Nanoscience

**NANO 3301** Introduction to Nanoscience and Nanotechnology (3 semester hours) Introduction to the underlying principles and applications of the emerging field of nanotechnology and nanoscience. Intended for a multidisciplinary audience with a variety of backgrounds. Introduces tools and principles relevant at the nanoscale dimension. Discusses current and future nanotechnology applications in engineering, materials, physics, chemistry, biology, electronics, and energy. Prerequisites: **CHEM 1311, MATH 2419 or MATH 2415, PHYS 2326** or instructor consent required. (Same as **ECS 3301**) (3-0) Y

**NANO 3302** Microscopy, Spectroscopy, and Nanotech Instrumentation (3 semester hours) The instructor will guide students in learning and practicing the techniques for using laboratory instruments common to the field of nanotechnology. Techniques include ion scattering, electron spectroscopy, diffraction, Raman and UV-vis-NIR spectroscopy, SEM, SFM, and thin film growth/deposition and processing. Prerequisites: **CHEM 1311, MATH 2419 or MATH 2415, PHYS 2326** or instructor consent required. (3-0) Y

**NANO 3310** Introduction to Materials Science (3 semester hours) This course provides an intensive overview of materials science and engineering focusing on how structure/property/processing relationships are developed and used for different types of materials. The course illustrates roles of materials in modern technology by case studies of advances in new materials and process. Topics include atomic structure, crystalline solids, defects, failure mechanisms, phase diagrams and transformations, metal alloys, ceramics, polymers as well as their mechanical, thermal, electrical, magnetic and optical properties. Prerequisites: **CHEM 1311, MATH 2419 or MATH 2415, PHYS 2326** or instructor consent required. (Same as **ECS 3310**) (3-0) Y

**NANO 4391** Technology of Plasma (3 semester hours) Plasmas are critical to making the best electronic devices. This class will be an introduction to the technology required to make and use these plasmas. Topics include: high-vacuum technology (gas properties, pumps, pressure gauges, flow-meters, gas composition analysis) and plasma technology (etch, deposition, and lamps). Prerequisites: **ENGR 3300 and (CE 3310 or EE 3310)**. Recommended: **ENGR 3341**. (Same as **EE 4391**) (3-0) Y

**NANO 4v95** Undergraduate Research in Nanotechnology (1-9 semester hours) Provides students with experience in a laboratory setting. A total of at most 6 hours can be counted towards the minor. Hands-on opportunity to interact with professors and companies in the field. May be repeated (9 hours maximum). Pre- or corequisites: **NANO 3301** and **NANO 3302**, or instructor consent required. ((1-9)-0) S