BIOCHEMISTRY (BIOC)

Subject-area course lists indicate courses currently active for offering at the University of Louisville. Not all courses are scheduled in any given academic term. For class offerings in a specific semester, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm).

500-level courses generally are included in both the undergraduate- and graduate-level course listings; however, specific course/section offerings may vary between semesters. Students are responsible for ensuring that they enroll in courses that are applicable to their particular academic programs.

Course Fees
Some courses may carry fees beyond the standard tuition costs to cover additional support or materials. Program-, subject- and course-specific fee information can be found on the Office of the Bursar website (http://louisville.edu/bursar/tuitionfee).

BIOC 545. Biochemistry I 3 Units
Description: Chemistry of amino acids, peptides, proteins, nucleotides and nucleic acids; methods of analysis and laboratory synthesis; nucleotides; RNA, DNA and protein biosynthesis.
Note: Credit may not be earned in both BIOC 545 and BIOC 645.
Note: Credit may not be applied toward an advanced degree in Chemistry.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

BIOC 547. Biochemistry II 3 Units
Prerequisite(s): BIOC 545.
Description: Cellular metabolism of carbohydrates, lipids, amino acids and biomembrane phenomena, enzyme properties, kinetics, and control mechanisms; ligand binding.
Note: Credit may not be earned in both BIOC 547 and BIOC 647.
Note: Credit may not be applied toward an advanced degree in Chemistry.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

BIOC 603. Special Topics in Biochemistry 1-4 Units
Prerequisite(s): BIOC 645 and BIOC 647 (or concurrently), or consent of instructor.
Description: Arranged to fit individual needs on topics of current interest or to receive some advanced training or conduct research project.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

BIOC 606. Biochemistry Seminar 1 Unit
Description: Both Fall and Spring semesters.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

BIOC 611. Advanced Techniques in Biochemistry and Molecular Biology 4 Units
Prerequisite(s): BIOC 645 or equivalent; restricted to Biochemistry & Molecular Genetics graduate students.
Description: An introduction to modern biochemical and molecular biology methods in lecture and laboratory format. Methodologies covered include: DNA cloning and sequencing, RNA isolation and quantitative PCR, bioinformatics analysis, transfection and RNA knockdown approaches, immunoprecipitations and protein detection, and enzyme characterization.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

BIOC 613. Biochemistry Laboratory 2-4 Units
Grading Basis: Pass/Fail
Description: The course will consist of participation in the research programs of two laboratories in the department. A half-semester will be devoted to each laboratory. Pass/Fail grading.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

BIOC 619. Research 1-15 Units
Grading Basis: Pass/Fail
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

BIOC 620. Scientific Method and Grant Writing 2 Units
Term Typically Offered: Spring Only
Prerequisite(s): Restricted to students in the Biochemistry and Molecular Genetics graduate programs; permission of course director.
Description: This objective of this course is to introduce students to the fundamentals of grantsmanship. The topics incorporate all aspects for grant application process as well as overview of the scientific method, generation of hypotheses, and research design. Student-directed learning is a major component for this course with the summative event being completion of a grant proposal. A reiterative writing process for proposal development will be ongoing throughout the course.
Note: May be repeated once for up to 4 credits.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

BIOC 630. Responsible Conduct of Research: Survival Skills and Research Ethics 1-4 Units
Grading Basis: Pass/Fail
Description: The topics covered include 11 areas of Research Compliance training mandated by the NIH for training grants and focuses on contemporary research ethics in biomedical sciences.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
**BIOC 640. Principles of Biochemistry**  
**Term Typically Offered:** Spring Only  
**Prerequisite(s):** Consent of instructor.  
**Description:** Covers general aspects of biochemistry with special emphasis given to areas applicable to dentistry. Topics include protein structure and function; chemistry and metabolism of carbohydrates, lipids, amino acids, and nucleotides; molecular genetics; nutritional biochemistry; calcification; and molecular endocrinology. Clinical conferences keyed to current lecture topics are presented by clinical faculty.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

**BIOC 645. Advanced Biochemistry I**  
**Prerequisite(s):** BIOC 445.  
**Description:** Chemistry of amino acids, peptides, proteins, nucleotides and nucleic acids; methods of analysis and laboratory synthesis; nucleotides; RNA, DNA and protein biosynthesis.  
**Note:** Credit may not be earned in both BIOC 545 and BIOC 645.  
**Note:** Credit may not be applied toward an advanced degree in Chemistry.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

**BIOC 647. Advanced Biochemistry II**  
**Prerequisite(s):** BIOC 645.  
**Description:** Cellular metabolism of carbohydrates, lipids, amino acids and nucleotides; enzyme properties, kinetics, and control mechanisms, ligand binding; biomembrane phenomena.  
**Note:** Credit may not be earned in both BIOC 547 and BIOC 647.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

**BIOC 661. Molecular Mechanisms of Toxicology**  
**Prerequisite(s):** BIOC 668 or approval by course directors or program directors.  
**Description:** Molecular interactions of drugs and toxicants on cellular processes; including foreign compound metabolism, signal transduction, cell cycle, DNA repair/DNA replication are covered and put in context topics in molecular epidemiology.  
**Note:** Crosslisted with PHTX 661.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

**BIOC 662. Biomedical Research Data Analysis Methods**  
**Grading Basis:** Pass/Fail  
**Term Typically Offered:** Summer Only  
**Prerequisite(s):** Currently enrolled graduate students in good standing.  
**Description:** A lecture and discussion course designed for graduate students desiring to learn the basic statistical methods and data presentation approaches that are used in biomedical research.  
**Note:** This course requires permission from the instructor.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

**BIOC 663. Advanced Biochemistry II**  
**Prerequisite(s):** BIOC 545 or BIOC 645 or consent of instructor.  
**Description:** An advanced treatment of contemporary cell biology including membrane structure and function, cytoskeleton, signal transduction, regulation of cell cycle, apoptosis, and molecular mechanisms of cellular differentiation. Graded.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

**BIOC 666. Molecular Biology and Genetics**  
**Prerequisite(s):** BIOC 645 and BIOC 647 or consent of course director.  
**Description:** This course examines the fundamental principles of genetics and molecular biology as they apply to molecular and cellular processes. Topics include: Mendelian, population, and quantitative genetics; epigenetics; bioinformatics; mechanisms controlling transcriptional and post-transcriptional regulation of gene expression; RNA and miRNA biology; and protein synthesis and regulation. An emphasis will be on reading and critiquing current literature.  
**Note:** Crosslisted with BIOL 668.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

**BIOC 667. Cell Biology**  
**Term Typically Offered:** Spring Only  
**Prerequisite(s):** One quarter of graduate level biochemistry or consent of instructor.  
**Description:** A comprehensive course on cancer biology with emphasis on molecular mechanisms and research. Topics will include: the public health impact of cancer, molecular mechanisms of carcinogenesis and metastasis, host-tumor interactions, current and future molecular therapies and prevention, apoptosis, tumor immunology, cancer genetics and genomics, prevention, metabolism in cancer cells, signal transduction, cell cycle, and oncogenes and tumor suppressor genes. There will also be clinical-based lectures.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

**BIOC 668. Molecular Biology and Genetics**  
**Prerequisite(s):** BIOC 645 and BIOC 647 or consent of course director.  
**Description:** This course examines the fundamental principles of genetics and molecular biology as they apply to molecular and cellular processes. Topics include: Mendelian, population, and quantitative genetics; epigenetics; bioinformatics; mechanisms controlling transcriptional and post-transcriptional regulation of gene expression; RNA and miRNA biology; and protein synthesis and regulation. An emphasis will be on reading and critiquing current literature.  
**Note:** Crosslisted with BIOL 668.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

**BIOC 675. Cancer Biology**  
**Prerequisite(s):** BIOC 545 or BIOC 645 or equivalents.  
**Description:** A comprehensive course on cancer biology with emphasis on molecular mechanisms and research. Topics will include: the public health impact of cancer, molecular mechanisms of carcinogenesis and metastasis, host-tumor interactions, current and future molecular therapies and prevention, apoptosis, tumor immunology, cancer genetics and genomics, prevention, metabolism in cancer cells, signal transduction, cell cycle, and oncogenes and tumor suppressor genes. There will also be clinical-based lectures.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

**BIOC 680. Biomolecular Interactions**  
**Prerequisite(s):** BIOC 645 and BIOC 647 or equivalents.  
**Description:** This course examines techniques used to characterize biomolecules and their interactions including surface plasmon resonance, equilibrium dialysis, microcalorimetry, analytical ultracentrifugation, dynamic light scattering and absorption fluorescence and circular dichroism spectroscopies.  
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)