Syllabus for EEE 6390 – VLSI Device Design

1. **Catalog Description**
   Criteria and tradeoffs in designing high-performance semiconductor devices in scaled (VLSI) Si-based integrated-circuit technologies
   Credits: 3

2. **Pre-requisites and Co-requisites**
   EEE 5400 Future of Microelectronics Technology or EEE 5426 Introduction to Nanodevices*
   *Or consent of instructor

3. **Course Objectives**
   The objective of this course is to investigate Si MOSFET design considerations for high performance circuit applications based on the device physics motivated by historical and current trends in integrated circuit technologies.

4. **Contribution of course to meeting ABET professional component**
   For undergraduate courses only

5. **Relationship of course to ABET program outcomes**
   For undergraduate courses only

6. **Instructor: Dr. T. Nishida**
   a. Office location: Larsen 219
   b. Office hours: Tuesday and Thursday 10th period (5:10pm – 6pm) or by appointment
   c. Telephone: (352) 392-6774
   d. E-mail address: nishida@ufl.edu
   e. Web site: [http://lss.at.ufl.edu/](http://lss.at.ufl.edu/) (Click on “Sakai system entry” button)

7. **Teaching Assistants**
   None

8. **Meeting Times**
   a. Tuesday 8th – 9th periods (3:00 pm – 4:55 pm)
   b. Thursday 9th period (4:05 pm – 4:55 pm)

9. **Meeting Location**
   MAEA 327

10. **Laboratory Schedule**
    None

11. **Material and Supply Fees**
    None

Updated 1/5/2015
12. Textbooks and Software Required
   a. Title: Fundamentals of Modern VLSI Devices, 2nd Edition
   b. Author: Yuan Taur and Tak H. Ning
   c. Publication date and edition: 2008
   d. ISBN number: 978-0-521-83294-6 (hardback)
   e. Mathematical solver software such as Matlab (available at UF ECE terminal server available by remote login)

13. Recommended Reading
   **Solid-State Electronics**
   a. Title: Fundamentals of Solid-State Electronics
   b. Author: Chih-Tang Sah
   c. Publication date and edition: 1991
   d. ISBN number: 981-02-0638-3 (paperback)

   **Compact Modeling**
   a. Title: Compact Modeling: Principles, Techniques and Applications
   b. Author: Gennady Gildenblat, Ed.
   c. Publication date and edition: 2010
   d. ISBN number: 978-90-481-8613-6
   e. E-book at UF Library:
      http://uf.catalog.fcla.edu/uf.jsp?ix=au&st=gildenblat&Submit=Find

14. Course Outline (provide topics covered by week or by class (approximate))
   I. 50 Years of Device Design for Si Integrated Circuit Technologies
   II. Semiconductor Device Physics Fundamentals
   III. Planar Bulk MOSFETs: Long versus Short Channel
   IV. Device Design: Planar Bulk MOSFET Scaling
   V. Device Design: Compact Models for Circuit Design
   VI. Multi-Gate MOSFETs
   VII. Other Device Concepts

15. Attendance and Expectations
   It is understood that all attendees will be focused on the lecture and will take every possible measure to minimize distractions for everyone (i.e. no newspapers, no cell phones, no PDAs, no iPODs, no laptops, etc. unless instructed to use them for class, no newspapers, yes on-time attendance, and no early departures (unless noted and approved in advance)).

16. Grading – methods of evaluation
   a. Homework: 25%
   b. Term paper: 25%
   c. Test 1: 25%
      **Tuesday, February 24 (2 hours)**
   d. Test 2: 25%

Updated 1/5/2015
Tuesday, April 21 (2 hours)

17. Grading Scale:
   Examinations may be curved to an average of 75 with no score > 100.

18. Make-up Exam Policy
   Makeup exam is contingent on appropriate justifications and legal documents (UF Dean of Students, certified physician, military active duty, judge for jury duty, etc.)
   Late assignments will receive a 10% deduction per day late.

19. Honesty Policy
   All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

20. Accommodation for Students with Disabilities
   Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

21. UF Counseling Services
   Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
   - University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
   - SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.
   - Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
   - Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

22. Software Use
   All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.