



UNIVERSITY OF SCIENCE AND TECHNOLOGY CHITTAGONG (USTC)

Department of Computer Science and Engineering (CSE)

CT: Assignment

Semester: 7th

Year: October, 2025

Course: EEE 411

Title: VLSI Design

Marks: 30

Figures in the right-hand margin indicate full marks.

01. (a) What is the main motivation behind VLSI technology? Discuss with one example from early and modern processors [5] [CLO1]
- (b) Draw and explain the basic structure of a MOSFET. Label all its regions and briefly describe the function of each part. [5] [CLO1]
- (c) Explain the three modes of operation of a MOSFET with proper conditions and examples [5] [CLO1]

02. (a) Draw a simple block diagram of the VLSI fabrication process and explain each major step in short [5] [CLO2]
- (b) Compare constant-field scaling and constant-voltage scaling. Why is scaling important in VLSI design? [5] [CLO2]
- (c) Explain why polysilicon replaced aluminum as the gate material in CMOS technology. Add a labeled diagram of self-aligned silicon gate technology [5] [CLO2]