Physics-ECE AGRADE Courses

While completing the BS degree in Applied Physics, students enrolled in Physics-ECE AGRADE take minimum of 3 cr. hr. and maximum of 12 cr. hr. of 5000-level courses counted towards both BS in Applied Physics and MS in Electrical Engineering (MS-EE). These may include PHY5340/41, PHY5620/21, PHY5100, or 5000-level ECE courses taken as electives.

Beyond the transferred credits, AGRADE students will need to take at least 20 cr. hr. of ECE graduate courses, out of which at least 8 cr. hr. must be 7000 level courses.

Minimum requirement for graduation with MSEE degree is 32 cr. hr.

At ECE, the graduate level EE courses cover three major areas broadly described as Electronic and Photonic Devices, Control Systems, and Communication Systems.

Undergraduate Physics students normally gain appropriate background to take Master-level EE courses in the Devices area. Once qualified, they should be able to successfully continue their studies at MSEE program even if they didn’t take ECE courses within the BS-Physics track. From the perspective of future career in Electrical Engineering, it is advised that Physics students interested in AGRADE at ECE would use the electives to learn more in the EE area. In particular, with ECE4470 - Control Systems I, 4 cr. h., and/or ECE4700 - Introduction to Communication Theory, 4 cr. h. courses taken as electives, Physics students will have more freedom while on MS-EE Program and will be able to take higher level courses in areas such as Control and/or Communication.

ECE courses in the Devices area than can be taken as electives within the BS-Physics track and simultaneously counted towards MS-EE degree or to satisfy the 5000-level 12 cr. hr. requirement on the MS-EE track are following: ECE5325 - Smart Sensors and Fuel Cells, 4 cr. hr., ECE5550 - Solid State Electronics, 4 cr. hr., ECE5575 - Introduction to Micro and Nano Electro Mechanical Systems, 4 cr. h, ECE5870 - Optical Communication Networks, 4 cr. h., and ECE6570 - Smart Sensor Technology I: Design, 4 cr. hr. The Devices courses that can be used to satisfy the 7000-level 8 cr. hr. requirement on the MS-EE track are ECE7550 - Advanced Solid State Electronics I, 4 cr. h., ECE7850 - Fiber and Integrated Optics, 4 cr. hr., and ECE7570 - Smart Sensor Technology II: Characterization and Fabrication, 4 cr. hr.

Students interested in taking MS-EE courses in the Control area need to obtain appropriate background while on BS-Physics track by taking ECE4470 as elective. Higher level ECE courses in the Control area are ECE5330 - Modeling and Control of Power Electronics and Electric Vehicle Powertrains, 4 cr. h., ECE5410 - Power Electronics and Control, 4 cr. h., ECE5440 - Electric Energy Systems Engineering, 4 cr. h., ECE 5470 - Control Systems II, 4 cr. h.,ECE7420 - Nonlinear Control Systems, 4 cr. h., ECE7430 - Control of Discrete Event Systems, 4 cr. h., and ECE7690 - Fuzzy Systems, 4 cr. h.

Students interested in taking MS-EE courses in the Communication area need to obtain appropriate background while on BS-Physics track by taking ECE4700 as elective. The higher level courses in the Communication area are ECE5650 - Computer Networks and Programming, 4 cr. h., ECE5700 - Digital Communications, 4 cr. h., ECE5870 - Optical Communication Networks, 4 cr. h., and ECE7700 - Statistical Communication Theory, 4 cr. hr.

The MS-EE track does not require that all the graduate courses should be taken from a single area. From future employment perspective, however, selection of courses focused on a specific area in Electrical Engineering is viewed to be beneficial.