

# LECOM Learning Pathways

## The Lecture Discussion Pathway

### Program Description

Lecture presentations and small-group tutorials are the heart of the Lecture/Discussion Pathway. Students usually spend the morning in lecture sessions and the afternoon in a combination of lectures, laboratories, tutorials, small-group discussions, and independent study where they have ample access to faculty members in the basic and clinical sciences. The Lecture/Discussion Pathway is ideal for those students who learn from a combination of presentations and readings and who are more comfortable in a teacher-directed environment.

The Lecture/Discussion Pathway is composed of the Core Curriculum (Phase I) and the Systems Curriculum (Phase II).

### Core Curriculum – Phase I

The following courses are taught as part of the core curriculum:

Clinical Human Gross Anatomy – first 12 weeks of the first year  
Embryology  
Cell Biology/Histology  
Microbiology/Immunology  
Physiology  
Pharmacology  
Pathology  
Osteopathic Principles and Practices  
Medical Ethics  
Medical Genetics

### Systems Curriculum - Phase II

Phase II begins in the second semester of the first year and continues through the second year. An understanding of the etiology, pathophysiological ramifications, current diagnostic capabilities, and treatments of disease is fundamental to the development of the complete osteopathic primary care physician, as well as to the systems approach of medical education. With this premise, the basic and clinical science components of the LECOM Systems Curriculum concerned with each particular organ system of the body are integrated in classroom and small group instruction/discussion.

Instructional materials presented within each particular system expand upon basic principles mastered during the Core Curriculum – Phase I. Preclinical topics consider each respective system from viewpoints of the basic science disciplines. As a complement, clinical perspectives are offered from the point of view of both the primary care physician as well as the respective

specialist. This format of presentation not only promotes a better learning environment due to extensive integration/correlation of course material, but also provides a “real life” view of contemporary healthcare. Physicians must be acutely aware of the interrelationships between the practice of medicine and the business of medicine. The areas where these cross over are identified within the Health Care Management course, where emphasis is also placed on understanding managed care treatment protocols.

Other instructional modalities, proceeding concurrently within each respective system, are designed to reinforce, complement, and expand upon the actual coursework comprising each system. These modalities include, but are not limited to: Geriatric Medicine, Public Health and Preventative Medicine, Physical and Rehabilitative Medicine, Medical Ethics, Medical Jurisprudence, Emergency Medicine, Radiology and Pediatrics. Important aspects of Family Medicine and other presentations are introduced throughout the Systems as appropriate.

The osteopathic approach to patient care is continually emphasized, both philosophically and in practice, from the first day of class through graduation by means of lectures and laboratory demonstrations of manipulative techniques. Concepts of osteopathic philosophy and practice are included in all aspects of LECOM’s educational programs whenever possible.

## The Problem-Based Learning Pathway

In Problem-Based-Learning (PBL) Pathway, studies are based on patient cases that provide the context for acquiring the underlying knowledge and understanding of medical science. These studies replace the major part of the traditional lecture program. This method of learning promotes critical thinking and clinical reasoning skills, and retention of knowledge is enhanced through its contextual nature. Since the PBL process involves, for the most part, small group discussion and personal study instead of lectures, it also strongly promotes interpersonal skills and independent learning. Consequently, PBL is widely considered to facilitate the development of key professional competencies.

The Problem-Based Learning (PBL) Pathway is ideal for students who:

- ❑ Are pro-active learners,
- ❑ Prefer a strong clinical context for their learning,
- ❑ Are comfortable with flexibility in the learning process, and
- ❑ Learn best through small group discussion and reading

### Outline description of the PBL Pathway

During the first 12 weeks of the program, PBL students, along with those of the other pathways, follow an initial didactic course of anatomical sciences (anatomy, embryology and histology) and anatomical dissection. During this time, PBL is pursued only as a minor component, to allow students to become acquainted with the process. After the 12-weeks, students in the PBL pathway study the basic medical sciences almost completely by PBL, which occupies about 70% of their total pre-clinical curriculum.

In groups of 8 or 9, each with a faculty facilitator, PBL students meet for three 2 hour sessions each week to study a sequence of more than 70 cases (all based on actual patients) in paper presentation. The faculty facilitators do not teach *per se*, but facilitate the efforts of the student group to investigate and understand the cases for themselves. However, the PBL class may occasionally call on specialist faculty to provide “enrichment sessions” covering areas of specific difficulty or interest, and, as with other pathways, all faculty are available for individual consultation when required. A small number of orientation workshops are also provided at the start of the program, both to explain how to approach the study of certain subjects, and to cover areas such as laboratory testing and diagnostic imaging that are essential to the case studies.

During the course of studying each case, *learning issues* are identified (see *The PBL Group Session* below). Between meetings, with the help of their required texts, students work independently, or in small, informal groups, on these learning issues, which later form the basis for their examinations.

Every aspect of the program cannot, of course, be taught by PBL, and PBL students also receive additional didactic instruction and experiential learning in subjects such as taking patient history, physical examination of patients, osteopathic manipulation, interpretation of EKG, emergency medical support, etc. In addition, a simulated patient manikin is used for the study of acute cases, and preceptorships also provide clinical experience under physician guidance.

## **The PBL Group Session**

In these sessions, students work through each case from initial patient presentation to final diagnosis. Initially all students in the group are given the age, gender and chief complaint of the patient. In the initial discussions that follow, one student plays the role of patient, and he/she alone is given details of the patient history. Another student plays the role of physician, interviewing the student “patient” to obtain the history, and requesting, from the facilitator, an account of each aspect of the physical examination. The student group then proceeds as a team, brainstorming the case and requesting various further data, such as laboratory tests or diagnostic procedures. The appropriate information is progressively disclosed by the facilitator in response to the students’ requests.

Although arrival at the correct diagnosis marks completion of each case, the *primary purpose* of the PBL group sessions is not to reach a diagnosis, but to use the case as a vehicle for study, through the generation of learning issues. Learning issues are topics that the students find they need to study in greater depth in order to progress to the diagnosis, and to understand the medical science that underlies the patient problem.

In general, cases are studied in sets of 6 to 8, after which the student composition of the PBL groups is changed, before proceeding to the next case set. Initially, progression through each case to the definitive diagnosis will require several group sessions. At the completion of each case study, each member of the group gives an informal, oral evaluation of the performance and contribution of every other member over the course of the case.

## **Student Assessment**

The study of each set of 6 to 8 patient cases is followed by a written examination that tests the students’ knowledge and understanding of the material covered by the learning issues generated from those cases. Generally 3 written examinations are given per semester, each comprising multiple choice and matching questions written in the style of the medical examining board.

The written examination scores comprise the major component of the student PBL grade. A small additional component emanates from written evaluations, of each student’s performance in the group sessions, by the facilitator and by the other group members.

## The Independent Study Pathway

The Independent Study Pathway (ISP) is a unique program among medical school curricula and provides significant flexibility for students during their first two years of medical school. In turn the pathway requires the student to have excellent organizational and time management skills in order to proceed through the curriculum and meet strict examination deadlines.

The ISP stresses the students' self-directed learning capabilities. Compared to the more traditional LDP medical curriculum, which, during the first two years, may involve an average of 25 hours of mandatory class attendance per week, class time is greatly reduced in the ISP.

The Independent Study Pathway (ISP) is appropriate for students who:

- Are self-motivated and self-directed, with good organizational and time-management skills (procrastination is not acceptable);
- Enjoy the freedom of non-traditional time scheduling;
- Learn best through reading and small group interactions;
- Are responsible enough to utilize this freedom, balancing the demands of academic responsibilities with those of extracurricular activities.
- Have a strong science or previous clinical background.

### Program Description

Initial matriculation at LECOM involves a 12-week, five days per week, group of anatomical science courses including Gross Anatomy, Embryology and Histology, with mandatory attendance. Following this course load, ISP students study other basic sciences using lists of highly structured learning objectives compiled into “module” booklets, used in combination with textbooks and other educational resources, in order to master the materials typically in a small group environment. Students proceed through these modules with certain time limits in place and examinations are administered on specific dates by which time the students are expected to have mastered all learning objectives outlined in the module.

While primarily based on faculty-directed module study, ISP students are typically required to be present on campus two to three days per week in order to attend **classroom and laboratory-based courses** needed to complete the preclinical curriculum (both first and second years). Students are therefore expected to maintain living accommodations in Erie in order to limit the time lost to travel.

Though the program stresses independence, it is very much a closely directed course of study and students meet with faculty members at least weekly at regularly scheduled times. Faculty are also available to assist individual or groups of students in mastering difficult concepts and materials. In addition, ISP students are always welcome to sit in on any or all of the Lecture-Discussion Pathway lectures as part of their learning experience.

The modules are divided into two curricular categories: “Core” and “Systems”. Core modules deal with fundamentals of basic science while systems modules integrate basic science and clinical

disciplines in an organ systems approach to learning. Core modules are utilized during the first and part of the second semesters of the first year, while systems modules begin in the second semester of first year and continue through the full second year. Lecture based courses, including Osteopathic Principles and Practice (OPP), one of the most characteristic courses of osteopathic medical education, are presented throughout the first and second years, joining together members of the ISP with students from the other curricular pathways. The modules and classroom/laboratory courses (which have mandatory attendance) include:

**First Year Modules:**

Biochemistry  
 Medical Genetics  
 Microbiology  
 Immunology  
 Pathology  
 Pharmacology I & II  
 Physiology  
 Musculoskeletal System  
 Nervous System  
 Human Sexuality

**First Year Courses:**

Gross Anatomy (first 12 weeks of first semester)  
 Histology (first 12 weeks of first semester)  
 Embryology (first 12 weeks of first semester)  
 Osteopathic Principles and Practices I, II (entire year)  
 Spirituality, Medicine and Ethics  
 Healthcare Management I and II  
 History and Physical Examination 1 and 2

**Second Year Modules:**

Cardiovascular System  
 Respiratory System  
 Hematology/Oncology  
 Renal System  
 Geriatric Medicine  
 Digestive System  
 Reproductive System  
 Pediatrics

**Second Year Courses:**

History and Physical Examination II and III (entire year)  
 Public Health and Preventive Medicine (first semester)  
 Osteopathic Principles and Practices (entire year)  
 Medical Jurisprudence (distance learning, first semester)  
 Advanced Cardiac Life Support (end of second semester)  
 Introduction to Behavioral Science

ISP students may attend any or all of the Lecture Discussion Pathway classes as part of their learning experience. During the third and fourth years, ISP, PBLP and LDP students are integrated in their clinical clerkships.

**Clinical Experience**

ISP students are involved from the beginning in a number of courses involving clinical experience. From Osteopathic Manipulative Medicine class and lab throughout the two years, to learning how to take histories and conduct physical examinations, the ISP stresses comprehensive examination of the patient and helps develop a proficiency in the use of diagnostic equipment.

**Some of the advantages and special characteristics of the ISP are:**

- ISP helps in turning students into “lifelong learners,” reinforcing learning skills needed throughout a physician’s career. The program is especially suited for those students who possess skills in self-education and time management, and in particular, the ability to efficiently learn without a constant dependence on instructors. All of these are important professional assets to the practicing physician and define the “lifelong learners.” It should be noted that there is no statistical evidence to demonstrate the superiority of any pathway; however, after completing the curriculum, most ISP students do believe that the ISP curriculum does aid them in developing learning skills that are necessary for an effective clinical educational experience during their MSIII and MSIV years of medical school.
- ISP involves an active learning process, with students being responsible for their own learning and progress. By practicing the self-discipline necessary to direct their own efforts to achieve mastery of subjects, students receive the self-satisfaction that comes from independent learning, which in turn motivates them to continue learning. In this process, faculty members become facilitators rather than dispensers of knowledge, and are utilized for learning more difficult concepts, consulted for clarification, help in determining additional resources, or answer specific questions.
- While each ISP module has a finishing date, learning within the pathway is self-paced as students arrange their studies as they see fit. In so doing, more time can be devoted to areas which a student may find very difficult or wishes to pursue in more depth, while less time may be spent on material already mastered in previous undergraduate courses.
- Faculty can use a greater variety of teaching materials. In choosing learning resources for the ISP students, faculty may specify texts, articles, web sites and other audio-visual resources for study. In turn, the module approach provides the freedom for students who want more information to use optional or additional resources for gaining in-depth knowledge.
- Independent study is considered by some students to be less stressful as they feel a flexible schedule is less onerous than a rigid one; however such flexibility requires excellent time-management.

## **Primary Care Scholars Pathway**

LECOM Primary Care Scholars Pathway (PCSP) condenses four years of medical education into three years in order to graduate Primary Care doctors sooner. The PCSP eliminates some of the barriers that discourage medical students from pursuing careers in family medicine and the other primary care specialties.

Based on LECOM's experience developing its unique Problem-Based Learning and Independent Study Pathways, the committee chose to use the Independent Study learning modules as a guide to this new curriculum. PCSP students will follow a year-round curriculum so that they complete the basic science and clinical courses by March of the second year. PCSP students immediately will begin core clinical rotations at carefully selected hospitals and physician offices.

Students must complete core competency-based clinical rotations that meet all the educational requirements necessary for primary care medicine. LECOM has introduced new core rotations to continue OMM training and other essential medical skills. A sub-internship introduces students to the hospitals where they will continue their clinical training after graduation.

### **First Year Courses (August to May)**

Gross Anatomy  
Histology  
Embryology  
Osteopathic Principles and Practice  
Medical Ethics/Spirituality  
Healthcare Management  
History and Physical Examination  
Osteopathic Preceptor Education Project

### **First Year Modules (August to May)**

Physiology  
Biochemistry  
Microbiology  
Pharmacology  
Pathology  
Molecular Genetics  
Immunology  
Integumentary System  
Musculoskeletal System  
Nervous System

**Second Year Courses (June of Year 1 to March of Year 2)**

Osteopathic Principles and Practice

CODA

Public Health

Medical Jurisprudence

Board Review

Psychiatry

ACLS

**Second Year Modules (June of Year 1 to March of Year 2)**

Cardiology

Respiratory

Renal

Geriatrics

Human Sexuality

Pediatrics

Reproductive System

Endocrinology

**Clinical Rotations (March of Year 2 to October of Year 3)**

Family Medicine

Clinical Overview

Pediatrics

OB/GYN

Internal Medicine 1

Internal Medicine 2

General Surgery

Medical Selective 1

**Clinical Rotations (October of Year 3 to May of Year 3)**

Psychiatry/Comprehensive Review

OMM/Comprehensive Review

Medical Selective 2

Ambulatory Medicine 1

Ambulatory Medicine 2

ENT/Ophthalmology

Emergency Medicine

Sub-internship