed, 2000, Prentice Hall

**Course Learning Outcomes:** This course requires the student to demonstrate the following:

1. Design and describe the operation of basic memory elements.
2. Analyze circuits containing basic memory elements.
3. Describe and implement finite state machines (FSM).
4. Apply the concepts of basic timing issues, including clocking, timing constraints, and

propagation delays during the design process.

1. Analyze the behavior of synchronous and asynchronous machines.
2. Design synchronous and asynchronous sequential machine.
3. Explain Memory and Programmable Logic Devices and technologies.
4. Use basic combinational and sequential components in typical datapath designs.
5. Analyze and design functional building blocks and control and timing concepts of digital systems.

**Major Topics covered and schedule in weeks:**

Memory elements 2

Sequential circuits analysis and Design 2

Registers and Counters 2

Memory and Programmable Logic Devices 2

Register Transfers and Datapaths 2

Sequencing and Control 2

Asynchronous Circuit Analysis and Design 2

Review and evaluation 2

**Assessment Plan for the Course:**

Student’s performance in homework, quizzes, exams, and class-projects

**Contribution of Course to Meeting Professional Component:**

|  |  |
| --- | --- |
| **Curriculum Discipline** | **Percentage** |
| Mathematics and Basic Science | 10% |
| Engineering Science |  |
| Engineering Design | 90% |
| General Education |  |

**Relationship of Course to Program Outcomes**

|  |  |  |
| --- | --- | --- |
| **Outcome** | **Outcome Description** | **Contribution** |
| **(a)** | An ability to apply knowledge of mathematics, science, and engineering | **🗸** |
| **(b)** | An ability to design and conduct experiments, as well as to analyze and interpret data |  |
| **(c)** | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability | **🗸** |
| **(d)** | An ability to function on multidisciplinary teams |  |
| **(e)** | An ability to identify, formulate, and solve engineering problems | **🗸** |
| **(f)** | An understanding of professional and ethical responsibility |  |
| **(g)** | An ability to communicate effectively |  |
| **(h)** | The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context |  |
| **(i)** | A recognition of the need for, and an ability to engage in life-long learning |  |
| **(j)** | A knowledge of contemporary issues |  |
| **(k)** | An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice | **🗸** |