

BIOS 422-D10 (CRN#40774). Molecular Cell Biology II (3)

Molecular aspects of gene expression, including genome structure and replication, RNA synthesis/processing, and protein synthesis. Attendance in the satellite class is required. **Prerequisite:** BIOS 345 or equivalent.

Instructor: Prof. Michael Kuchka **Wednesday** **1:15 – 4:15 p.m.** **MRK5** **X83687** **E301**

BIOS 427-D10 (CRN#43615). Techniques in Cell and Molecular Biology (3)

Independent research with approval of advisor. Contact advisor for information and approval.

Instructor: Prof. Vassie Ware **VCW0** **X83690**

CANCELLED BIOS 464-D10 (CRN#43616). Molecular Biology of Eukaryotic Organisms (3)

Comparative analysis of several eukaryotes as model systems in cell biology, developmental biology, genetics, and molecular biology. Discussion course. **Prerequisite:** – BIOS 345

Instructor: Prof. Vassie Ware **Monday** **12:30 – 3:30 p.m.** **VCW0** **X83690** **E301**

BIOS 490-D10 (CRN#41284). Thesis (1-6)**BIOS 499-D10 (CRN#40972). Dissertation (1-15)****CHEMISTRY****CHM 358-D10 (CRN#40644). Advanced Organic Chemistry (3)**

Reaction mechanism types and supporting physical-chemical data. Classes of mechanisms include elimination, substitution, rearrangement, oxidation-reduction, enolate alkylations, and others. **Prerequisite:** one year of organic chemistry

Instructor: Prof. Ned Heindel **M & W** **12:45 – 2:00 p.m.** **NDH0** **X83464** **PL410**

CHM 371-D10 (CRN#40642)/ BIOS 371-D10 (CRN#40643). Elements of Biochemistry I (3)

A general study of carbohydrates, proteins, lipids, nucleic acids, and other biological substances and their importance in life processes. Protein and enzyme chemistry are emphasized. **Prerequisite:** one year of organic chemistry

Instructor: Prof. Michael Behe **T & R** **7:55 – 9:10 a.m.** **MJB1** **X83474** **PL416**

CHM 393(CRN#41010)/CHE 393 (CRN#41009)/MAT 393-D10 (CRN#41008)Physical Polymer Science (3).

Structural and physical aspects of polymers (organic, inorganic, natural). Molecular and atomic basis for polymer properties and behavior. Characteristics of glassy, crystalline, and paracrystalline states (including viscoelastic and relaxation behavior) for single- and multi-component systems. Thermodynamics and kinetics of transition phenomena. Structure, morphology, and behavior. **Prerequisite:** 1 year of physical chemistry

Instructor: Prof. Les Sperling **T & R** **12:10 – 1:25 p.m.** **LHS0** **X83845** **PL410**
Prof. Robeson **LMR404**

CHM 421-D10 (CRN#40964). Chemistry Research (1-6)

Research in one of the following fields of chemistry: analytical, inorganic, organic, physical, polymer, biochemistry.

Contact: Your advisor. No book required. **X84048** **ROF2**

CHM 481-D10 (CRN#40965). Chemistry Seminar (1)

Student presentations on current research topics in the student's discipline but not on subjects close to the thesis. A one-hour presentation. **To be arranged with Dr. Robert Flowers, Chairperson. No book required.**

X84048 **ROF2**

CHM 489-D10 (CRN#44221). Organic Polymer Science II (3)

This is a continuation of CHM 394 (Organic Polymer Science I) and it covers the higher chapters (10-17) of the textbook for that course, ("Polymer Chemistry – An Introduction," by M. Stevens). Since these two courses are somewhat linear, students who have not taken CHM 394 may still be able to enroll in CHM 489 if they have consulted the course instructor and discussed their level of preparation. The course will commence with a review of the kinetic expressions for chain and step-polymerization and then deal with the organic synthesis and properties of conductive polymers, polyethers and related analogs, polyesters, polyamides and related analogs, phenol- and urea-formaldehyde resins, heterocyclic and furfuryl alcohol polymers, natural polymers, synthetic biopolymers, inorganic polymer, commercial polymers and special applications thereof. The course will also treat polymer-supported reagents useful in organic synthesis and macro beads as polymeric microreactors. Some common laboratory preparations for polymers will also be reviewed. Students in the pharmaceutical industry will find the treatments of synthetic methodologies & of natural/synthetic biopolymers of special application to their discipline.

Instructor: Prof. Fran Waller **T & R** **12:10 – 1:25 p.m.** wallerfj@entermail.net (610) 434-7836 **E301**

CHM 490-D10 (CRN#40966). Chemistry Thesis (1-6)

Should be used if you are graduating and are finished with your coursework. You must be registered in the semester you intend to graduate. Please contact Dr. Robert Flowers if you have any questions. X84048 ROF2

CHM 499-D10 (CRN#41202). Chemistry Dissertation (1-15)

To be used by PhD students only. Please contact Dr. Robert Flowers if you have any questions. X84048 ROF2

ENGINEERING**CHE 341(CRN#44618)/CHE 441-D10 (CRN#44620). Biotechnology I (3)**

Applications of material and energy balances; heat, mass, and momentum transfer; enzyme and microbial kinetics; and mathematical modeling to the engineering design and scale-up of bio-reactor systems. Prerequisites: MATH 22, Phys 11, and CHM 187 or the equivalent of each. Closed to students who have taken CHE 442.

Instructor: Prof. Jim Hsu M & W 11:10 – 12:25 p.m. JTH0 X84257 PL410

CHE 393 (CRN#41009)/CHM 393(CRN#41010)/MAT 393-D10 (CRN#41008) Physical Polymer Science (3).

Structural and physical aspects of polymers (organic, inorganic, natural). Molecular and atomic basis for polymer properties and behavior. Characteristics of glassy, crystalline, and paracrystalline states (including viscoelastic and relaxation behavior) for single- and multi-component systems. Thermodynamics and kinetics of transition phenomena. Structure, morphology, and behavior. Prerequisite: 1 year of physical chemistry

Instructor: Prof. Les Sperling T & R 12:10 – 1:25 p.m. LHS0 X83845 PL410
Prof. Robeson LMR404

CHE 428-D10 (CRN#44619). Rheology (3)

An intensive study of momentum transfer in elastic viscous liquids. Rheological behavior of solution and bulk phase polymers with emphasis on the effect of molecular weight, molecular weight distribution and branching. Derivation of constitutive equations based on both molecular theories and continuum mechanics principles. Application of the momentum equation and selected constitutive equations to geometries associated with viscometric flows.

Instructor: Prof. A. J. McHugh T & R 10:45 – 12:00 noon AJM8 X85218 E301

CHE 441-D10 (CRN#44620)/CHE 341(CRN#44618). Biotechnology I (3)

Applications of material and energy balances; heat, mass, and momentum transfer; enzyme and microbial kinetics; and mathematical modeling to the engineering design and scale-up of bio-reactor systems. Prerequisites: MATH 22, Phys 11, and CHM 187 or the equivalent of each. Closed to students who have taken CHE 442.

Instructor: Prof. Jesus Gonzalez M & W 11:10 – 12:25 p.m. JEGH X85417 PL410

CHE 461-D10 (CRN#44621)/ME 442-D10 (CRN#44617). Mathematical Methods in Engineering (3)

Analytical techniques are developed for the solution of engineering problems described by algebraic systems, and by ordinary and partial differential equations. Topics covered include: linear vector spaces; eigenvalues, eigenvectors, and eigenfunctions. First and higher-order linear differential equations with initial and boundary conditions; Sturm-Liouville problems; Green's functions. Special functions; Bessel, etc. Qualitative and quantitative methods for nonlinear ordinary differential equations; phase plane. Solutions of classical partial differential equations from the physical sciences; transform techniques; method of characteristics.

Instructor: Prof. Philip Blythe T & R 4:30 – 5:45 p.m. PAB0 X83782 PL410

IE 328-D10 (CRN#40713). Engineering Statistics (3)

Random variables, probability functions, expected values, statistical inference, hypothesis testing, regression and correlation, analysis of variance, introduction to design of experiments, and fundamentals of quality control. This course requires use of Minitab Software. "Minitab" computer program will also be needed for this course.

Instructor: Prof. Eugene Perevalov M,W,F 10:10 - 11:00 a.m. EUP2 X84031 PL410

IE 405-D10 (CRN#44580). Special Topics in IE: Foundations of Systems Engineering (3)

Experimental procedures for sorting out important casual variables, finding optimum conditions, continuously improving processes, and trouble shooting. Applications to laboratory, pilot plant and factory.

Prerequisite: Some statistical background and experimentation in prospect

Instructor: Prof. Nicholas G. Odrey T & R 2:35 – 3:50 p.m. NGO0 X84036 PL410

IE 410-D10 (CRN#44582). Design of Experiments (3)

Experimental procedures for sorting out important casual variables, finding optimum conditions, continuously improving processes, and trouble shooting. Applications to laboratory, pilot plant and factory.

Instructor: Prof. Eugene Perevalov **M & W** **2:35 – 3:50 p.m.** **EUP** **X84031** **PL410**

IE 426-D10 (CRN#42962). Optimization Models and Applications (3)

Modeling and analysis of operations research problems using techniques from mathematical programming. Linear programming, integer programming, multi-criteria optimization, stochastic programming and nonlinear programming using an algebraic modeling language. This course is a version of IE 316 for graduate students, with research projects and advanced assignments. Closed to students who have taken IE 316. Prerequisite: IE 220 or equivalent background.

Instructor: Staff (TBA) **M & W** **6:00 – 7:15 p.m.** **PL410**

IE 443-D10 (CRN#44584)/ MSE 427-D10 (CRN#44586). Automation and Production Systems (3)

Principles and analysis of manual and automated production systems for discrete parts and products. Cellular manufacturing, flexible manufacturing systems, transfer lines, manual and automated assembly systems, and quality control systems.

Instructor: Prof. Mikell P. Groover **M & W** **4:30 – 5:45** **X84030** **MPG0** **E301**

ME 385 (CRN#44691)/ME 485-D10 (CRN#44692). Polymer Processing (3)

An exploration of the science underlying polymer processes such as injection molding through a combination of theory development, practical analysis, and utilization of commercial software. Polymer chemistry and structure, material rheological behavior, processing kinetics, molecular orientation development, process simulation software development, manufacturing defects, manufacturing window establishment, manufacturing process design, manufacturing process optimization. **Prerequisites:** (ME 385: Senior level standing in engineering or science). (ME 485: This course is a version of ME 385 for graduate students, with research projects and advanced assignments. Closed to students who have taken ME 385. Graduate level standing in engineering or science).

Instructor: Prof. John Coulter **T & R** **10:45 – 12:00 noon** **JC01** **X86310** **PL410**

ME 401-D10 (CRN#43439). Product Design/Analysis (3)

Integrated approach to design and analysis of products and systems. Principles for robust design and use of computer-aided engineering to model, evaluate, and enhance design. Case studies and design assignments are major components of this course.

Instructor: Prof. John Ochs **Tuesday** **6:00 – 9:00 p.m.** **JBO0** **X84593** **PL410**

ME 430-D10 (CRN#43284). Advanced Fluid Mechanics (3)

This course is a first graduate course in compressible fluid mechanics, providing a broad coverage of key areas of viscous and inviscid fluid mechanics. Topics covered include: Flow kinematics, differential equations of motion, viscous and inviscid solutions, vorticity dynamics and circulation, vorticity equation, circulation theorems, potential flow behavior, irrotational and rotational flows, simple boundary layer flows and solutions, and real fluid flows and consequences.

Instructor: Prof. Chuck Smith **T & R** **9:20 – 10:35 a.m.** **CRS1** **X85532** **PL410**

ME 442-D10 (CRN#44617)/CHE 461-D10 (CRN#44621). Mathematical Methods in Engineering (3)

Analytical techniques are developed for the solution of engineering problems described by algebraic systems, and by ordinary and partial differential equations. Topics covered include: linear vector spaces; eigenvalues, eigenvectors, and eigenfunctions. First and higher-order linear differential equations with initial and boundary conditions; Sturm-Liouville problems; Green's functions. Special functions; Bessel, etc. Qualitative and quantitative methods for nonlinear ordinary differential equations; phase plane. Solutions of classical partial differential equations from the physical sciences; transform techniques; method of characteristics.

Instructor: Prof. Philip Blythe **T & R** **4:30 – 5:45 p.m.** **PAB0** **X83782** **PL410**

MSE 427-D10 (CRN#44586)/ IE 443-D10 (CRN#44584). Automation and Production Systems (3)

Principles and analysis of manual and automated production systems for discrete parts and products. Cellular manufacturing, flexible manufacturing systems, transfer lines, manual and automated assembly systems, and quality control systems.

Instructor: Prof. Mikell P. Groover **M & W** **4:30 – 5:45 p.m.** **X84030** **MPG0** **E301**

MSE 433-D10 (CRN#44626). Technology and the Factory of the Future (3)

Engineering and technological issues affecting future developments in manufacturing. Topics include flexible automation systems, integration of design and production through the factory data network, intelligent machines, the man-machine interface, and the manufacturing management information system.

Instructor: Prof. Alan Feiertag **Thursday** **4:00 – 7:00 p.m.** **ADF5** **610-351-8681** **E301**

MSE 438-D10 (CRN#44628). Agile Organizations & Manufacturing Systems (3)

Analysis of the factors contributing to the success of manufacturing enterprises in an environment characterized by continuous and unpredictable change. Fundamentals of lean production; aspects of systems design, value stream analysis, flow, set-up and cycle time reduction, kaizen, elimination of waste. Fundamentals of agility: global enterprises, virtual organizations, adapting to change, mass customization, manufacturing flexibility, activity-based management.

Instructor: Profs Gardiner/Groover Tuesday 6:00 – 9:00 p.m. KG03 (X85070) MPG0 (84030) E301

MSE 451-D10 (CRN#42426). Manufacturing Systems Engineering Project (1-3)
Advisor: Prof. Keith Gardiner X85070 KG03

MSE 490-D10 (CRN#42427). Manufacturing Systems Engineering Thesis (1-6)
Advisor: Prof. Keith Gardiner X85070 KG03

Courses may be cancelled due to low enrollments

M – Monday T = Tuesday W = Wednesday R = Thursday F = Friday
E301 – Mountain Campus PL410 = Packard Lab 410 PL416 = Packard Lab 416
Cost per credit hour for Fall 07 = \$630 Lehigh phone (610) 75+extension
4/10/2007