

UNIVERSITY OF PITTSBURGH
Department of Electrical and Computer Engineering

Graduate Course Announcement - Fall Term 2009-2010 (2101)

(updated July 15, 2009)

- ECE 2120 (33272) **HARDWARE DESIGN METHODOLOGIES** – Professor Jones
3 credits, Tuesday, 5:20-7:50 pm, 370 Benedum Hall
This course teaches hardware design processes through use of industry tools. Students use graphical tools to design, simulate and synthesize designs using hardware description languages (e.g. VHDL/Verilog). High-level design and problem decomposition are also taught. Optimization, simulation and synthesis of combinatorial functions, data paths, and finite state machines are covered in depth. Architecture encapsulation and reuse through “Intellectual Property” (IP) modules is described and covered in detail. Students will work individually and as a part of a team to create, simulate, model, document, and test IP models. Prerequisites: ECE/CoE 0142 or CoE 1502 or instructor permission.
- ECE 2160 (20914) **EMBEDDED COMPUTER SYSTEM DESIGN** – Professor Cheng
3 credits, Monday & Wednesday, 4:30-5:45 pm, 525 Benedum Hall
LAB
(20918) 0 credits, Wednesday, 6:00-8:50 pm, 361 Benedum Hall
(20916) 0 credits, Friday, 9:00-11:50 am, 361 Benedum Hall
Design and implementation of embedded microprocessor systems. Topics include “C” language, top down iteration for assembly language programming, data structures, co-routines, I/O software structures and real time operating systems. Prerequisite: ECE/CoE 0142
- ECE 2162 (27708) **COMPUTER ARCHITECTURE** – Professor Yang
3 credits, Thursday, 5:20-7:50 pm, 423 Benedum Hall
Review of basic architecture concepts, data representation, microprocessor and minicomputer architectures, memory, I/O subsystems, stack computers, parallel and pipelined computers. Prerequisite: ECE/CoE 0142
- ECE 2192 (20910) **INTRODUCTION TO VLSI DESIGN** – Professor Levitan
4 credits, Tuesday & Thursday, 4:00-5:15 pm, 370 Benedum Hall
LAB
(20912) 0 credits, Friday, 12:00-1:50 pm, 370 Benedum Hall
Introduction to the concepts and techniques of modern integrated circuit design. Use of Computer Aided Design (CAD) tools for circuit design and simulation. Prerequisite: ECE/CoE 0142, ECE 0257
- ECE 2240 (35745) **NANO-OPTICS** – Professor Kim
3 credits, Monday, 6:00-8:30 pm, 424 Benedum Hall
A graduate level course designed for students who want to understand the mechanisms of interaction of light and matter at the nanometer scale, and become acquainted with nano-optics-based technologies. Topics include electromagnetic theory of optical interaction with matter, optical waves in periodic media, photonic bandgap structures, surface plasmons, optical interaction with metal nanostructures (metal nanoapertures and arrays, and metal nanoparticles), surface Plasmon resonance spectroscopy, Plasmon coupling and concentration/funneling of electromagnetic energy, surface-enhanced Raman scattering, near-field imaging and microscopy, and negative refraction. Prerequisite: Junior or senior level EM theory course.

- ECE 2521
(20938) ANALYSIS OF STOCHASTIC PROCESSES – Professor Jacobs
3 credits, Thursday, 5:20-7:50 pm, 426 Benedum Hall
Probability theory, random variables, sums and limits of random variable sequences, time and frequency domain, modeling of continuous and discrete random signals, least-squares estimation.
- ECE 2646
(20940) LINEAR SYSTEM THEORY – Professor Mao
3 credits, Wednesday, 6:00-8:30 pm, 420 Benedum Hall
Linear spaces and operators, mathematical descriptions of linear systems, controllability and observability, irreducible realization of rational transfer-function matrices, canonical forms, state feedback and state estimators, and stability.
- ECE 2671
(35747) OPTIMIZATION METHODS – Professor El-Jaroudi
3 credits, Monday, 6:00-8:30 pm, 420 Benedum Hall
Analytical and computational aspects of finite dimensional optimization, unconstrained and equality constrained problems, basic descent methods, conjugate direction methods, nonlinear programming and the Kuhn-Tucker theorem, linear programming, dynamic programming, multicriteria optimization
- ECE 2795
(37447) RENEWABLE & ALTERNATIVE ENERGY RESOURCES AND GENERATION – Professors Marriott and Reed
3 credits, Tuesday, 6:00-8:30 pm, 423 Benedum Hall
In this course, we will look at the full life cycle of the current portfolio of generation, storage and transmission options and discuss the environmental impacts of each phase and type including technologies and regulations in place to control these impacts. From there, we will move on to look at the potential alternatives including renewable forms of generation, the tradeoffs associated with moving to these alternatives and the environmental impacts associated with them. Students can expect to understand the issues associated with current forms of power generation (i.e. coal, nuclear, natural gas, hydro), and the realistic potential of renewable sources (e.g. wind, solar, fuel cells, etc.) to solve those problems.
- ECE 3233
(35748) SEMICONDUCTOR DEVICE MODELING – Professor El Nokali
3 credits, Thursday, 4:00-6:30 pm, 420 Benedum Hall
Topics of current interest in the field of solid state electron devices. Prerequisite: ECE 2231
- ECE 3374
(35749) APPLICATIONS OF WAVELET TRANSFORMS – Professor C.C. Li
3 credits, Tuesday & Thursday, 2:30-3:45 pm, 423 Benedum Hall
This course presents applications of wavelet transforms to multiresolution signal/image processing and pattern recognition. Topics include basic notions of scaling functions with compact support, localization property, multiresolution analysis, continuous wavelet transform, discrete dyadic wavelet transform, wavelet packets, image compression, signal/image denoising, edge localization, texture feature extraction, and multiresolution data fusion. Prerequisite: ECE 1390 or ECE 2523 or permission of instructor.
- ECE 3650
(35751) OPTIMAL CONTROL – Professor Mao
3 credits, Thursday, 5:20-7:50 pm, 1220 Benedum Hall
Variation calculus and optimality conditions, linear quadratic problems, the Riccati equation, Pontryagin maximum principle, time-optimal control, dynamic programming and the Hamilton-Jacobi equation, numerical methods, decentralized control, multicontroller-multiobjective systems, differential games. Prerequisite: ECE 2646

ECE 3893
(20950)

GRADUATE SEMINAR

1 credit, Wednesday, 12:00-1:50 pm, 424 Benedum Hall

A weekly seminar series of presentations by local industry engineers and scientists,
visiting researchers, faculty and graduate students.

Faculty	2997	2998	2999	3000	3995	3997	3998	3999
Boston				20948	20952	20954	20958	20956
Chaparro	20942	20944	20946	28176	28268	28332	28380	28728
Chen	27968	27974	28110	28178	28270	28334	28382	28730
Cheng	33034	27990	28112	28180	28272	28336	28422	28732
El-Jaroudi	33120	27994	28114	28182	28274	28338	28384	28734
El Nokali	33122	28002	28116	28186	28280	28340	28386	28736
Falk	33124	28020	28118	28188	28284	28342	28388	28738
Jacobs	33126	28024	28120	28192	28286	28344	28390	28740
Jones	33128	28028	28122	28196	28288	28346	28392	28742
Kim	33130	28030	28134	28208	28292	28348	28394	28744
Kusic	33132	28036	28140	28218	28296	28350	28396	28746
Levitan	33136	28044	28146	28240	28306	28354	28400	28750
Li, C.C.	33138	28056	28148	28244	28310	28356	28402	28752
Li, G.	33140	28060	28150	28246	28314	28358	28404	28754
Loughlin	33142	28066	28152	28248	28316	28360	28406	28756
Mao	33144	28068	28154	28252	28318	28362	28408	28758
Mickle	33146	28070	28156	28254	28320	28364	28410	28760
Reed	33134	28042	28142	28220	28300	28352	28398	28748
Stanchina	33148	28072	28158	28256	28322	28366	28412	28764
Sun	33150	28084	28160	28260	28324	28368	28414	28766
Yang	33152	28088	28162	28262	28326	28370	28416	28768
Yun	33154	28092	28164	28264	28328	28372	28418	28770

Please contact Sandy Weisberg regarding ECE 3000, ECE 3995, or ECE 3999 as you need a special permission number.