

Clinical Laboratory Science Program Annual Assessment Report 2008-09

I. Introduction

The Clinical Laboratory Science Program (CLS) serves all admitted OIT CLS degree students, who are each required to take a total of 83 credits in the clinical laboratory disciplines. The program offers courses in hematology, chemistry, immunology, transfusion medicine, urinalysis and body fluids, microbiology, biometry, instrumentation, and laboratory management, in both didactic and student practicum settings. Fall enrollment over the period of 2004 to 2008 has ranged between 45 and 48 students per year. The program has had excellent retention rates over the last five available record years (2004-2008); 116/121 students graduated during that time period. The five year graduation rate based on 2004-2008 data ranged between 19 and 23 CLS graduates per year. Based on 2008 CLS graduates survey, the average salary was \$55,033.

II. Program Purpose, Objectives and Student Learning Outcomes

The purpose of the Clinical Laboratory Science Degree is to provide a comprehensive curriculum to prepare students to practice clinical laboratory science/medical technology in diagnostic laboratories and other healthcare-related settings. Successful completion of the Clinical Laboratory Science Program qualifies students to sit for national certification examinations.

Educational Objectives

The program's expectation is to graduate individuals who:

- are professionally competent;
- possess a commitment to lifelong learning;
- exhibit a sense of commitment to the ethical and humane aspects of patient care;
- appreciate the need for research to develop knowledge of health, disease, healthcare management and education;
- recognize the role of the clinical laboratory scientist in the assurance of quality health care.

Student Learning Outcomes (SLO)

The CLS faculty/staff met five times during the Fall 2008 and Winter 2009 terms to review the current program student learning outcomes. After thorough discussion, faculty and staff agreed to continue using the student learning outcomes. The continued version is as follows:

Upon graduation from the program, students will be able to demonstrate:

1. theoretical knowledge and technical skills in the clinical laboratory according to established laboratory standards;
2. error recognition, and the ability to integrate and interpret analytical data and establish a course of action to solve problems;
3. professionalism and ethical behavior;
4. administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management, and appropriate composure under stressful conditions;
5. safe laboratory practice to include maintenance of working environment, adherence to all safety rules and regulations, and appropriate test sample acquisition and handling;
6. communication skills to ensure correct, effective, courteous and appropriate information transfer.

III. Three-Year Cycle for Assessment of Student Learning Outcomes

The faculty agreed that we will have six main outcomes and will assess them based on the three-year cycle shown in Table 1 below.

Learning Outcomes	Annual	07-08	'08-09	'09-10	'10-11	'11-12
1. Theoretical knowledge and technical skills in the clinical laboratory according to established laboratory standards.	✓					
2. Error recognition, and the ability to integrate and interpret analytical data and establish a course of action to solve problems.	✓					
3. Professionalism and ethical behavior.		✓			✓	
4. Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management, and appropriate composure under stressful conditions.			✓			✓
5. Safe laboratory practice to include maintenance of working environment, adherence to all safety rules and regulations, and appropriate test sample acquisition and handling.	✓					
6. Communication skills to ensure correct, effective, courteous and appropriate information transfer.				✓		

Table 1. CLS Program Assessment Cycle

Please refer to Appendix A for a detailed mapping of program student learning outcomes to the CLS curriculum.

IV. Summary of 2008-09 Assessment Activities

CLS faculty and staff conducted a formal assessment of four student learning outcomes during Fall term 2008 and Winter term of 2009.

Student Learning Outcome #1: Theoretical knowledge and technical skills in the clinical laboratory according to established laboratory standards.

Direct Assessment #1

The CLS faculty and staff conducted an analysis of American Society of Clinical Pathologists Board of Registry (ASCP BOR) certifying exam scores of graduates from 2004-2008 classes. The results of this outcome can be found in Appendix B, Table 1. ASCP BOR exam results included seven laboratory practice areas. These results indicated a downward trend in test scores. In particular 2008, chemistry and immunology scores fell below the national average for university-based CLS program graduates taking the exam for the first time. Whether this is an anomaly or a real indication of needed improvement will be studied. It is worth noting that although the averages trended down, 100% of students passed on their first attempt.

Early, but as for now incomplete data, for the first batch of 2009 ASCP Board examinee's (9 students out of 22 in the class) results for all seven practice areas, indicates scores well above the national average (range of 105% to 129%) and that all 9 students passed.

Direct Assessment #2

Each CLS student must satisfy externship rotation criteria before graduation. Criteria fall into two sections: psychomotor and affective domains of practice in clinical service lab expectations; and written externship exam scores at a satisfactory level for good laboratory practice. Externship exams are given to students at the completion of every laboratory section (chemistry/immunology, hematology, transfusion medicine, microbiology, urinalysis, and specimen processing). The minimum satisfactory exam assessment requires a score of at least 70% for each laboratory section.

Students who assess at lower than 70% are allowed additional externship time, direction and guidance before taking a second exam in the individual section in which the student did not reach the minimum satisfactory level for good laboratory practice. The minimum satisfactory level for second attempt students is 70%.

CLS faculty review of the results of the 2008 CLS externship scores indicated no apparent deficiencies in any laboratory practice area. In addition CLS faculty determined that question selection will remain the same, as breadth of questions covered all major topics within each clinical laboratory specialty.

Faculty and staff determined that no action is needed at this time to alter the methods of construction used to prepare students to sit for the certifying exams and externship exams.

Detailed records of this assessment can be found in the CLS department assessment coordinator's notebook and individual student records in the CLS program office.

Student Learning Outcome #2: Error recognition, and the ability to integrate and interpret analytical data and establish a course of action to solve problems.

The CLS faculty and staff conducted an analysis of externship evaluations in problem recognition and problem solving as scored by clinical site faculty (Appendix B, Table 3). To ensure consistent grading and interpretation, the CLS clinical coordinator instructed clinical site faculty on scoring criteria and guidelines. For the graduating class of December 2008, no student received an evaluation score that indicated a weakness in student preparation in problem solving and problem recognition. The lowest minimum passing score of three was acquired or exceeded by every student in all four rotation sections. No didactic or student laboratory course changes associated with this SLO were indicated at this time.

Detailed records of this assessment can be found in the CLS department assessment coordinator's notebook, and individual student records maintained in the CLS Program office.

Student Learning Outcome #4: Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management, and appropriate composure under stressful conditions.

The CLS Laboratory Management course instructor and externship site coordinators conducted an analysis of administrative skills and behaviors utilizing student written reports, and observation of student demeanor and composure in clinical laboratory work environments (Appendix B, Table 4). Scoring of written reports was based on instructor's evaluation scale. Stressful condition composure observations utilized input over a 16 week externship. For the graduating class of December, 2008, no student received a score in CQI, FRM, and Stress categories that indicated a weakness in administrative skills, philosophies, and behaviors. No didactic lecture course changes associated with this SLO were indicated at this time.

Detailed records of this assessment can be found in the CLS department assessment coordinator's notebook, and individual student records maintained in the CLS program

Student Learning Outcome #5: Safe laboratory practice to include maintenance of working environment, adherence to all safety rules and regulations, and appropriate test sample acquisition and handling.

The CLS faculty and staff conducted an analysis of externship evaluations in laboratory techniques and laboratory results as scored by clinical site faculty (Appendix B, table 5). To ensure consistent grading and interpretation, the CLS clinical coordinator instructed clinical site faculty on scoring criteria and guidelines. For the graduating class of December, 2008, no student received an evaluation score that indicated a weakness in student preparation in safe laboratory practice, adherence to safety rules and regulations, and appropriate test sample handling and acquisition.

Detailed records of this assessment can be found in the department assessment coordinator's notebook, and individual student records maintained in the CLS program office.

V. Evidence of Student Learning

During the 2008-2009 academic year, the Clinical Laboratory Science faculty formally assessed the student learning outcomes summarized below.

Student Learning Outcome #1: Theoretical knowledge and technical skills in the clinical laboratory according to established standards.

Strengths: Externship students performed above expectations for all clinical laboratory practice areas, including chemistry, immunology, hematology, microbiology, transfusion medicine (blood banking), urinalysis, and laboratory operations. On average students scored well above the minimum pass level on national certifying exams and externship exams.

Areas needing improvement: Although 100% of the students passed in both 2007 and 2008 ASCP BOR exams a slight downward trend may have occurred. This was especially evident in chemistry and immunology.

Course of Action: Currently CLS students are required to achieve a minimum satisfactory level score of 70%. A new minimum of 75% will replace the 70% level. This change will be fully initiated for the graduating class of December, 2009. Student progress and success will be monitored using attrition rates, number of de-accelerated students, and changes in ASCP BOR exam results. A minimum of 3 year classes (08-09, 09-10, & 10-11) will be evaluated.

Student Learning Outcome #2: Error recognition, and the ability to integrate and interpret analytical data and establish a course of action to solve problems.

Strengths: All externship students performed at or above expectations for recognition of errors in techniques, calculations, and instrument malfunctions. All students utilized learned skills at the appropriate level to determine course of action to solve problems and determine correct solutions.

Areas needing improvement: None at this time.

Student Learning Outcome #4: Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management, and appropriate composure under stressful conditions.

Strengths: All CLS students performed at or above minimum proficiency level for CQI, FRM ($\geq 70\%$) and Stress (3 or higher). Twenty two CLS students (88%) met or exceeded minimum expectations in Lab Ed (assessment $\geq 70\%$). Eighteen CLS students (78%) met or exceeded minimum expectations in QA (assessment $\geq 70\%$). Feedback from externship clinical coordinators indicated that all students promoted and practiced at high managerial behavior, utilized appropriate procedures, and handled stress conditions adequately.

Areas needing improvement: None at this time

Student Learning Outcome #5: Safe laboratory practice to include maintenance of working environment, adherence to all safety rules and regulations, and appropriate test sample acquisition and handling.

Strengths: All externship students either met or exceeded expectations, in all clinical areas, for appropriate laboratory technique, which included compliance with facility and established safety policies, maintenance of clean and stocked work areas, documentation of accurate and precise results, interpretation of lab results, and chemical and biological safety protocols. Externship coordinators noted that every student was able to acquire and maintain safe laboratory procedures with minimum supervision, thus meeting and exceeding expectations for laboratorians in hospital work environments.

Areas needing improvement: None at this time.

Clinical Laboratory Science Curriculum Map for SLO 1

Theoretical knowledge and technical skills in the clinical laboratory according to established laboratory standards

SLO 1 required curricula are indicated with **Bold Font**
Senior Year

Fall	CLS 406	Biometry
	CLS 410	Clinical Microbiology I
	CLS 420	Immunology
	CLS 441	Practicum: Instrumentation ★
	CLS 442	Practicum: Hematology ★
	CLS 443	Practicum: Transfusion Medicine ★

Winter	CLS 411	Clinical Microbiology II
	CLS 415	Clinical Chemistry I
	CLS 447	Practicum: Chemistry
	CLS 448	Practicum: Immunology/Infectious Serology
	CLS 449	Practicum: Urinalysis

Spring	CLS 412	Pathophysiology
	CLS 416	Clinical Chemistry II
	CLS 419	Immunoematology
	CLS 461	Clinical Laboratory Management I
	CLS 444	<i>Practicum: Microbiology ▲</i>
	CLS 445	<i>Practicum: Parasitology ▲</i>
	CLS 446	<i>Practicum: Mycology ▲</i>

Summer	CLS 440	Practicum: Specimen Collection
	CLS 452	Practicum: Adv. Hematology Techniques
	CLS 453	Practicum: Adv. Transfusion Medicine Techniques
	CLS 454	Practicum: Adv. Microbiology Techniques
	CLS 457	Practicum: Adv. Chemistry/Immunology Techniques
	CLS 459	Practicum: Chemistry/Immunology Techniques
	CLS 462	Clinical Laboratory Management II

Fifth Term – Extended Senior Year

CLS 463	Clinical Laboratory Management III
CLS 470	Clinical Laboratory Externship

★▲ Represent ½ class rotation between Fall and Spring terms for each class (year 1)

Clinical Laboratory Science Curriculum Map for SLO 2

Error recognition, ability to integrate and interpret analytical data, and establish a course of action to solve problems

SLO 2 required curricula are indicated with **Bold Font**
Senior Year

Fall	CLS 406	Biometry
	CLS 410	Clinical Microbiology I
	CLS 420	Immunology
	CLS 441	Practicum: Instrumentation ★
	CLS 442	Practicum: Hematology ★
	CLS 443	Practicum: Transfusion Medicine ★

Winter	CLS 411	Clinical Microbiology II
	CLS 415	Clinical Chemistry I
	CLS 447	Practicum: Chemistry
	CLS 448	Practicum: Immunology/Infectious Serology
	CLS 449	Practicum: Urinalysis

Spring	CLS 412	Pathophysiology
	CLS 416	Clinical Chemistry II
	CLS 419	Immunochemistry
	CLS 461	Clinical Laboratory Management I
	CLS 444	<i>Practicum: Microbiology ▲</i>
	CLS 445	<i>Practicum: Parasitology ▲</i>
	CLS 446	<i>Practicum: Mycology ▲</i>

Summer	CLS 440	Practicum: Specimen Collection
	CLS 452	Practicum: Adv. Hematology Techniques
	CLS 453	Practicum: Adv. Transfusion Medicine Techniques
	CLS 454	Practicum: Adv. Microbiology Techniques
	CLS 457	Practicum: Adv. Chemistry/Immunology Techniques
	CLS 459	Practicum: Chemistry/Immunology Techniques
	CLS 462	Clinical Laboratory Management II

Fifth Term – Extended Senior Year

CLS 463	Clinical Laboratory Management III
CLS 470	Clinical Laboratory Externship

★▲ Represent ½ class rotation between Fall and Spring terms for each class (year 1)

Clinical Laboratory Science Curriculum Map for SLO 3

Professionalism through ethical behavior, attitude, organizational skills,
maintenance of patient confidentiality, and respect for coworkers

SLO 3 required curricula are indicated with **Bold Font**
Senior Year

Fall	CLS 406	Biometry
	CLS 410	Clinical Microbiology I
	CLS 420	Immunology
	CLS 441	Practicum: Instrumentation ★
	CLS 442	Practicum: Hematology ★
	CLS 443	Practicum: Transfusion Medicine ★

Winter	CLS 411	Clinical Microbiology II
	CLS 415	Clinical Chemistry I
	CLS 447	Practicum: Chemistry
	CLS 448	Practicum: Immunology/Infectious Serology
	CLS 449	Practicum: Urinalysis

Spring	CLS 412	Pathophysiology
	CLS 416	Clinical Chemistry II
	CLS 419	Immunochemistry
	CLS 461	Clinical Laboratory Management I
	CLS 444	<i>Practicum: Microbiology ▲</i>
	CLS 445	<i>Practicum: Parasitology ▲</i>
	CLS 446	<i>Practicum: Mycology ▲</i>

Summer	CLS 440	Practicum: Specimen Collection
	CLS 452	Practicum: Adv. Hematology Techniques
	CLS 453	Practicum: Adv. Transfusion Medicine Techniques
	CLS 454	Practicum: Adv. Microbiology Techniques
	CLS 457	Practicum: Adv. Chemistry/Immunology Techniques
	CLS 459	Practicum: Chemistry/Immunology Techniques
	CLS 462	Clinical Laboratory Management II

Fifth Term – Extended Senior Year

CLS 463	Clinical Laboratory Management III
CLS 470	Clinical Laboratory Externship

★▲ Represent ½ class rotation between Fall and Spring terms for each class (year 1)

Clinical Laboratory Science Curriculum Map for SLO 4

Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management, and appropriate composure under stressful conditions

SLO 4 required curricula are indicated with **Bold Font**
Senior Year

Fall	CLS 406	Biometry
	CLS 410	Clinical Microbiology I
	CLS 420	Immunology
	CLS 441	Practicum: Instrumentation ★
	CLS 442	Practicum: Hematology ★
	CLS 443	Practicum: Transfusion Medicine ★

Winter	CLS 411	Clinical Microbiology II
	CLS 415	Clinical Chemistry I
	CLS 447	Practicum: Chemistry
	CLS 448	Practicum: Immunology/Infectious Serology
	CLS 449	Practicum: Urinalysis

Spring	CLS 412	Pathophysiology
	CLS 416	Clinical Chemistry II
	CLS 419	Immunohematology
	CLS 461	Clinical Laboratory Management I
	CLS 444	<i>Practicum: Microbiology ▲</i>
	CLS 445	<i>Practicum: Parasitology ▲</i>
	CLS 446	<i>Practicum: Mycology ▲</i>

Summer	CLS 440	Practicum: Specimen Collection
	CLS 452	Practicum: Adv. Hematology Techniques
	CLS 453	Practicum: Adv. Transfusion Medicine Techniques
	CLS 454	Practicum: Adv. Microbiology Techniques
	CLS 457	Practicum: Adv. Chemistry/Immunology Techniques
	CLS 459	Practicum: Chemistry/Immunology Techniques
	CLS 462	Clinical Laboratory Management II

Fifth Term – Extended Senior Year

CLS 463	Clinical Laboratory Management III
CLS 470	Clinical Laboratory Externship

★▲ Represent ½ class rotation between Fall and Spring terms for each class (year 1)

Clinical Laboratory Science Curriculum Map for SLO 5

Safe laboratory practice to include maintenance of working environment, abiding by all safety rules and regulations, and appropriate test sample acquisition and handling

SLO 5 required curricula are indicated with **Bold Font**
Senior Year

Fall	CLS 406	Biometry
	CLS 410	Clinical Microbiology I
	CLS 420	Immunology
	CLS 441	Practicum: Instrumentation ★
	CLS 442	Practicum: Hematology ★
	CLS 443	Practicum: Transfusion Medicine ★

Winter	CLS 411	Clinical Microbiology II
	CLS 415	Clinical Chemistry I
	CLS 447	Practicum: Chemistry
	CLS 448	Practicum: Immunology/Infectious Serology
	CLS 449	Practicum: Urinalysis

Spring	CLS 412	Pathophysiology
	CLS 416	Clinical Chemistry II
	CLS 419	Immunohematology
	CLS 461	Clinical Laboratory Management I
	CLS 444	<i>Practicum: Microbiology ▲</i>
	CLS 445	<i>Practicum: Parasitology ▲</i>
	CLS 446	<i>Practicum: Mycology ▲</i>

Summer	CLS 440	Practicum: Specimen Collection
	CLS 452	Practicum: Adv. Hematology Techniques
	CLS 453	Practicum: Adv. Transfusion Medicine Techniques
	CLS 454	Practicum: Adv. Microbiology Techniques
	CLS 457	Practicum: Adv. Chemistry/Immunology Techniques
	CLS 459	Practicum: Chemistry/Immunology Techniques
	CLS 462	Clinical Laboratory Management II

Fifth Term – Extended Senior Year

CLS 463	Clinical Laboratory Management III
CLS 470	Clinical Laboratory Externship

★▲ Represent ½ class rotation between Fall and Spring terms for each class (year 1)

Clinical Laboratory Science Curriculum Map for SLO 6

Communication skills to ensure correct, effective, courteous and appropriate information transfer

SLO 6 required curricula are indicated with **Bold Font**

Senior Year

Fall	CLS 406	Biometry
	CLS 410	Clinical Microbiology I
	CLS 420	Immunology
	CLS 441	Practicum: Instrumentation ★
	CLS 442	Practicum: Hematology ★
	CLS 443	Practicum: Transfusion Medicine ★

Winter	CLS 411	Clinical Microbiology II
	CLS 415	Clinical Chemistry I
	CLS 447	Practicum: Chemistry
	CLS 448	Practicum: Immunology/Infectious Serology
	CLS 449	Practicum: Urinalysis

Spring	CLS 412	Pathophysiology
	CLS 416	Clinical Chemistry II
	CLS 419	Immunochemistry
	CLS 461	Clinical Laboratory Management I
	CLS 444	Practicum: Microbiology ▲
	CLS 445	Practicum: Parasitology ▲
	CLS 446	Practicum: Mycology ▲

Summer	CLS 440	Practicum: Specimen Collection
	CLS 452	Practicum: Adv. Hematology Techniques
	CLS 453	Practicum: Adv. Transfusion Medicine Techniques
	CLS 454	Practicum: Adv. Microbiology Techniques
	CLS 457	Practicum: Adv. Chemistry/Immunology Techniques
	CLS 459	Practicum: Chemistry/Immunology Techniques
	CLS 462	Clinical Laboratory Management II

Fifth Term – Extended Senior Year

CLS 463	Clinical Laboratory Management III
CLS 470	Clinical Laboratory Externship

★▲ Represent ½ class rotation between Fall and Spring terms for each class (year 1)

Board of Registry CLS Certification Exam Scores (ASCP)

Mean Scaled Scores for First-Time Examinees	No. Students	Total Score	By Subject								UA
			BB	Chem	Heme	Imm	LO	Micro	UA		
2008 OHSU-OIT CLS Pgm	14	507 : 1.05	547 : 1.12	456 : .95	528 : 1.07	484 : .96	578 : 1.12	496 : 1.03	523 : 1.10		
2008 University-Based	1843	485	487	482	493	481	514	482	475		
2008 OHSU-OIT CLS Pgm	14	507 : 1.04	547 : 1.12	456 : .94	528 : 1.07	484 : .95	578 : 1.12	496 : 1.02	523 : 1.08		
2008 National	2752	489	488	486	494	487	514	486	486		
2007 OHSU-OIT CLS Pgm	21	520 : 1.00	514 : 1.05	497 : 1.02	534 : 1.08	517 : 1.07	548 : 1.08	523 : 1.07	607 : 1.24		
2007 University-Based	1753	526	490	487	496	484	509	487	491		
2007 OHSU-OIT CLS Pgm	21	526 : 1.07	514 : 1.05	497 : 1.01	534 : 1.08	517 : 1.06	548 : 1.07	523 : 1.08	607 : 1.22		
2007 National	2675	491	491	490	495	488	510	485	497		
2006 OHSU-OIT CLS Pgm	33	535 : 1.09	553 : 1.12	537 : 1.11	551 : 1.12	506 : 1.21	575 : 1.12	500 : 1.03	526 : 1.08		
2006 University-Based	1096	490	495	482	494	491	514	485	480		
2006 OHSU-OIT CLS Pgm	33	535 : 1.10	553 : 1.12	537 : 1.11	551 : 1.12	506 : 1.22	575 : 1.12	500 : 1.03	526 : 1.07		
2006 National	1740	488	482	484	493	490	512	484	492		
2005 OHSU-OIT CLS Pgm	18	604 : 1.21	612 : 1.25	584 : 1.19	628 : 1.24	592 : 1.19	666 : 1.30	571 : 1.14	638 : 1.27		
2005 University-based	799	498	489	491	506	496	511	502	501		
2005 OHSU-OIT CLS Pgm	18	604 : 1.26	612 : 1.25	584 : 1.20	628 : 1.27	592 : 1.20	666 : 1.31	571 : 1.16	638 : 1.28		
2005 National	1266	491	488	487	496	494	509	491	497		
2004 OHSU-OIT CLS Pgm	23	530 : 1.08	547 : 1.09	505 : 1.02	530 : 1.05	600 : 1.19	561 : 1.11	527 : 1.05	643 : 1.28		
2004 University-based	506	500	501	491	504	504	505	503	504		
2004 OHSU-OIT CLS Pgm	23	530 : 1.13	547 : 1.11	505 : 1.02	530 : 1.07	600 : 1.21	561 : 1.12	527 : 1.07	643 : 1.27		
2004 National	862	477	483	497	484	486	502	494	508		

Graduating Class of December 2008
Externship Section Exams
(Individual and Mean % Score to Nearest Whole %)

Student	Chemistry/ Immunology	Hematology	Microbiology	Transfusion Medicine
A	93	89	96	83
B	88	94	93	89
C	94	91	92	87
D	88	85	90	79
E	79	91	88	79
F	69/97	77	78	73
G	93	89	92	75
H	99	95	95	92
I	99	97	98	91
J	99	97	95	93
K	88	93	98	76
L	73	89	90	87
M	94	91	96	88
N	95	93	98	89
O	58/95	81	87	79
P	95	88	88	85
Q	82	75	91	80
R	97	93	93	83
S	89	87	82	81
T	74	82	87	91
U	86	75	92	91
V	89	89	93	91
Average	88	88	91	85

Externship first-time exam scores based on comprehensive multiple-choice exams (75-150 questions per exam)

*Minimum satisfactory criteria requires an assessment of 70%.
 Students falling below minimum level were allowed a second attempt. In this case both scores are presented (1st attempt/2nd attempt).
 The averages reflect all attempts.*

**Graduating Class of December 2008
Externship Evaluation Scores for Problem Recognition (PR)
and Problem-Solving (PS)**

Student	Chemistry/ Immunology PR/PS	Hematology PR/PS	Microbiology PR/PS	Transfusion Medicine PR/PS
A	4/4	4/4	4/4	3/3
B	4/4	3/3	3/3	4/4
C	4/4	5/4	5/5	4/4
D	5/5	5/3	5/5	4/4
E	4/4	4/4	4/4	3/3
F	5/5	4/4	3/3	3/3
G	4/4	4/4	3/3	4/4
H	4/4	5/5	3/3	-/4
I	4/5	4/5	5/5	4/4
J	5/5	4/4	4/4	4/4
K	3/3	3/3	3/3	4/4
L	5/5	NA	5/5	4/4
M	3/3	4/4	4/4	4/3
N	4/4	3/3	5/5	4/4
O	4/4	5/5	NA	3/3
P	4/4	3/3	5/5	4/4
Q	4/4	3/3	3/5	3/4
R	4/3	4/4	5/5	4/5
S	4/4	4/4	4/3	3/3
T	4/4	4/5	4/4	3/3
U	3/3	3/3	NA	3/3
V	4/4	4/4	3/4	3/4
Average	4.0/4.0	3.4/3.9	4.0/3.8	3.6/3.7

Problem Recognition: Recognizes errors in techniques or calculation results, and/or instrument malfunctions.

Problem Solving: Determines course of action to solve problems and/or suggests correct solution.

Rating Scale:

- 5 = Exemplary
- 4 = Above Expectations
- 3 = Meets Expectations
- 2 = Needs Improvement
- 1 = Unacceptable
- NA = Not Observed

Graduating Class of December 2008

Exam Scores, Assignments, and External Evaluation Scores for Administration Skills related to Philosophies of Quality Assurance (QA) Continuous Quality Improvement (CQI), Laboratory Education (LabEd), Fiscal Resource Management (FRM), and Stress.

Student	QA ¹	CQI ²	LabEd ³	FRM ⁴	Stress ⁵
A	100	100	100	100	4.1
B	75	100	100	100	NA
C	88	100	94	100	4.0
D	88	90	75	100	5.0
E	88	100	100	100	4.5
F	75	100	62	85	NA
G	69	100	50	100	4.5
H	84	100	100	85	3.8
I	88	100	100	100	4.0
J	69	100	100	100	4.2
K	81	100	100	100	4.5
L	81	100	100	100	4.5
M	88	100	88	80	3.5
N	81	100	88	100	5.0
O	69	100	56	100	NA
P	81	100	100	100	4.5
Q	88	100	100	85	4.8
R	81	100	100	100	4.0
S	88	100	100	90	4.2
T	69	100	94	85	3.8
U	69	100	94	85	4.9
V	69	100	81	100	4.1
W	69	100	100	80	4.8
X	75	100	100	100	3.8
Y	88	100	100	100	4.0
* Overall Average	79	100	91	95	4.3
*% of students who achieved proficiency at least minimum satisfactory level					

<ol style="list-style-type: none"> 1. QA results based on philosophy of Quality Assurance written Clinical Laboratory Management I course <i>Minimum score of 70% to meet satisfactory expectation level</i> 2. CQI results based on Philosophies of Continuous Quality Improvement paper submitted in Clinical Laboratory Management I course (topic: Improvement of a Selected Laboratory Test Procedure). <i>Minimum score of 70% to meet satisfactory expectation level</i> 3. LabEd results based on Philosophies of Laboratory Education paper submitted in Clinical Laboratory. <i>Minimum score of 70% to meet satisfactory expectation level</i> 4. FSM results based on Philosophies of Fiscal Resource Management paper submitted in Clinical Laboratory Management I course (topic: Methods to Compute Cost for Select Laboratory Tests (e.g. cost per test) <i>Minimum score of 70% to meet satisfactory expectation level</i> 	<p>Stress⁵</p> <ol style="list-style-type: none"> 5. Stress Score for each student reflects an average based on each of four laboratory sections (Chemistry & Immunology; Hematology; Transfusion Medicine; Microbiology). <p>Stress Rating Scale: 5 = Exemplary 4 = Above Expectations 3 = Meets Expectations 2 = Needs Improvement 1 = Unacceptable NA=Not Observed</p>
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Graduating Class of December 2008
Externship Evaluation Scores for Laboratory Techniques (LT)
and Laboratory Results (LR)

Student	Chemistry/ Immunology LT/LR	Hematology LT/LR	Microbiology LT/LR	Transfusion Medicine LT/LR
A	4/5	5/4	5/4	3/3
B	5/5	4/3	4/4	5/4
C	5/5	5/5	5/5	4/4
D	5/5	4/4	5/5	4/4
E	4/4	4/4	5/5	3/4
F	5/5	4/4	4/3	3/3
G	4/4	5/5	5/4	4/4
H	5/4	5/5	3/3	4/3
I	4/4	4/4	5/5	5/5
J	4/4	4/5	5/5	5/5
K	4/4	3/4	3/4	5/5
L	5/5	NA	5/5	5/4
M	3/3	5/4	4/4	5/4
N	4/4	5/5	5/5	5/5
O	4/4	4/3	NA	4/3
P	4/4	4/4	5/5	4/4
Q	4/4	4/4	5/4	4/3
R	4/4	5/5	5/5	5/4
S	5/5	4/4	4/3	3/4
T	4/4	5/4	5/4	3/3
U	4/4	3/3	4/4	3/3
V	5/4	4/4	4/4	5/4
Average	4.3/4.3	4.4/4.1	4.5/4.1	3.9/3.9

Laboratory Techniques: Follows verbal/written procedure; uses proper techniques; complies with instructional safety policies. Maintains clean/stocked work area.

Laboratory Results: Obtains accurate/precise results; records, interprets and reports results completely, clearly and accurately. Requires minimum supervision.

LT/LR Rating Scale:

5 = Exemplary

4 = Above Expectations

3 = Meets Expectations

2 = Needs Improvement

1 = Unacceptable

NA = Not Observed