1. **Course Title:**  
   Microelectronic Circuit Designs

2. **Course Code:**  
   EE3132

3. **Course Aims and Objectives:**  
   It is an introductory course on VLSI microelectronic circuit designs. The course intends to present the student a solid foundation of custom VLSI design using CMOS technology including VLSI design methodology, circuit operation and characteristics, basic digital circuit implementation, data path and control path design and digital system design. It reinforces the basic materials taught in the course with practical hands-on experience in the design process with state-of-the-art CAD tools.

4. **Units:** 3

5. **Level:** B3

6. **Syllabus:**

   Syllabus discusses the topics of: MOSFET Circuit Characterization, Design Methodology, CMOS Logic Families and Timing Analysis, Data Path and Control Path Design.

   6.1 **Design Methodologies**
   
   Top-Down Design and Bottom-Up Design, VLSI Fabrication Process.

   6.2 **Digital CMOS Circuit Characteristics**
   

   6.3 **CMOS Logic Families**
   

   6.4 **CMOS Sub-System Design**
   
7. **Teaching Methods:**

Teaching is conducted in 2-hour sessions which are in the form of combined lecture and class discussions, with special emphasis on problem solving, hands-on experience and design exercises. Coursework consists of a term project to reinforce the design aspects of the course, assignments and tests.

**Teaching Pattern**
- **Duration of course:** 1 Semester
- **Offered in:** Semester B
- **Total Hours:** Lectures 26 hours, Tutorials 8 hours, Laboratories 12 hours

8. **Assessment Pattern:**

- **Examination duration:** 2 hours, at the end of the semester
- **Percentage of coursework, examination, etc.:**
  - 60% CW (Term Project - 40% Assignment, Test - 20%)
  - 40% Exam

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained, and a laboratory attendance of at least 75% recorded.

9. **Pre-requisites:**

Nil

10. **Pre-cursor:**

Nil

11. **Exclusive Courses:**

Nil

12. **Equivalent Old Course Code and Title:**

Nil

13. **Booklist:**

**Essential Reading**


**Supplementary Reading**

L A Glasser and D W Dobberpuhl: *The Design and Analysis of VLSI Circuits*, (Addison Wesley, 1985)
