

BSE - BIOMEDICAL SCIENCES AND ENGINEERING

BSE Class Schedule (<https://courses.illinois.edu/schedule/DEFAULT/DEFAULT/BSE/>)

Courses

BSE 600 Global One Health credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/600/>)
Same as VCM 547. See VCM 547.

BSE 612 Foundations: Molecules to Populations credit: 13 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/612/>)
This course, which covers the fundamental elements of medical science, serves as a baseline for the rest of the medical school curriculum. Topics to be covered include foundational anatomy, cell biology, histology, physiology, integration of engineering science, systems, microbiology, pharmacology, genetics, and behavioral science, concepts of populations, social behavior, chronic disease, health care team, patient safety, statistics, big data, Patient-Centered Medical Home, palliative care, quality, compensation, and mobile health technologies. No graduate credit. 13 professional hours. Approved for S/U grading only. May be repeated up to 13 hours in the same terms, to a maximum of 39 credit hours in separate terms, with approval from the Student Progress and Promotions Committee. Prerequisite: Restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 631 Cardiovascular credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/631/>)
Topics include ischemic heart Dx, cardiomyopathy/CHF, aortic stenosis, atrial fibrillation, peripheral vascular disease, pediatric ASD. No graduate credit. 4 professional hours. Approved for S/U grading only. May be repeated in separate semesters for a total of 12 credit hours with approval from the Student Progress and Promotions Committee. Prerequisite: Restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 632 Respiratory credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/632/>)
Topics include asthma – peds, COPD, Pulmonary Fibrosis, Respiratory failure, pulmonary vasculitis. No graduate credit. 3 professional hours. Approved for S/U grading only. May be repeated in separate semesters for a total of 9 credit hours with approval from the Student Progress and Promotions Committee. Prerequisite: Restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 633 Renal credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/633/>)
Topics include UTI with pyelonephritis, urinary obstruction-BPH, acute renal failure-toxic, chronic renal failure-DM, polycystic renal disease-peds. No graduate credit. 3 professional hours. Approved for S/U grading only. May be repeated in separate semesters for a total of 9 credit hours with approval from the Student Progress and Promotions Committee. Prerequisite: Restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 634 Clinical Neuroscience credit: 5 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/634/>)
Topics include neurovascular disorders, seizures, brain injury, dementia, tumors of the brain, disorders involving neuroinflammation, psychotic disorders, affective disorders, anxiety disorders, as well as disorders of the peripheral nervous system and neuromuscular junction. No graduate credit. 5 professional hours. Approved for S/U grading only. May be repeated in separate semesters, for a total of 15 credit hours with approval from the Student Progress and Promotions Committee. Prerequisite: Restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 635 Musculoskeletal credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/635/>)
Topics include primary inflammatory diseases such as rheumatoid arthritis, lupus, polymyalgia rheumatica and associated disorders, degenerative diseases of the joints such as osteoarthritis, primary diseases of muscle, primary diseases of bone such as osteoporosis and osteogenesis imperfecta as well as mechanical trauma to bone leading to fracture. No graduate credit. 4 professional hours. Approved for S/U grading only. May be repeated in separate semesters for a total of 12 credit hours with approval from the Student Progress and Promotions Committee. Prerequisite: Restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 636 Digestion, Nutrition, & Metabolism credit: 1 to 5 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/636/>)
Topics include malabsorption syndrome, vitamin D deficiency, G6PD deficiency, TPN, obesity, GERD with stricture/Barretts, Crohn's disease, peptic ulcer disease with hemorrhage, chronic diarrhea, pyloric stenosis – peds hepatitis C, and colonic polyposis. No graduate credit. 1 to 5 professional hours. Approved for S/U grading only. May be repeated in separate semesters for a total of 15 credit hours with approval from the Student Progress and Promotions Committee. Available for honors grade. Prerequisite: Participation in ongoing study of the digestive system. Restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 638 Endocrine, Genitourinary, & Women's Health credit: 1 to 10 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/638/>)
Topics include diabetes – type II, ketoacidosis, hypothyroidism, hyperthyroidism, adrenal insufficiency, Cushing's syndrome, diabetes insipidus, hypogonadism, erectile dysfunction, testicular torsion, infertility, sexual orientation, BPH, dysmenorrhea, menorrhagia, polycystic ovarian disease, cervical dysplasia, menopause – vasomotor, pelvic pain, normal delivery, breach, multiple gestation, medical illness of pregnancy – diabetes, and placenta previa. No graduate credit. 1 to 10 professional hours. Approved for S/U grading only. May be repeated in separate semesters for a total of 30 credit hours with approval from the Student Progress and Promotions Committee. Available for honors grade. Prerequisite: Restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 642 Hematology, Oncology, Infection, and Immunity credit: 1 to 6 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/642/>)

Topics include lung cancer, colon cancer, breast cancer, renal cancer, prostate cancer, pancreatic cancer, iron deficiency anemia, sickle cell anemia, lymphoma- non-Hodgkin, acute myelocytic leukemia, chronic lymphocytic leukemia, idiopathic thrombocytopenia, pneumonia, sepsis UTI – pyelonephritis, cellulitis, HIV anaphylaxis, allergic dermatitis, and myocarditis encephalitis. No graduate credit. 1 to 6 professional hours. Approved for S/U grading only. May be repeated in separate semesters for a total of 24 credit hours with approval from the Student Progress and Promotions Committee. Available for honors grade. Prerequisite: Restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 644 Multisystem Conditions credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/644/>)

The Multisystem Conditions course is a required course for students in Phase 1 of the Carle Illinois College of Medicine Curriculum. In this course, students work in small groups to approach complex diseases and conditions they may see in the clinical environment. No graduate credit. 4 professional hours. Approved for S/U grading only. May be repeated in separate semesters to a maximum of 12 hours. Prerequisite: Restricted to students enrolled in Phase 1 of the Carle Illinois College of Medicine curriculum.

BSE 645 Synthesis & Summary credit: 6 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/645/>)

This course will review critical concepts in the areas of Behavioral Science, Biochemistry, Cells and Tissues, Human Development and Genetics, Microbiology, Immunology, Pathology, and Pharmacology, Population Health. The course will be organized around the major organ systems: Blood and Lymphoreticular System, Cardiovascular, Endocrine, Gastrointestinal, Hematology and Oncology, Musculoskeletal, Neurology, Psychiatry, Renal, Reproductive, Respiratory, Skin and Subcutaneous Tissue. No graduate credit. 6 professional hours. Approved for S/U grading only. Prerequisite: This course is restricted to Carle Illinois College of Medicine Students.

BSE 646 Synthesis & Summary - Phase 2 credit: 0 to 4 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/646/>)

An optional elective for students who are at the end of Phase 2 in the Carle Illinois College of Medicine curriculum. Designed to be student-centered. During the course, you will review how the basic science disciplines fit together, identify personal content weaknesses and work to deepen your understanding, create a Step 2 study strategy, and prepare for Step 2 in a manner that values wellness as well as growth. No graduate credit. 0 to 4 professional hours. Approved for S/U grading only. May be repeated in separate semesters to a maximum of 8 hours. Prerequisite: Restricted to students enrolled in Phase 2 or 3 of the Carle Illinois College of Medicine curriculum.

BSE 650 Global Studies/Service Learning Elective credit: 1 to 4 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/650/>)

This course will engage the student in interdisciplinary studies or projects and demonstrate understanding of complex global events and processes of globalization. Students will learn about issues and problems in health care from a global perspective. No graduate credit. 1 to 4 professional hours. Approved for S/U grading only. May be repeated to a maximum of 28 hours. Prerequisite: This course is restricted to Carle Illinois College of Medicine students.

BSE 655 Research Elective credit: 1 to 16 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/655/>)

The goal of this course is to introduce the students to the foundations of selected multi-disciplinary research in medical/engineering field. Students will learn about the purpose for research; identifying researchable issues; finding, evaluating, and using sources effectively; recognizing methods associated with different types of data and disciplines; and writing a literature review. No graduate credit. 1 to 16 professional hours. Approved for S/U grading only. May be repeated up to 16 hours in the same semester, to a maximum of 64 hours in separate semesters. Prerequisite: This course is restricted to Carle Illinois College of Medicine students.

BSE 660 Self-Designed Study credit: 1 to 16 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/660/>)

Students will develop skills and gain experience working collaboratively with other professional through a self-designed study. Develop a self-guided study when students have an interest in an intellectual issue that is best studied through an integrative approach based in multiple academic disciplines. This course will introduce the student to a selected multi-disciplinary study or project in the medical/engineering field, addresses appropriate methodology, provides opportunities for advanced level research or other creative projects, and culminates in an integrative experience. It must be arranged between the student and an individual faculty member or external collaborator, and subsequently approved by the dean of Academic Affairs. No graduate credit. 1 to 16 professional hours. Approved for S/U grading only. May be repeated up to 16 hours in the same semester to a maximum of 32 hours over separate semesters. Prerequisite: This course is restricted to Carle Illinois College of Medicine students.

BSE 665 Special Topics credit: 1 to 4 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/665/>)

Subject offerings of new and developing areas of knowledge in medicine intended to augment the existing curriculum. No graduate credit. 1 to 4 professional hours. Approved for S/U grading only. May be repeated to a maximum of 16 hours in the same or subsequent semesters. Prerequisite: This course is restricted to Carle Illinois College of Medicine students.

BSE 666 Academic Progress I (Longitudinal) credit: 0 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/666/>)

Provides students with an opportunity to demonstrate core medical skills. The course includes assessment of students' understanding of clinical skills, professionalism, anatomy, and medical knowledge. Areas covered in the course include: cardiovascular, respiratory, renal, neurology, musculoskeletal, digestive, nutrition, metabolism, endocrine, genitourinary, oncology, hematology, infection, and immunity. No graduate credit. 0 professional hours. Approved for S/U grading only. May be repeated in separate semesters. Prerequisite: Restricted to Carle Illinois College of Medicine students.

BSE 680 Innovation, Design, Engineering and Analysis Projects (Longitudinal) credit: 0 to 6 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/680/>)

Innovation, Design, Engineering and Analysis Projects (IDEA) is a required course for students in Phase 2 of the Carle Illinois College of Medicine curriculum. In this course, students work independently and in small groups to solve challenges they are presented with in the clinical environment. No graduate credit. 0 to 6 professional hours. Approved for S/U grading only. May be repeated in separate semesters to a maximum of 15 hours. Available for honor grades. Prerequisite: Restricted to students enrolled in Phase 2 of the Carle Illinois College of Medicine curriculum.

BSE 685 Medicine - Capstone Project (Longitudinal) credit: 2 to 4 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/685/>)
Selecting one of the clinical challenges investigated during the Innovation, Design, Engineering and Analysis Projects (Longitudinal), students will work to potentially translate new approaches, technologies, and treatments in healthcare. No graduate credit. 2 to 4 professional hours. Approved for S/U grading only. May be repeated in separate semesters to a maximum of 12 professional hours. Prerequisite: Restricted to students enrolled in Phase 3 of the Carle Illinois College of Medicine curriculum.

BSE 686 Medicine - Data Science Project (Longitudinal) credit: 2 to 4 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/686/>)
Develop skills in data science for health care through the Data Science Project. Identify an exciting data-driven question, find data sources to address the question, and access and utilize those data to improve clinical care. Students will interact with databases, utilize tools for analyzing clinical or molecular data, and learn about the immense potential of medical data science while familiarizing themselves with the issues of human subject's protection and privacy regulations around data. No graduate credit. 2 to 4 professional hours. Approved for S/U grading only. May be repeated in separate semesters to a maximum of 12 hours. Prerequisite: Restricted to students enrolled in Phase 3 of the Carle Illinois College of Medicine curriculum.

BSE 690 Research credit: 1 to 8 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/690/>)
Carle Illinois students are encouraged to participate in research in order to enhance their scientific reasoning, and fulfill the college's mission of developing "Physician Innovators". This course will allow students to engage in a broad spectrum of research experiences. Students will work closely with a research mentor at the University of Illinois at Urbana-Champaign to develop their ideas and generate a list of research outcomes. No graduate credit. 1 to 8 professional hours. Approved for S/U grading only. May be repeated in separate semesters to a maximum of 16 hours. Prerequisite: Students must be in Phase 2 or Phase 3 of the curriculum. This course is restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 700 Innovations in Problem Based Learning credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/700/>)
This elective will provide students multiple opportunities to identify compassionate innovation through problem-based learning facilitation. The students will learn how to facilitate a PBL session and how to identify moments in cases where compassionate innovation can be furthered. This will be done through creating additional probes or tasks in the cases to be used by future facilitators. Students will also have the opportunity to create notes and evaluations on first year students. These notes/evaluation will be reviewed by CIMED facilitators. The overall goal of this is not only to improve cases for current PBL students, but to assist students participating in the elective in ideation and entrepreneurship. This will help students as they create IDEA projects in the clerkships as well as preparing them for Capstone and potentially Data Science projects. Based on student interest, certain areas of this elective may be emphasized to achieve student goals. No graduate credit. 4 professional hours. Approved for S/U grading only. Prerequisite: Students must be in Phase 2 or Phase 3 of the curriculum. This course is restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 701 Introduction to Telemedicine credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/701/>)
This introduction to telemedicine will help students understand the role of telemedicine in various contexts such as in primary care, for underserved or rural patients, during times of crisis (disasters, pandemics) and more. Considerations include benefits & limitations, tools & technology, patient interactions & follow-up, insurance considerations, legal and regulatory issues, and research. Students will have an opportunity to research an area of telemedicine and present what they have learned. This could be new uses of telemedicine, new tools, policy/legal considerations, expanding the reach of telemedicine, or any other issue related to telemedicine. Outputs could include a literature review, program plan, roadmap, white paper or other presentation medium. No graduate credit. 2 professional hours. Approved for S/U grading only. Prerequisite: Restricted to students enrolled in the Carle Illinois College of Medicine.

BSE 702 Medical Spanish credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/702/>)
Carle Illinois College of Medicine strives to support physicians who want to serve diverse populations. To that end, students may enroll in a 2-week medical Spanish course. This hybrid online course allows students to increase their proficiency in Spanish, while also practicing with a standardized patient. No graduate credit. 2 professional hours. Approved for S/U grading only. Prerequisite: Restricted to students enrolled in the Carle Illinois College of Medicine.

BSE 703 Medical Informatics credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/703/>)
A detailed overview of biomedical and health informatics for medical students. The course provides up-to-date details on the informatics field, which includes: electronic health records, data standards and interoperability, clinical decision support, healthcare data analytics, population health, patient engagement, and telemedicine. It also describes and sets the context for new technologies, such as SMART on FHIR, machine learning, artificial intelligence, and wearables. No graduate credit. 2 professional hours. Approved for S/U grading only. Available for honors grades. Prerequisite: Restricted to students enrolled in the Carle Illinois College of Medicine.

BSE 704 Medicine in Literature credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/704/>)
The medical encounter between patients and physicians has been represented in literary texts such as poems, short stories and novels for centuries. In this elective, students will be given the opportunity to reflect on the medical experience through an analysis of literary texts from various time periods and cultural contexts. Particular attention will be paid to the difference in perspective by patients, physicians and other actors in the healthcare setting. Our reading of literature will be complemented by texts from the field of narrative medicine, which uses the tools of literary analysis and close reading to understand patients' histories and fine-tunes awareness of the cultural and social determinants of health. No graduate credit. 2 professional hours. Approved for S/U grading only. Prerequisite: Restricted to students enrolled in the Carle Illinois College of Medicine.

BSE 705 Race in Medicine credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/705/>)

This elective provides an opportunity to explore the topics of unconscious bias, history of race in medicine and effects on systemic racism in medicine. The goal is to give time to grow in personal insight and development in this area to progress to become a compassionate and unbiased health care provider. Progress towards this goal will be made through the personal journey of completing a 21 day equity challenge and reflection paper, participation in online discussion boards, and group projects looking at the history and current state of racism and social determinants of health in medicine. No graduate credit. 4 professional hours. Approved for S/U grading only. Prerequisite: Restricted to students enrolled in the Carle Illinois college of Medicine curriculum. The course is only available during the Discovery Learning timeframe.

BSE 706 Literature Review in Pathology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/706/>)

Pathology is a multidisciplinary science that connects theory (basic sciences) with practice (clinical sciences). This elective provides students with opportunities to explore the role of pathology in medical education. This course might be of particular interest to those who are generally interested in medical education and/or pathology as a future specialty. No graduate credit. 4 professional hours. Approved for S/U grading only. May be repeated in separate semesters to a maximum of 8 hours. Prerequisite: Restricted to students enrolled at the Carle Illinois College of Medicine.

BSE 710 Computational Genomics credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/710/>)

The first week of this elective is an intensive course for scientists and clinicians covers the basics of computational genomics, while integrating the latest technologies and computational methodologies. University of Illinois faculty and Mayo Clinic scientists teach lectures and lead hands-on lab exercises in a variety of subject areas including genome sequencing and assembly, polymorphism and variant analysis, epigenomics, and systems biology. The second week is an in-depth independent study that focuses on a project using the skills from the first week. No graduate credit. 2 professional hours. Approved for S/U grading only. Prerequisite: This course is restricted to students enrolled in the Carle Illinois College of Medicine.

BSE 711 Climate Aware Physicians credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/711/>)

Medical students should learn how to practice medicine in the context of the current health impacts of climate change. Throughout the U.S. and globally, climate change contributes to increasing morbidity and mortality, including heat illness, respiratory and cardiovascular disease from air pollution, vector and water borne diseases, food and water insecurity, mental stress, and injuries. We highlight health threats, policies, and actions for physicians, engineering/medical researchers, and medical students. No graduate credit. 2 professional hours. Approved for S/U grading only. Available for honor grades. Prerequisite: Restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 720 Advanced Anatomy credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/720/>)

Provides a focused concentration on gross anatomy via literature review and intensive cadaver dissection related to the student's specific clinical interest. Topics will emphasize clinical conditions that have clear anatomic correlates. Key topics will include the 3D relationships of gross anatomical structures, foundational anatomical knowledge required to interpret results of different imaging modalities, and the application of anatomical knowledge in carrying out surgical, diagnostic, or therapeutic clinical procedures. No graduate credit. 4 professional hours. Approved for S/U grading only. Available for honors grades. Prerequisite: Restricted to students enrolled in the MD program at Carle Illinois College of Medicine.

BSE 730 Introduction to Deep Learning on Healthcare Data credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/BSE/730/>)

Covers deep learning methods, healthcare data and applications using deep learning methods. Includes activities such as online lectures or video lectures, programming labs, literature review, and individual or group presentations. The overall goal is to understand basic data science workflow for healthcare data such as electronic health records, clinical notes, and medical images, to learn basic deep learning models, and to learn the structure of data science projects. No graduate credit. 2 professional hours. Approved for S/U grading only. Prerequisite: Experience with Python programming, basic machine learning, and Jupyter notebooks. Restricted to students enrolled in the Carle Illinois College of Medicine curriculum.

BSE 790 Understanding the Response to the COVID-19 Pandemic credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/BSE/790/>)

This course is designed to help students apply the principles of virology, immunology, public health, data science and population Medicine in evaluating the current public health policy responses to the COVID-19 pandemic. Since the learning activities will focus on current events and daily topics, they will be altered and refined to align with unfolding circumstances and policy decisions. The learning activities will provide students with a model foundation of competency and confidence which they would need to serve on a local, community health advisory board and provide expertise in support of the design of a coordinated response to mitigate the impact of a Covid-19 outbreak on patient health, societal well-being, business continuity and economic durability. The competency foundation will include: 1. an understanding of viral biology, host defense and infectious disease dynamics. 2. the ability to gather, understand and intelligently apply biostatistical and epidemiological data in designing practical solutions. 3. an appreciation of the different: a. political, demographic, educational, attitudinal, behavioral, socioeconomic, and cultural factors, along with the inherent disparities and preferences that impact health risk and community compliance to public health recommendations b. needs and constraints of local business owners c. barriers to public participation and communication. No graduate credit. 1 professional hour. Approved for S/U grading only. Prerequisite: Restricted to Carle Illinois professional students only.