Dr. Courtney Young – Fall 2011 Courses:

EMET 232 Processing of Particulate Systems
An introduction to processing methods and equipment, particularly those utilized in the mining industry. Topics include material balances, size analysis, crushing, grinding, classification, flotation, leaching, magnetic, gravity and electrostatic separations. Applications to recycling and aggregate/concrete industries are discussed. A major design problem is given to cover process design and material balances. **Prerequisites:** CHMY 141. (1st)

EMET 233 Design of Particulate Systems
Size reduction processes of crushing and grinding, particle sizing methods of screening and classifying, and solid/liquid separations of thickening and filtering are detailed. Types of equipment, methods for sizing equipment, prediction of energy requirements, flowsheet development, and safety considerations are examined. Design problems are given throughout. **Prerequisite:** EMET 232 or Consent. (2nd)

EMET 401 Processing of Aqueous Systems
Chemistry and operating principles related to hydrometallurgical and electrometallurgical unit operations are illustrated and discussed for industrial processes. Acid rock drainage formation and treatment methods are examined. Physical and chemical processes as well as design criteria are discussed and examined from an operational approach throughout. Hydrometallurgical processes commonly used for concentrating include traditional leaching (dump, heap, vat and agitation), bacterial leaching, solvent extraction, ion exchange, and reduction (cementation, electrowinning and gaseous reduction). Electrometallurgical processes commonly used for purifying include electrothermic, electrolytic, electrowinning and electromelting methods. **Prerequisites:** EMET 307 or Consent. (1st)

EMET 490 Undergraduate Research
This course is designed for students involved in directed research projects and is required for participants in the Undergraduate Research Program (URP). This course can be repeated. Students will be required to prepare a formal paper and present their results. A faculty member must advise the project. Pending the number of credits taken, graduation requirements, and as demanded of the research advisor, other requirements may be needed. To participate in URP, students must submit a proposal for a research project to the Undergraduate Research Committee and meet other requirements as listed in URP guidelines. Proposals are evaluated competitively and winners will receive a stipend. URP participants must register for this class in the Spring for at least one credit in order to present their findings in the annual Undergraduate Research Conference. A call for proposals is made at the beginning of the Spring Semester. Another call may be offered in the Fall Semester. **Prerequisite:** Mi&ME major. (1st, 2nd, Summer)

EMET 504 Fire Assay
This laboratory/lecture course covers the art and science of assaying for precious metals. Procedural differences are discussed for various ore types as well as the precious metal being assayed. In this regard, gold, silver, rhodium, platinum and palladium assay methods are compared. Field trips to area mines and smelters will be made. **Students must register in MetE 5040 Lab. Prerequisite:** Senior or Graduate Standing and Consent. (1st, 2nd, Summer)

EMET 511 Materials Handling Design
A design-oriented course covering belt conveyors, feeders, storage facilities, slurry pipelines and pumps. Spreadsheet calculations are used to design belt conveyors and slurry pipelines based on laboratory data obtained from samples collected at industrial sites. **Prerequisite:** Senior or Graduate Standing and Consent. (2nd, even yrs)

EMET 526 Thermodynamic Modeling of Aqueous Systems
Reviews principles of thermodynamics appropriate for aqueous systems. The course then focuses on obtaining and measuring thermodynamic data, making the information consistent with various data bases, and using the data for modeling environmental, geochemical and metallurgical systems. **Prerequisites:** Senior or Graduate Standing and Consent. (2nd, odd yrs)

EMET 534 Processing of Primary and Secondary Resources
This course describes the physical and chemical processes involved in separations. Flotation, the most commonly used separation, is discussed in detail. Gravity, magnetic and electrostatic separations are also described. Strategies involving non-mineral systems (recycling and waste minimization) are introduced and corresponding laboratory exercises are conducted. Students must register for EMET 534 Lab. **Prerequisites:** Senior or Graduate Standing and Consent. (1st, odd yrs)

EMET 582 Processing of Energy Resources
Focuses on the coal and uranium processing including discussions on environmental issues. Coal topics include genesis, macerals, properties, washability analysis, beneficiation principles, levels of preparation, beneficiation equipment, preparation economics, power plant operations, blending, and fractionation. Spreadsheet calculations involving comminution modeling and coal drying are developed. Labs on maceral identification, hardness, washability, carbon/sulfur analysis, and BTU measurement are conducted. Uranium topics include mineralogy, leaching practices, solution concentration and purification. Nuclear power plant operations are touched upon. Students will conduct library searches and write reports on other energy resources excluding oil. **Prerequisites:** Senior or Graduate Standing and Consent. (2nd, even yrs)

EMET 583 Processing of Precious Metal Resources
An introduction to the processing and hydrometallurgy of precious metal ores with a focus on gold. Lectures cover crushing, grinding, autoclaving, agglomeration, roasting, concentration, leaching, solution purification, recovery, cementation, electrowinning and recycling. Environmental concerns and industrial solutions are emphasized. The laboratory experience consists of visiting gold processing facilities, collecting processing data from each plant, and writing summary trip reports. **Prerequisite:** Senior or Graduate Standing and Consent. (1st, odd yrs)