COURSE NUMBER: Ve413	**COURSE TITLE:** Monolithic Amplifier Circuits
CREDIT: 4	**PREREQUISITES:** Ve311 and Ve320 or Graduate standing
TEXTBOOKS/REQUIRED MATERIAL: B. Razavi, Design of Analog CMOS Integrated Circuits, McGraw-Hill, 2001	**INSTRUCTOR:** Jon Tomas Gudmundsson **DATE OF PREPARATION:** Nov. 1, 2012 **DATE OF UC APPROVAL:** Oct. 30, 2013
INSTRUCTOR(S): Jon Tomas Gudmundsson	**SCIENCE/DESIGN:** A design project
CATALOG DESCRIPTION: Analysis and design of BJT and MOS multi-transistor amplifiers. Feedback theory and application to feedback amplifiers. Stability considerations, pole-zero cancellation, root locus techniques in feedback amplifiers. Detailed analysis and design of BJT and MOS integrated operational amplifiers. Design project using SPICE. Lectures and laboratory.	**COURSE TOPICS:** 1. Basic BJT and MOS device physics 2. Single-stage & differential amplifiers 3. Operational amplifiers 4. Feedback 5. Mismatch & short channel effects 6. Passive and active loads 7. Frequency response of amplifiers

COURSE STRUCTURE/SCHEDULE: Lecture: twice per week, 90 minutes each; Laboratory: SPICE laboratory, 5 hrs, Hands on laboratory 3 x 5 hrs, Final design project

COURSE OBJECTIVES [Course Outcomes in brackets]	1. To teach students the fundamentals of analog/mixed-signal (analog & digital) circuit design [1.2] 2. To teach students to use commercial design tools for schematic entry and simulation [1,2,3] 3. To prepare students for higher-level courses in analog & RF circuits, and analog-digital conversion [1,2,3,4]
COURSE OUTCOMES [Program Outcomes in brackets]	1. An ability to design and simulate amplifiers, and to measure their characteristics in lab; [a,b,c,e,i,j,k] 2. An ability to design an analog circuit to meet specs; [a,b,c,e,k] 3. An ability to design a high-gain or multistage op-amp to meet full design constraints; [a,b,c,e,i,j,k] 4. An ability to present design project results both orally and in IEEE-style reports; [d,g]
ASSESSMENT TOOLS [Course Outcomes in brackets]	Weekly Homework [2, 8, 9, 10, 11] Midterm Exams [8, 9, 10, 11] Written reports [1, 2, 3, 4] Oral presentation [5]