**Secure VLSI Design – Instructor: Dr. Shayan (Sean) Taheri**

**Topics:**

1. Introduction to Secure VLSI Design.
2. Review of VLSI Design.
3. CMOS Transistor Theory and Circuits.
4. Security-Oriented Fabrication, Layout, and Design Rules.
5. Design Methodologies, Flows, and Tools for Security.
6. Design and Optimization of Secure Static Gates.
7. Circuit Characterization, Performance Evaluation, and Simulation for Security.
8. Secure Combinational and Sequential Circuit Design.
9. Secure Design of Latches, Flip-Flops, and Register.
10. Parasitic Extraction and RC Delay Model.
11. Logical Effort and Wires.
12. Secure Clock Generation and Distribution.
13. Static Timing Analysis for Security.
14. Secure Power Distribution and Dissipation.
15. Static and Dynamic Power Analysis for Security.
16. Secure Interconnect Aware Design.
17. Floor-planning, Placement, Routing, and Timing Closure with Security Considerations.
18. Sign-off Verification.
19. Secure Datapath Element Design for Synchronous Circuits.
20. Secure Memory System Design.
21. Introduction to Secure Dynamic Circuits and Asynchronous Circuits.
22. Secure Datapath Design for FSM Controller.
23. Input/Output Interface and Packaging Considerations for Security.
24. Hardware Description Languages for VLSI Design.
25. Secure ASIC and FPGA Design.
26. Secure Full-Custom Design.
27. Security Aspects of Error Detection and Correction, Analog/RF, and Mixed-Signal Circuits.
28. Secure System-on-a-Chip Design.