Proposal for Curriculum Change

For the Bachelor of Health Science Degree

In the Clinical Laboratory Sciences

April 2, 2001
# Proposal for Curriculum Change
For the Bachelor of Health Science Degree
In the Clinical Laboratory Sciences

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Section 1

Overview
Overview

The Division of Clinical Laboratory Sciences (CLS) proposes to modify the present Baccalaureate Degree Program in the Clinical Laboratory Sciences. The modification will clearly define basic level and advanced level content in the clinical laboratory sciences. Basic level courses will be defined in the third year of the program. Advanced level courses, offered in the fourth year, will build on this base. Advanced level courses will offer instruction toward supervisory and management positions in health care settings. The fourth year will emphasize integration of didactic and clinical knowledge. During the fourth year, clinical practicum experiences will be supplemented and monitored by faculty through web-based, asynchronous exercises.

The present CLS program consists of two options: a traditional 2 year professional program that is offered to third and fourth year students on the Lexington campus of the University of Kentucky and a non-traditional, distance learning program that is offered to graduates of associate degree, clinical laboratory technician programs at community colleges.

The traditional CLS program emphasizes lecture and student laboratory practice in hematology, clinical chemistry, clinical microbiology, immunology and immunohematology. The traditional option is now in suspension and is offered as needed, based on assessment of health care needs of the Commonwealth. This issue is further elaborated in the Needs Assessment section of this document.

The present non-traditional program offers courses to distance-learning students through synchronous format via interactive video and other technological instruction. The non-traditional program builds on basic level technical courses of associate degree clinical laboratory technician program. Students of the non-traditional program complete advanced level courses while practicing in a clinical setting. Students also complete advanced science and math courses and complete other requirements of undergraduate study at the University of Kentucky. Non-traditional students are required to complete 44 credit hours in professional courses to earn the bachelor degree.

The non-traditional, articulated CLS program serves health care needs across Kentucky. The program provides a unique opportunity in distance education for rural and/or place-committed students through an associate-to-baccalaureate degree program. Success of the non-traditional program can be measured by outcome. Ninety-five percent of graduates of the program practice in rural, medically under-served counties throughout Kentucky. Most graduates have remained in their home counties and continue to contribute to their local health care delivery systems.
Graduates have attained higher job positions and contribute to improving health care in rural health: Nine percent of graduates move into management or director positions at clinical laboratories. Seven percent of graduates matriculate into medically related graduate programs. Sixty-seven percent of graduates report increased responsibility and/or salary in clinical laboratory medicine within one year of graduation.

The modification, proposed in this application, reorganizes the content of the program to place basic level, student laboratory instruction into the third year of the program and concentrate advanced level content into the fourth year. The reorganization ensures relevancy for the non-traditional, articulation program, which is based on advanced level content. The modification strengthens fourth year clinical practicum experiences by increasing instructor supervision during web-based, problem-solving exercises. Advanced level courses will be available to students during clinical practicum by Internet and other asynchronous technology, such as computed-assisted exercises and videotape presentations.
Section 2

Background
Background

Description of the Profession
The National Accrediting Agency for Clinical Laboratory Science describes the profession best:

“The clinical laboratory scientist/medical technologist is an allied health professional who is qualified by academic and practical training to provide service in clinical laboratory science. The clinical laboratory scientist/medical technologist must also be responsible for his/her own actions, as defined by the profession. The ability to relate to people, a capacity for calm and reasoned judgment and a demonstration of commitment to the patient are qualities essential for a clinical laboratory scientist/medical technologist. They must demonstrate ethical and moral attitudes and principles which are essential for gaining and maintaining the trust of professional associates, the support of the community, and the confidence of the patient and family. An attitude of respect for the patient and confidentiality of the patient's record and/or diagnoses must be maintained. Clinical laboratory scientists/medical technologists are competent in:

1. developing and establishing procedures for collecting, processing, and analyzing biological specimens and other substances;
2. performing analytical tests of body fluids, cells, and other substances;
3. integrating and relating data generated by the various clinical laboratory departments while making decisions regarding possible discrepancies;
4. confirming abnormal results, verifying quality control procedures, executing quality control procedures, and developing solutions to problems concerning the generation of laboratory data;
5. making decisions concerning the results of quality control and quality assurance measures, and instituting proper procedures to maintain accuracy and precision;
6. establishing and performing preventive and corrective maintenance of equipment and instruments as well as identifying appropriate sources for repairs;
7. developing, evaluating, and selecting new techniques, instruments and methods in terms of their usefulness and practicality within the context of a given laboratory's personnel, equipment, space, and budgetary resources;
8. demonstrating professional conduct and interpersonal skills with patients, laboratory personnel, other health care professionals, and the public;
i. establishing and maintaining continuing education as a function of growth and maintenance of professional competence;

j. providing leadership in educating other health personnel and the community; exercising principles of management, safety, and supervision;

k. applying principles of educational methodology, and

l. applying principles of current information systems.

Upon graduation and initial employment, the clinical laboratory scientist/medical technologist should be able to demonstrate entry level competencies in the above areas of professional practice. “ (NAACLS Essentials)

The Transition from Technician to Scientist

Entry to the profession is gained through a variety of educational options. Graduates of associate degree programs as CLTs receive technical training with minimal management instruction. CLT graduates may expect to fill technical positions in clinical laboratories in hospitals, medical centers, clinics and other health care facilities. Instruction to the baccalaureate level includes technical training at the basic level. In addition, the baccalaureate curriculum includes specialized technical training, education and practice in problem-solving in the clinical laboratory, education and practice in statistical analysis of health care outcomes related to the laboratory, and education and practice in correlation of laboratory data and disease management.

This profession is served by an educational “ladder” approach. Students and practitioners of associate degree CLT programs may seek further education in the laboratory sciences for career advancement to the supervisory and management level in the clinical setting. Graduates of the baccalaureate program use the education and degree as a rung in the ladder toward graduate education in primary care, clinical research and public health epidemiology.

At the University of Kentucky, the Clinical Laboratory Sciences Program leads to a Bachelor of Health Sciences Degree in the College of Allied Health Professions. The CLS program provides academic and technical instruction that prepares graduates for work in clinical settings as Clinical Laboratory Scientists. The program is accredited by the National Accrediting Agency for Clinical Laboratory Science (NAACLS), 8410 West Bryn Mawr Avenue, Chicago, Illinois 60631; 773.714.8880. Graduates are qualified to take national certification examinations and licensure examinations.

The goal of the UK CLS Program is to produce graduates who:

1. Meet or exceed the minimum standards for knowledge and proficiency for entry-level CLS practice in typical clinical laboratory settings.
2. Are able to recognize and evaluate technical problems in a systematic way, so as to be able to form hypotheses, collect relevant data, analyze data and propose answers, solutions and other corrective action.

3. Possess communication and management skills that meet the demands of entry-level practice.

4. Adapt to different health care settings.

5. Demonstrate professional behavior/ethics.

6. Demonstrate fundamental research skills.
Section 3

Assessment of Need
Assessment of Need

The 2000 Wage and Vacancy Survey of Medical Laboratories: A National Survey

According to the results of the most recent survey conducted by the American Society of Clinical Pathologists, vacancies for positions as clinical laboratory personnel are increasing. In addition, salary levels for clinical laboratory personnel continue to increase. The following information is part of the results of a biennial wage and vacancy survey of medical laboratory managers. The survey was sent to 2500 randomly selected laboratory managers. Responses were received between August 4, 2000 and October 10, 2000, and fully represent clinical laboratories by type and size of facility and geographic region of the country.

Vacancy Survey Results

Mean Percent (%) Vacancy Rate in 1996, 1998 and 2000

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As vacancies in clinical laboratories continue to increase in health care facilities, educational programs to train new personnel decrease. The American Society of Clinical Pathologists reports that a recent survey of educational programs for CLS revealed a reduction in baccalaureate degree programs. In the latest journal of Clinical Laboratory Science (volume 14, number 1, page 33) the accrediting body for CLS education programs reports that, over a ten year period (1988-1998), the number of CLS programs went from 464 to 288 in the nation.

Health Professions Needs Assessment in Kentucky

An assessment of the personnel needs for health professions in Kentucky was conducted by the UK Center for Rural Health in 1999. Based on the Kentucky Workforce Occupational Outlook to 2005, the assessment found that Kentucky would have an estimated need for 2,910 laboratory workers with bachelor degree education by the year 2005 and an estimated need for 2,133 laboratory workers.
with associate degree education by the year 2005. To meet the projected need, Kentucky will need 80 new laboratory workers with bachelor degree education per year and 58 new laboratory workers with associate degree education per year. The Commonwealth will gain new laboratory workers through out-of-state hire and through education of its residents. State-supported CLS programs at UK, Eastern Kentucky University and University of Louisville now graduate approximately 40 bachelor degree laboratory workers annually. Based on the results of the assessment, the workforce analysis task force recommended that the Commonwealth of Kentucky support two programs for education toward baccalaureate degree in Clinical Laboratory Sciences. With the scheduled closure of the CLS program at the University of Louisville, programs at UK and Eastern Kentucky University will be more critical to the maintenance of health care in Kentucky.

The proposed modification to the CLS program continues an already successful effort to articulate community college graduates of CLT programs into mainstream CLS job opportunities. The University of Kentucky, by offering the non-traditional CLT-to-CLS articulation option, is poised to answer the needs of the Commonwealth. As the health care needs of the Commonwealth change, the University can respond with both traditional and non-traditional programs in clinical laboratory science.

**Applicant Response**

The CLT-to-CLS articulation program is an on-going program that has graduated 8 cohorts of students since its inception 10 years ago. Without advertisement, the UK CLT-to-CLS non-traditional program has received 35 requests for admission into the technology-based, asynchronous CLS program. These applicants have expressed need for greater accessibility of professional courses and are particularly interested in completing the didactic portion of professional courses through Internet-based technology.
Section 4

Admissions Requirements
Admissions Requirements

Clinical Laboratory Science Admission Criteria

Admission to the CLS professional program is based on:

- a minimum cumulative grade-point average of 2.5,
- a minimum key grade-point average of required science and mathematics courses of 2.3,
- personal interview scores and
- three letters of recommendations.

Interviews focus on identifying the applicant's strengths, commitment to and knowledge of the profession.

In addition, applicants must have completed University Studies Program (USP) requirements and CLS program pre-requisites as described below.

Applicants will be considered for admission to the fall or spring semester

Clinical Laboratory Science Program Requirements

University Studies Program (USP)

- The University Studies Program (USP) is a program of required subjects that all students must complete in order to receive a baccalaureate degree from the University of Kentucky.

- Applicants who already hold a baccalaureate or graduate degree must still complete USP requirements if another degree is desired. Applicants who desire a certificate in clinical laboratory sciences may complete CLS course requirements only.

- Previous course work at undergraduate and graduate levels may be applied towards the USP requirement.

- USP requirements must be completed by the start of the professional program.

Requirements for Admission to the CLS Professional Program

Students applying for the professional program must have completed or be enrolled in the following CLS pre-requisite courses at the time of application. Pre-requisite courses must be successfully completed by the start of the professional program:

2 Semesters of General Chemistry with Laboratory
1 Semester of Microbiology with Laboratory
1 Semester of Quantitative Statistics
1 Semester of Human Physiology (or combined course in Anatomy and Physiology)
International Students
In addition to the prerequisite courses, international students must complete the TOEFL examination with a score of 600 or better. An evaluator who is acceptable to the American Society of Clinical Pathology must also evaluate international transcripts.

Immunization Requirements
The University of Kentucky Medical Center requires that any student who has contact with patients (this included all CLS students) must provide documentation for the following immunizations and tests:

- MMR (Measles, Mumps, Rubella)
- DPT (Diphtheria, Pertussis, Tetanus)
- Polio
- Varicella
- Hepatitis B (a 3-vaccination program that should be started prior to matriculation into the professional program)
- Skin test or x-ray for tuberculosis
- And any other immunization or test that is required by clinical sites for student practicum
Section 5

Curriculum
Curriculum

The academic requirements for the Clinical Laboratory Sciences curriculum are divided into two phases: the Pre-Professional program and the Professional program. The pre-professional program consists of (1) courses that fulfill the USP (required of all students receiving a Bachelor's degree from UK; and (2) pre-requisite courses required by the CLS division.

Requirements of the new curriculum include:

- Completion of University Studies Program requirements
- Completion of CLS pre-requisites
  - Two semesters general chemistry with laboratory
  - One semester quantitative statistics
  - One semester general microbiology with laboratory
  - One semester Human physiology (or combined course in Anatomy and Physiology)
- Completion of basic level courses in the UK CLS program or graduation from an Associate's Degree CLT program
- Advanced level courses in the UK CLS program
  - Clinical biochemistry
  - Clinical immunology
  - Laboratory management and education principles
  - Advanced Clinical Hematology
  - Advanced Clinical Chemistry
  - Advanced Clinical Microbiology
  - Advanced Immunohematology
  - Independent Laboratory Investigation
  - Advanced Clinical Laboratory Practice

Prospective students may choose to complete the Pre-Professional phase at the educational institution of their choice. At the time of application to the Professional Program applicants should have completed or presently be enrolled in the prerequisite courses required for application to the Clinical Sciences Program. All prerequisite courses must be successfully completed before the first day of class work in the professional program.

CLT-to-CLS program applicants will be considered for admission into the fall or spring semester.

The following items describe the curriculum

- Request for Change in Undergraduate Program
- Semester by Semester Program
## Semester-by-Semester Program: First and Second Years

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<tr>
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<td>CLS 890</td>
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<tr>
<td></td>
<td>Elective</td>
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</tr>
<tr>
<td></td>
<td>Sub-total</td>
<td>13</td>
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</table>
| *CLS 881, 882, 883 and 884 will not be repeated each semester but will be completed on various schedules over the academic year by all students.
Section 6

Program Leadership and Faculty
Leadership and Faculty

The leadership and faculty of the CLS program are particularly suited for offering instruction for CLS courses by distance learning technology. Faculty members have many years of experience in instruction of their specialty areas. The clinical director of the program and many of the faculty have experience in distance instruction. A description of leadership and faculty attributes and their roles in the program follows:

Leadership:

Dr. Raymond Olesinski
- CLS Division Director for 2 years
- Director of Technology and Information Services at UK Center for Rural Health for 3 years
- 22 years of experience in hematology instruction
- 7 years of experience in instruction of laboratory management
- 10 years of experience in phlebotomy instruction
- 8 years experience in instruction by distance technology
- PhD in education

Dr. Julie Ribes, MD, PhD
- Medical Director for the Clinical Laboratory Sciences program at the University of Kentucky
- Director for Clinical Microbiology at the University of Kentucky
- Diplomate, American Board of Pathology
- Director of Hematology, Veterans Affairs Medical Center, Lexington
- Director of Blood Bank, Veterans Affairs Medical Center, Lexington, 1995-1997

Faculty

Dr. Jean Brickell
- Distance Learning Coordinator for 2 years
- 10 years of experience in instruction in clinical laboratory sciences
- 8 years experience in instruction by distance technology

Ms. Kim Campbell, MS, MT (ASCP)
- 15 years of experience as Medical Instructional Specialist for CLS Program
- 15 years of teaching experience in Body Fluids Analysis
Ms. Patricia Collins, MS, MT (ASCP)
• Certification as Specialist in Microbiology
• 8 years experience in instruction by distance technology
• 25 years experience in microbiology instruction

Dr. Linda Gorman, PhD, MT (ASCP)
• 20 years experience in clinical chemistry instruction

Ms. Margaret Steinman, BSMT
• Certification as Specialist in Immunohematology
• 8 years experience in immunohematology instruction
<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Title</th>
<th>Role</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Dr. Raymond Olesinski</td>
<td>Program Director</td>
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<td>Teaches:</td>
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<td></td>
<td></td>
<td>• CLS 833</td>
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<td>• CLS 836</td>
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<td>• CLS 843</td>
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<td>• CLS 860</td>
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<td></td>
<td></td>
<td>• CLS 890, team member</td>
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<tr>
<td>Dr. Julies Ribes</td>
<td>Pathologist</td>
<td>Medical Director</td>
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<td>Dr. Jean Brickell</td>
<td>Associate Professor</td>
<td>Distance Learning Coordinator</td>
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<td></td>
<td></td>
<td>• CLS 851, Bacteriology</td>
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<td>• CLS 856, Bacteriology</td>
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<td>• CLS 890, team leader</td>
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<td>• CLS 883</td>
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<td>• CLS 884</td>
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<tr>
<td>Ms. Kim Campbell</td>
<td>Adjunct Faculty</td>
<td>Teaches:</td>
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<td>• CLS 890, team member</td>
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<tr>
<td>Ms. Patricia Collins</td>
<td>Associate Professor</td>
<td>Teaches:</td>
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<td></td>
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<td>• CLS 851, Parasitology/Mycology</td>
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<td></td>
<td></td>
<td>• CLS 856, Parasitology/Mycology</td>
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<td>• CLS 890, team member</td>
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<tr>
<td>Dr. Linda Gorman</td>
<td>Associate Professor</td>
<td>Pre-professional student advisor</td>
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<td>• CLS 822</td>
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<td>• CLS 832</td>
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<td>• CLS 844</td>
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<td>• CLS 890, team member</td>
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<tr>
<td>Ms. Margaret Steinman</td>
<td>Adjunct Faculty</td>
<td>Teaches:</td>
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<td>• CLS 838</td>
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<td>• CLS 848</td>
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<tr>
<td></td>
<td></td>
<td>• CLS 890, team member</td>
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</table>
Section 7

Clinical Sites
Clinical Sites

All CLS students are required to complete clinical rotation checklists as part of the requirements of CLS 881, 882, 883 and 884. Clinical rotation activities generally encompass 35-40 daytime hours during the workweek, Monday through Friday. No weekend or evening hours are required. There is no remuneration given to students for work performed during regular clinical rotation hours.

Clinical Sites

Students will be assigned to one of the three clinical sites in Lexington or an alternate site if necessitated by changes in clinical site availability or scheduling conflicts.

The following sites are currently available for CLS 881, 882, 883 and 884:

- University of Kentucky Medical Center
- Veteran’s Administration Medical Center
- St. Joseph Hospital

Clinical Rotation Exemption Policy

Clinical Laboratory Technicians may be eligible for exemption from some clinical rotation objectives. One of the following requirements must be met for exemption:

- Documentation of completion of the objectives at an school for Clinical Laboratory Technicians that is accredited by NAACLS
- Documentation of completion of the objectives through work experience.

   Documentation from supervisor or employer is required. Credit for completion of objectives will be granted pending an experiential learning review by the UK CLS program.
Appendix A

Accreditation Requirements
Accreditation Requirements

The following excerpts of the “Essentials of Accredited Educational Programs for the Clinical Laboratory Scientist/Medical Technologist” outline pertinent curriculum requirements of CLS programs by NAACLS:

“PREAMBLE

OBJECTIVE

The medical and health professions cooperate to establish, maintain, and promote standards of quality for educational programs in clinical laboratory sciences and to provide recognition for educational programs which meet or exceed the minimum standards outlined in these Essentials. The standards are to be used for the development and evaluation of clinical laboratory science/medical technology programs. Site visit teams assist in the evaluation of the program’s compliance with the Essentials. Lists of accredited programs are published for the information of students, employers, and the public.

III. CURRICULUM

Essential 11

Course work shall include general chemistry, organic and/or biochemistry, biological science, microbiology, immunology, mathematics, general education and the clinical laboratory sciences.

Essential 12

Instruction shall:

A. Follow a plan which documents a structured curriculum, including clinical education, with clearly written program goals and course syllabi which include individual course objectives and competencies to be achieved. The curriculum shall include all the major subject areas commonly offered in the modern clinical laboratory. Behavioral objectives which address cognitive, psychomotor, and affective domains must be provided for didactic and clinical aspects of the program and must include clinical significance. Course objectives shall show progression to the level consistent with entry into the profession as outlined in the PREAMBLE.

The curriculum shall include:

1. principles and methodologies for all major areas commonly practiced by a modern clinical laboratory;
2. clinical significance of laboratory procedures in diagnosis and treatment;

3. principles and practices of quality management;

4. principles and practices of laboratory administration, supervision, safety, and problem solving;

5. educational methodology;

6. principles and practices of computer science;

7. acquisition and evaluation of laboratory information systems, and

8. principles and practices of professional conduct.

B. Provide sequenced learning experiences in the curriculum to develop entry-level competencies, including instructional materials, classroom presentations, discussions, demonstrations, laboratory sessions, supervised practice and experience that supports course objectives.

1. Learning experiences during hours other than the normally scheduled clinical experience (i.e., evenings, weekends, and holidays) shall be justified. Specific objectives and evaluations must be developed to address the uniqueness of these learning experiences.

2. Once entry-level competencies and psychomotor skills are achieved, including those in phlebotomy, repetition should be limited to periodic reinforcement.

3. Policies and processes by which students may perform service work must be published and made known to all concerned in order to avoid practices in which students are substituted for regular staff. After demonstrating proficiency, students, with qualified supervision, may be permitted to perform procedures. Service work by students in clinical settings outside of regular academic hours must be noncompulsory.

C. Include written criteria for passing, failing, and progression in the program. These shall be given to each student at the time of entry into the program. Evaluation systems shall be related to the objectives and competencies described in the curriculum for both didactic and supervised clinical education components. They shall be employed frequently enough to provide students and faculty with timely indications of the students’ academic standing and progress and to serve as a reliable indicator of the effectiveness of instruction and course design.
Appendix B

Course Change Forms

CLS 832
CLS 833
CLS 835
CLS 836
CLS 838
CLS 843
CLS 844
CLS 848
CLS 851
CLS 856
CLS 860
CLS 881
CLS 882
CLS 883
CLS 884
CLS 890
Appendix C

Course drop forms

CLS 845
CLS 855
CLS 861
CLS 867
CLS 880
Appendix D

Curriculum vitae for Raymond Olesinski, PhD, MT (ASCP),
CLS Division Director

Curriculum vitae for Julie Ribes, MD, Medical Director of the Clinical Laboratory Sciences Program
Appendix E

Curriculum vitae for Faculty

Jean Brickell, EdD, MT (ASCP)
Kim Campbell, MS, MT (ASCP)
Patricia Collins, MS, MT (ASCP)
Linda Gorman, PhD, MT (ASCP)
Margaret Steinman, BS, SBB (ASCP)
Appendix F

Curriculum vitae for Clinical Faculty

UK Chandler Medical Center
Joy Gall, BHS
William Porter, PhD
Julie Ribes, MD, PhD (see CV under faculty leadership)

St. Joseph Hospital
Kathy Emmons, BS

VA Medical Center
Marcella Baker, BA
Larry Cornett, BA
Phillip Flanary, BS
David Hodges, BHS
Janet Overley, BS
Timothy Overman, PhD
Henry Woo, BS
Appendix G

Ten Year Evaluation of the Associate-Degree-to-Baccalaureate-Degree Program in the Clinical Laboratory Sciences
The Clinical Laboratory Sciences Outreach Program
A Ten Year Status Report

Prepared for the UK Center For Rural Health
March, 2000

The Clinical Laboratory Sciences (CLS) program of the Center for Rural Health may be the aspect of the Center that most clearly demonstrates the Center’s achievements in each of the University’s missions of education, scholarly activity and service. The rurally-based faculty are excellent educators as demonstrated by the achievements of their students in winning awards and passing the national examination, and in the leadership that they have exhibited in developing new approaches to distance learning. They are recognized internationally for their scholarly pursuits through presentations and work in Holland, England, Norway and Ghana. The Center’s CLS program has provided helpful and innovative services to rural communities through its expertise in blood banking and its important work in teaching multiple skills to personnel of financially fragile rural communities.

The Clinical Laboratory Sciences Outreach Program serves the health care needs of rural residents across Kentucky. The Clinical Laboratory Sciences Program leads to a Bachelor of Health Sciences Degree in the College of Allied Health Professions. The program on the Hazard campus provides a unique opportunity in distance education for rural, place-committed students through an associate-to-baccalaureate degree program. Eight cohorts of distance learning students have successfully graduated from the baccalaureate CLS undergraduate program since its inception in 1990. Two cohorts of students are currently enrolled. Graduates of the program practice in rural, medically under-served counties throughout Kentucky, as can be seen by the map of University of Kentucky Center for Rural Health Clinical Laboratory Science Counties of Practice. Most graduates have remained in their home counties and continue to contribute to their local health care delivery systems.

Many clinical laboratory technicians (CLTs/MLTs) trained in a community college are capable of earning a bachelor's degree but lack the financial resources to move to a metropolitan area to continue their education or are tied to their communities by family or work obligations. With ties to rural communities, these health care workers provide a ready pool of potential baccalaureate technologists already committed to an underserved area. Graduates upgrade the quantity and quality of health care services in their home regions. Once students leave a rural area to attend school in a metropolitan area, they may not return.

The Center’s Outreach program builds on the partnership model of articulation with Kentucky’s Community Colleges and increases educational opportunities for CLTs by enabling them to continue their education with local community support and mentoring. Technology-
driven distance education offers an effective format for delivering courses to students who are widely distributed geographically. The CLS Outreach program makes use of interactive video-conferencing, computer-assisted instruction, the Internet and World Wide Web (WWW) for distribution of course modules. Using distributed learning to deliver education allows the CLS Outreach program to reach learners anywhere and at any time.

Outcome of the Center's CLS program can be measured through its effect upon its graduates and its fidelity to the mission of providing high quality, accessible education in rural areas of Kentucky. The following criteria has been used for measuring outcome:

• **Graduates contribute to rurally based health care:**
  95% of graduates remain in rural areas

• **Graduates upgrade job position and contribute to improving health care in rural health:**
  9% of graduates move into management or director positions at clinical laboratories
  7% of graduates matriculate into medically related graduate programs
  67% of graduates report increased responsibility and/or salary in clinical laboratory medicine within one year of graduation

• **High standards are maintained through the distance learning format:**
  81% of those attempting the American Society of Clinical Pathologists Registry Exam pass the exam. This rate of success is above the national average for the exam of 71%.
  In competition with other CLS students across Kentucky, the Center’s CLS students have won many awards. Please review the “Milestones” section of this report to see the many honors and awards which have been earned by the Center’s CLS students.

• **The program is accessible from home counties:**
  The average graduate of the Outreach program completes the professional program in 3 years as a part time student. Most students in the full time traditional CLS program complete the professional program in 27 months.

• **Attrition rates are acceptable:**
  The CLS Outreach program has an attrition rate of 17% (86 students admitted, 51 graduates, 20 continuing students).

In addition to objective criteria that measures outcome of the program, graduates offer subjective comments. Graduates offered the following comments concerning the CLS Outreach program:

“The CLS program has paved a way for my future career in laboratory medicine. Thanks to the quality education and the outstanding educators, the UKCRH has given me a great base of knowledge on which to build a career.”
“The quality of education at UKCRH is superb. I hope that UK will continue to see the need for quality healthcare in rural Kentucky and continue to support the UKCRH by offering more funding and more educational programs.”

“Excellent program, when students finish they are ready to enter the work field.”

“We need more 4 year degree programs here to bring in more industries.”

“UKCRH gives people the chance on this end of the state to have access to education without leaving home.”

“Education in CLS areas add to the economy.”

“My degree enabled me to get a promotion at my current worksite along with a substantial pay raise.”

“The off-campus evening hours and evening classes allows working health professionals to further their education. This allows higher degree professionals to stay in rural Kentucky rather than to move and go back to school.”

The Center’s CLS students have enjoyed many advantages as result of the stability of the excellent rurally-focused faculty: Lynn Alexander, MEd, Pat Barrett, MS, Jean Brickell, EdD, Patricia Collins, MS, and Raymond Olesinski, PhD. Professor Alexander has the distinction of being first person hired for the Center for Rural Health in the summer of 1990. Over the last ten years, faculty members of the CLS Outreach Program have contributed to the diverse mission of the Center for Rural Health. CLS faculty members have presented papers, which describe the goals and accomplishments of the Center for Rural Health, at international meetings. Faculty members have published rural health related articles in peer-reviewed journals. CLS faculty members have funded rural health projects through external sources.
Appendix H

Correspondence

Letters of Support

Julie Ribes, Medical Director
CLS Program
University of Kentucky

Barbara Bush, Chief Medical Technologist
Chandler Medical Center

Larry Johnson, Director Appalachian Regional Healthcare Laboratory, Lexington

Phil Flanery, Chief Medical Technologist
Veterans Affairs Medical Center

Bryan Mason
Graduate, UK CLS Program
Appendix I

References
References


Tackett, EK. (July, 1999). Kentucky Health Professions Workforce Summary. Kentucky State Office of Rural Health: Hazard, KY.


REQUEST FOR CHANGE IN UNDERGRADUATE PROGRAM

Program: Clinical Laboratory Sciences

Formal Option: NA
Or Specialty Field: NA

Department (if applicable): Clinical Sciences
College (if applicable): College of Allied Health Professions

Degree title: Bachelor of Health Science
Bulletin PP 76

CIP Code: Med Technology 51.1005

Accrediting Agency (if applicable): National Accrediting Agency for Clinical Laboratory Science (NAACLS)

I. PROPOSED CHANGE(S) IN PROGRAM REQUIREMENTS

1. Particular University Studies Requirements or Recommendations for this program

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<td>CHE 105, 107, 115</td>
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<td>Area III (Humanities)</td>
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<td>Area IV (Cross-disciplinary component)</td>
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<tr>
<td>Area V (Non-western cultural component)</td>
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</tbody>
</table>

2. College Depth and Breadth of Study Requirements (if applicable) (including particular courses required or recommended for this program) NOTE: To the extent that proposed changes in 2 through 6 involve additional courses offered in another program, please submit correspondence with the program(s) pertaining to the availability of such courses to your students.

Current: NA
Proposed: NA

3. Premajor or Preprofessional Course Requirements (if applicable)

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<td>1 sem General Microbiology with laboratory</td>
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<td>2 sem sequence or 1 sem inclusive course in organic chemistry</td>
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<tr>
<td>1 sem of Mathematics</td>
<td>1 sem Mathematics</td>
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<td>1 sem of Statistical Methods</td>
<td>1 sem Statistical Methods</td>
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<tr>
<td>1 sem of Human Physiology (or combined course in Anatomy and Physiology)</td>
<td>1 sem Human Physiology (or combined course in Anatomy and Physiology)</td>
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Total Hours: 23
4. Credit Hours Required

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<td>c. Premajor or Preprofessional: 23</td>
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<td>f. Hours Needed for a Particular Option: NA</td>
<td>f. Hours Needed for a Particular Option: NA</td>
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<tr>
<td>d. Field of Concentration: NA</td>
<td>g. Technical or Professional Support: NA</td>
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<td>h. Minimum Hours of Free or Electives (Required): 3-6</td>
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<td>e. Division of Hours Between Major Supportive Subject and Related Field: NA</td>
<td>i. Minimum Hours of Free or Electives (Required): 3-6</td>
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5. Major or Professional Course Requirements

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<td>75</td>
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6. Minor Requirements (if applicable)

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Total Hours: 120-130

7. Rationale for change(s): (If rationale involves accreditation requirements, please include specific references to those requirements.)

The change aligns the program more closely to associate degree clinical laboratory sciences programs, so that the associate degree-to-bachelor’s degree articulation program is more relevant to health care practice.
8. List below the typical semester by semester program for a major.

<table>
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<tr>
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<td>See attached.</td>
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Will this program be printed in the Bulletin?  X-Yes  No

**Signatures of Approval**

Department Chair Date
Dean of the College Date
Date of Notice to the Faculty
*Undergraduate Council Date
*University Studies Date
*Graduate Council Date
Academic Council for the Medical Center Date
Senate Council Date of Notice to University Senate
*If applicable, as provided by the Rules of the University Senate

**ACTION OTHER THAN APPROVAL**

Rev 11/98

APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR
1. Submitted by College of: Allied Health Professions     Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number:  CLS 832               Proposed prefix & number: same
   (b) Present Title: Basic Clinical Chemistry and Instrumentation
       New Title: same
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible
       title (not to exceed 24 characters) for use on transcripts: Basic Clin Chem
   (d) Present credits: 4                                             Proposed credits: 5
   (e) Current lecture: laboratory ratio: 1:1             Proposed: 3:2
   (f) Effective Date of Change: (Semester & Year):  Fall, 2002

3. To be Cross-listed as:           NA
   Prefix and Number Signature:
   Department Chair

4. Proposed change in Bulletin description:
   (a) Present description (including prerequisite(s):
       A course covering the theory and practice of general clinical chemistry laboratory
       testing. Emphasis is on laboratory testing, quality control, introduction of
       instrumentation principles, troubleshooting potential laboratory problems and
       concern for the accuracy of patient results and their confidentiality. Lecture 4 hours;
       laboratory 12 hours for 7 weeks.
       Pre-requisites: admission into the Clinical Laboratory Sciences Professional Program;
       Biochemistry (Biochemistry may be taken concurrently)
   (b) New description:
       The study of the theory and practice of clinical chemistry laboratory
       testing, including quality control, instrumentation principles, problem-
       solving, and appreciation of accuracy of and confidentiality for patient
       laboratory findings.
   (c) Prerequisite(s) for course as changed: no change

5. What has prompted this proposal?
   This course change is part of an overall program change that more clearly defines the
   4th year of the program toward instruction for supervisory and management positions in
   clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this
   course, indicate changes:
   Additional lecture and laboratory sessions will be added to this course and deleted from
   the advanced level clinical chemistry course, CLS 844.

7. What other departments could be affected by the proposed change? None

8. Will changing this course change the degree requirements in one or more programs?*  X-Yes
   No
   If yes, please attach an explanation of the change.*
   See Request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program?       Yes
    X-No
10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.
*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change? Yes X-No
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
Name: Linda Gorman Phone Extension: 323-1100 ext 253

**Signatures of Approval:**
Department Chair Date
Dean of the College Date
Date of Notice to the Faculty
**Undergraduate Council Date**
**Graduate Council Date**
**Academic Council for the Medical Center Date**
**Senate Council Date of Notice to University Senate**
**If applicable, as provided by the Rules of the University Senate.**

ACTION OTHER THAN APPROVAL

*******
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
a. change in number within the same hundred series;
b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 832:
BASIC CLINICAL CHEMISTRY AND INSTRUMENTATION

Following completion of this course, the student will be able:

**SPECTROPHOTOMETER**

Cognitive objectives:
1. Identify the component parts of a spectrophotometer and give examples of each.
2. Describe the operation and principles utilized in a spectrophotometer.
3. Outline troubleshooting procedures applicable to spectrophotometry.

Psychomotor Objectives:
1. Perform an assay using a spectrophotometer, accurately operating the control knobs to perform a blank, standard, and test sample determination. Repeat until proficient.
2. Perform a wavelength check on the spectrophotometer.

Affective Objective
1. Students will appreciate the basics of spectrophotometry and the devices used to measure assays in the visible spectrum.
2. Students will conceptualize that spectrophotometers form the foundation of detection in complex automated analyzers used in clinical chemistry laboratories.

**BASIC QUALITY CONTROL**

Cognitive:
1. Define the term: Quality Control
2. Define the terms: accuracy, precision, reliability and validity
3. Differentiate between controls and standards
4. Describe Internal and External laboratory control
5. Perform the necessary calculations to obtain the mean, standard deviation and coefficient of variation of a set of data
6. Describe how a Levey-Jennings chart is constructed
7. Discuss how a Levey-Jennings chart is used and evaluated for trends and shifts
8. Analyze and evaluate plotted QC data to determine shifts and trends. Specify the probable laboratory sources of such findings.

Psychomotor:
1. Students will perform a quality control calculation using data provided for the exercise.
2. Students will plot data to a Levey-Jennings chart that they create.

Affective:
1. Students will appreciate the significance of controls being “in range” so that results can be reported.

**ACID-BASE BALANCE-ELECTROLYTES**

Cognitive:
1. State the roles that electrolytes assume in bodily functions and meta-metabolism.
2. Describe the renal mechanism and acid-base involvement for sodium, potassium, carbon dioxide and chloride in the maintenance of electrolyte balance.
3. Explain the purpose of the sodium pump.
4. Name the procedures used in sodium, potassium, chloride and CO₂ determinations.
5. Describe disease states contributing to or bodily malfunctions eliciting electrolyte abnormalities.
6. Calculate an anion gap and determine reason(s) for abnormal value.
7. Explain importance of handling of specimens for all electrolyte analysis, especially CO₂ determinations.

Psychomotor:
1. Students will perform assays for electrolytes using the current methodologies in their lab (ie clinical site, student lab, or clinical situation).
2. Students will calculate anion gaps given sets of electrolyte data from patients.
3. Students will assess the accuracy of their results using controls and the lessons from the Quality Control Section of the course.

Affective:
1. The students will appreciate the complexity of disease as it pertains to electrolytes and acid-base balance.

**ATOMIC ABSORPTION**

1. Describe the operation of an atomic absorption device
2. Briefly explain the principles used in atomic absorption
3. Identify the component parts of an atomic absorption device
4. Delineate several trouble-shooting scenarios applicable to the atomic absorption device

Psychomotor:
1. The students will recognize the differences between atomic absorption and other means of electrolyte analysis.

**CHLORIDE and CO₂ ASSAYS**

Cognitive for Chloride:
1. State the principle for the Chloride determination by electrochemistry principle.
2. Identify component parts and designate the circuit in which each belongs.
3. Briefly explain the mode of operation for a chloride assay.
4. List the reagents and their use in a chloride assay.
5. Briefly explain the reasons for a chloride assay malfunction.

Cognitive for CO₂
1. State the components measured by total CO₂ assays.
2. List and explain the principles of 3 methods for determining total CO₂.
3. Identify factors which can alter the total CO₂ value of blood and serum.
4. Calculate the TCO₂ value given two of the following:
   - pH
   - pCO₂
   - HCO₃ conc
   - H₂CO₃ conc

Psychomotor for Chloride and CO₂:
1. Students will perform a chloride assay and CO₂ assay several times.
2. Students will use chloride and CO₂ results with other electrolyte results to calculate anion gap and to assess metabolic state.

Affective:
1. Students will appreciate the importance of having chloride and CO2 results when trying to assess electrolyte imbalance.

**CALCIUM/MAGNESIUM/PHOSPHOROUS**

1. Describe the functions of calcium in the body.
2. Describe the functions of magnesium in the body.
3. Describe the roles of phosphorus in the body.

Psychomotor:
1. Students will perform laboratory assays for calcium, magnesium and phosphorus in student lab with 95% accuracy.

Affective:
1. Students will appreciate the interplay between calcium, magnesium and phosphorus when looking at diseases that are influenced by each.

**CARBOHYDRATE METABOLISM**

1. Define the following terms:
   - carbohydrate
   - monosaccharide
   - polysaccharide
   - disaccharide
   - glycogen
   - glycogenolysis
   - maltose
   - gluconeogenesis
   - lactose
   - glycolysis
   - sucrose
2. Describe the basic scheme of carbohydrate metabolism from ingestion to storage or utilization.
3. Name five hormones that are important in the regulation of blood glucose levels and explain their effect on blood glucose.
4. Define hyperglycemia and hypoglycemia.
5. Explain two conditions that lead to hypoglycemia.
7. Define HbA1C and explain its role in monitoring diabetic patients.
8. Identify the relationship between CSF glucose and blood glucose levels.

Psychomotor:
1. Students will perform glucose assays using glucose oxidase and hexokinase assays for glucose.
2. Students will calculate glucose determination values given the spectrophotometer readings for a glucose assay.

Affective:
1. Students will appreciate the importance of carbohydrate metabolism to body functions.

**TOTAL PROTEIN AND SPECIFIC PROTEINS**

1. Define the following terms:
   - peptide bond
   - zwitterion
   - amino acid
   - isoelectric point
2. List the chemical constituents of protein and explain the formation of a peptide bond.
3. State three cellular functions that are performed by protein.
4. Explain the function and clinical significance of and the protein fraction where found, of the following:
prealbumin, albumin, alpha 1 anti-trypsin, haptoglobin, alpha 2 macroglobulin, ceruloplasmin, transferrin, immunoglobulins

5. Identify and interpret abnormal electrophoretic patterns and classify according to disease states.

Psychomotor:
1. Students will perform total protein and albumin assays.
2. Students will calculate total protein and albumin results from raw data.
3. Students will not report results unless quality control results are valid.

**TOTAL PROTEIN - BIURET METHOD**

Psychomotor:
1. Perform a total protein determination by the biuret method.
2. Calculate the total protein value in a control and standard sample.
3. Generate a calibration curve of known standards.

**QUANTITATIVE URINE PROTEIN: TURBIDIMETRIC METHOD**

Psychomotor
1. Perform a quantitative urine protein using sulfosalicylic acid-sodium sulfate.
2. Determine the concentration of urine protein from a standard curve.

Affective:
1. Students will contemplate the intricacies of specific protein roles in the body

**BLOOD UREA NITROGEN AND URIC ACID**

1. List the two major groups of nitrogen-containing compounds and give two examples of each.
2. Describe briefly the synthesis of urea in the body and identify its structure.
3. State the three main conditions in which azotemia may exist.
4. State the usefulness of the BUN/Creatinine ratio, and explain conditions associated with high and low ratios.
5. State the basic principles of the urea nitrogen methodologies:
   - Bertholet urease
   - diacetyl monoxime
   - coupled enzymatic
6. Describe briefly the synthesis of uric acid in the body.
7. Define hyperuricemia and hypouricemia and state various causes of each condition.
8. State the basic principles for both uric acid methodologies:
   - uricase
   - phosphotungstic acid
9. Describe the formation of creatinine in the body.
10. State the reason why urine creatinine can be used in validating a 24 hour urine collection.
11. List two conditions that lead to increased creatinine in the blood stream.
12. State and explain two chemical methods used for creatinine determination.
13. Given serum and urine creatinine values, calculate a creatinine clearance.

Psychomotor:
1. Students will perform non-protein nitrogen assays, given the procedure and reagents.
2. Perform a creatinine determination using the Sigma Diagnostic Test Kit based on work done by Slot, Heinegard and Tiderstrom.
Affective:
1. Students will appreciate the importance of non-protein assays in the assessment of kidney disease.

ENZYMEOLOGY
1. Define catalyst and describe its characteristics.
2. Differentiate between zero-order and first-order kinetics.
3. Describe how enzymes are named by the Enzyme Commission.
4. Define an international unit (IU).
5. Explain the effects of substrate concentration, pH, temperature, cofactors, activators and inhibitors on the rate of an enzyme reaction.
6. Define cofactor, activator, and inhibitor.
7. Describe the three types of inhibitors that can affect an enzyme reaction.
8. Explain the causes for most increased or decreased levels of serum enzymes.
9. Describe ALP in terms of enzyme action and sources of ALP in the body.
10. Explain the clinical significance of increased ALP in serum.
11. List the substrate commonly used in most ALP methods.
12. Describe AMS in terms of enzyme action and sources of AMS in the body.
13. Explain the clinical significance of increased AMS.
14. State the benefit of performing urinary AMS.
15. Differentiate the three methods used for AMS.
16. Describe LD in terms of enzyme action and sources of LD in the body.
17. Explain the clinical significance of increased LD in serum.
18. Describe the gradual rise of LD in serum following a myocardial infarction.
19. State the principle of the kinetic assay for LD.
20. Describe CK in terms of enzyme action and source of CK in the body.
21. Explain the clinical significance of increased CK in the serum.
22. Describe the gradual rise of CK following a myocardial infarction.
23. State the principle of the forward and reverse methods for CK determinations and state which is preferred.
24. Describe ALT and AST in terms of enzyme action and sources of ALT/AST in the body.
25. Explain the clinical significance of increased ALT and AST in the serum.
26. Explain the effects of hemolysis on ALT determinations.
27. Differentiate between colorimetric and continuous monitoring methods for ALT and AST.
28. Describe the gradual rise of AST following a myocardial infarction.
29. Describe GGT in terms of enzyme action and sources of GGT in the body.
30. Explain the clinical significance of increased GGT in serum.
31. State the principle of GGT assays.

Psychomotor:
1. Students will perform CK, LD, ALP, and other enzyme assays using automated analyzer(s).
2. Students will identify isoenzyme patterns for CK and LD given the appropriate physical evidence.
3. Students will recognize enzyme patterns that fit particular disease states.

Affective:
1. Students will appreciate the importance of clinical enzyme determinations in the identification of disease.

**FLUOROMETRY AND NEPHELOMETRY**
1. Describe the principle of fluorometry
2. Describe the principle of nephelometry
3. Identify the component parts of a fluorometer and nephelometer.
4. Briefly describe the operation of a fluorometer and nephelometer.
5. List four factors that limit fluorescence measurements.
6. Name two clinical applications of fluorometry.
7. Name two clinical applications of nephelometry.
8. Discuss limitations of light scatter pertaining to nephelometry.

Psychomotor:
1. Students will delineate the differences between fluorometry assays and spectrophotometric assays.
2. Given an opportunity, students will perform a fluorometric assay.

Affective:
1. Students will appreciate the complexity of testing available with fluorometric or nephelometric assays.

**ACID-BASE BALANCE**
1. Define what a buffer is and name the constituents of any buffer.
2. Name four buffer systems in the body and explain the role of each in maintaining acid-base balance in the body.
3. State what fractions make up the total O₂ content of the blood.
4. Define oxygen saturation and state the normal value for arterial blood.
5. Describe an oxygen dissociation curve.
6. List three tests that can determine the acid-base status of any patient.
7. Explain the proper procedure for collecting and transferring an arterial blood gas.
8. Define pH, pCO₂, pO₂.
9. Calculate blood gas value given any two of the parameters pCO₂, tCO₂, H₂CO₃, or pH.
10. Given blood gas data, state the clinical significance of pH, pCO₂ and pO₂ in explaining the data.
11. List four major acid-base abnormalities and explain each in terms of primary deficit or excess, bodily compensation and clinical laboratory findings.
12. Determine the acid-base condition given a case study with laboratory findings.

Psychomotor:
1. Students will observe a blood gas analyzer in operation.
2. Students will perform a blood gas analysis, when available

Affective:
1. Students will appreciate the use of blood gas analysis in determining acid-base status of patients.

**ION-SELECTIVE ELECTRODES**
1. Define the principles utilized in ion-selective electrode systems.
2. Describe the component parts and their arrangements.
3. Briefly describe the electrode systems used in blood gas determinations.
4. Briefly describe the electrode systems used in the Beckman analyzer systems.
5. Problem-solve common errors in electrode determinations

Psychomotor:
1. Students will perform analyses using an ion-selective electrode analyzer.
Affective:
1. Students will appreciate the capabilities that ion-selective electrodes offer to clinical chemistry and the clinical laboratory as a whole.

OSMOMETER
1. Define osmolality and relate it to osmometer measurements.
2. List the component parts of an osmometer and delineate each one’s significance to the assay.
3. Describe the mode of operation for a freezing point osmometer; for dew point type.
4. Write the formula for calculating osmolality and will be able to apply the formula to pertinent data.
5. List both mechanical and specimen trouble-shooting factors for an osmometer assay.
6. List 4 reasons for a change in serum osmolality value.
7. List 2 reasons for a change in urine osmolality.
8. Define the physiological control of osmolality in the body.

Psychomotor:
1. Students will perform osmolality assays on specimens and controls after calibrating the machine.

Affective:
1. Students will appreciate the importance of osmolality measurements to body chemistry.

BEDSIDE TESTING
1. Describe the advantages and disadvantages of bedside testing for the patient and the laboratory.
2. List principles of measurement used by bedside monitors to assay for glucose, electrolytes, and other chemical assays.
3. Discuss briefly the importance of QC and QA to bedside testing devices.

Psychomotor:
1. Students will observe a demonstration of bedside testing.

Affective:
1. Students will appreciate the importance of laboratorians controlling the training, QC, and selection of bedside testing monitors.

KIDNEY FUNCTION
1. Define relevant terms such as GFR, Na\(^+\)-H\(^+\) exchange, tubular absorption, etc.
2. Describe the relationship between kidney function and blood chemistry results.
3. Evaluate patient data for the presence or absence of disease.
4. Analyze data from patients as to which kidney malfunction/disease is present. Specify the pattern that is present and the basis of your answer.

Psychomotor:
1. Students will collect data from patient histories and data sets looking for the presence of kidney disease.

Affective:
1. Students will appreciate the importance of kidney function and the consequences that loss of kidney function precipitate.
LABORATORY DATA - CASE

1. identify abnormal results.
2. identify organ affected.
3. evaluate routine lab tests for abnormality.
4. characterize lab data indicating diabetes, kidney failure, liver problem, or acid-base problem.

Psychomotor:
1. Students will evaluate data from a set of patient results.

Affective:
1. Students will appreciate the tie in between “result”, “symptom” and “disease”.

LIPIDS

1. Describe the following in terms of structure and metabolism in the body:
   a. fatty acids
   b. triglycerides
   c. cholesterol
2. Define the following terms:
   lipoprotein LDL
   VLDL chylomicrons
   HDL
3. Explain lipid metabolism in terms of:
   a. effects of digestive enzymes on lipids
   b. conversion of lipids to various lipoproteins
   c. pathway of lipoprotein metabolism
   d. influence of lipoproteins on lipid metabolism
4. List six factors that affect cholesterol levels in the blood.
5. Explain the following lipid determinations in terms of reaction, specificity and sensitivity:
   a. cholesterol oxidase
   b. Triglyceride enzymatic methods
   c. HDL-cholesterol
6. List six factors that affect cholesterol levels in the blood.
7. Classify various lipoprotein disorders and describe the relationships between these hyper- and hypolipoproteinemias and their specific apoprotein abnormalities.
8. Discuss the hormonal regulation of lipids. Define relevant lipid terms.

Psychomotor:
1. Students will perform cholesterol and HDL-cholesterol assays using controls and standards for the calculations.
2. Students will perform triglyceride assay, if available.
3. Students will use automated analyzer to perform lipid assays.
4. Students will recognize the patterns of lipoproteins and the disease state that is demonstrated.
5. Students will calculate LDL-Cholesterol, given the total cholesterol, triglyceride, and HDL cholesterol values for a patient.

Affective:
1. Students will recognize the importance of lipid assays in the assessment of cardiovascular disease.
**LIVER FUNCTION - BILIRUBIN**

1. Discuss briefly the formation of bilirubin and urobilinogen, include glucuronide formation.
2. List two types of bilirubin found in the blood and explain their differences.
3. State the difference(s) between adult bilirubin and infant bilirubin.
4. Briefly discuss the three types of jaundice.
5. Discuss the major metabolic functions of the liver in the areas of CHO, protein, and fats.
6. Briefly explain the detoxification tasks of the liver.
7. Discuss briefly the types of hepatitis and their differences.
8. List 3 conditions associated with an elevated indirect bilirubin and 3 with an elevated direct bilirubin.

9. In relation to the following methods, describe the principle, each reagents importance, and the differentiating capacity:
   a. Jendrassik-Grof method
   b. direct spectrometric method

10. Briefly discuss the testing used to confirm hepatitis A, B, and C.

**Psychomotor:**
1. Students will perform bilirubin assays, including total and direct bilirubin determinations.
2. Students will recognize the abnormal pattern of bilirubin and associated metabolites in pre-hepatic, hepatic, and post hepatic disease.

**Affective:**
1. Students will appreciate the importance of bilirubin results to disease states.

**DNA PROBES**
1. Give a brief overview of the DNA Probe technique.
2. Define the terms Southern, Northern, and Western Blot.
3. Give 3 examples of DNA probe clinical application.

**Psychomotor**
1. Students will recognize the application of DNA physical behavior to the DNA clinical lab applications.
2. Students will explain by exam the different applications of DNA probe techniques to clinical labs.

**Affective:**
1. Students will appreciate the expanded knowledge that DNA probe technology gives to genetic disease identification.

**PANCREAS LECTURE**

**1. Discuss the structure and products of pancreatic function.**

2. Discuss role of pancreas in digestion process.
3. List hormones excreted by pancreas and each one's function.
4. Discuss diseases associated with pancreas.
5. Given patient data evaluate recognized tests for pancreatic function.
Psychomotor:
1. Students will evaluate data patterns for the presence of pancreatic disease, once they know the test markers to look for.

Affective:
1. Students will appreciate the importance of pancreatic function and the difficulties that ensue with pancreatic loss.

LABORATORY SUPPLIES
1. Describe the different types of glass and plastic ware used in the clinical laboratory and how they should be cleaned.
2. Describe the pipettes utilized in the clinical laboratory.
3. Describe glass and plastic supplies used in the clinical laboratory.
4. Discuss the different types of water used in the laboratory.
5. Discuss the different classifications of laboratory chemicals.

Psychomotor:
1. Students will perform experiments using the appropriate glassware and pipettes.
2. Students will recognize the appropriate glassware and water to use in a given laboratory situation.

Affective:
1. Students will appreciate the role of chemical and glassware safety within the clinical lab.

PIPETTING TECHNIQUES
1. Demonstrate proper of pipetting, using the following pipets:
   a. Volumetric
   b. Mohr
   c. Serologic
   d. Automated pipette
   e. Pipetting jar
2. Indicate the proper usage for each of the above.
3. Demonstrate with 100% mastery the ability to use each pipette listed above

Psychomotor
1. Students will demonstrate to the Instructors that they can pipette using all of the types of glass pipettes in the correct viscosity of fluid.

Affective:
1. Students will appreciate the importance of proper pipette use within the clinical lab.

QUALITY CONTROL CHARTS AND THEIR INTERPRETATION
1. apply statistical calculations and construct a quality control chart
2. diagram quality control results
3. interpret quality control results and use them to solve QC problems

Psychomotor:
1. Students will calculate QC results, plot the QC charts, and diagram QC charts.
2. Students will plot QC results to charts they have synthesized.

Affective:
1. Students will appreciate the role of QC in laboratory operations.
TOTAL PROTEIN METHODS & ELECTROPHORESIS

1. List 2 methods for T. Protein and 3 for assaying specific components of T. Protein.
2. Describe the principle of the biuret reaction and the significance of its reagents.
3. Name 4 properties of proteins used in protein methods of quantitation.
4. State the principle of electrophoresis and define pertinent terms.
5. Identify the component parts of an electrophoresis apparatus.
6. Briefly describe the operation of an electrophoretic separation.

Psychomotor:
1. Students will perform electrophoresis analysis of serum specimens, if available.

APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR

1. Submitted by College of: Allied Health Professions Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number: CLS 833 Proposed prefix & number: same
   (b) Present Title: Basic Clinical Hematology and Body Fluid Analysis
       New Title: same
   (c) If course title is changed and exceeds 24 characters (including spaces), include a sensible
       title (not to exceed 24 characters) for use on transcripts: Hematology/Body Fluids
   (d) Present credits: 4 Proposed credits: 5
   (e) Current lecture: laboratory ratio: 1:1 Proposed: 2:3
   (f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as: NA
   Prefix and Number Signature: Department Chair

4. Proposed change in Bulletin description:
   Present description (including prerequisite(s):
   This course will cover the basic theory and practice of clinical hematology, hemostasis and body
   fluids. Both manual and automated techniques in blood cell and body fluid analysis will be
   covered. Laboratory reporting, quality control, and concern for the patient will be emphasized.
   Lecture 4 hours; laboratory 12 hours for 7 weeks. Pre-requisite: admission into the Clinical
   Laboratory Sciences Professional Program

New description:

The theory and practice of clinical hematology laboratory testing, including the performance of
manual and automated procedures, instrumentation principles, quality assurance, and problem-
solving. Hematopoiesis, hemostasis, blood cell function and body fluid physiology are discussed
as they relate to clinical laboratory practice. Special emphasis is placed on the relationship of
clinical hematology and body fluids analysis testing to pathophysiology and on the acquisition of
valid test results.

(c) Prerequisite(s) for course as changed: Admission into the Clinical Laboratory Sciences
   Program or consent of the instructor

5. What has prompted this proposal?
This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:
Additional laboratory sessions will be added to this course and deleted from the advanced level clinical hematology course, CLS 843, and serology course, CLS 855. A revised list of objectives is provided below.

7. What other departments could be affected by the proposed change? None

8. Will changing this course change the degree requirements in one or more programs?* X-Yes No
If yes, please attach an explanation of the change.*
See Request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program? Yes X-No
If yes, please attach correspondence indicating concurrence of the University Studies Committee.

10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.

*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change? Yes X-No
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
Name: Raymond Olesinski Phone Extension: 323-1100 ext 291

Signatures of Approval:
Department Chair Date:
Dean of the College Date:
Date of Notice to the Faculty:
**Undergraduate Council Date:
**Graduate Council Date:
**Academic Council for the Medical Center Date:
**Senate Council Date of Notice to University Senate:
**If applicable, as provided by the Rules of the University Senate.

ACTION OTHER THAN APPROVAL

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The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
a. change in number within the same hundred series;
b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
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Rev 11/98
OBJECTIVES FOR CLS 833: BASIC CLINICAL HEMATOLOGY AND BODY FLUIDS ANALYSIS

Following completion of this course, the student should be able:

Major Cognitive Goals

- Discuss hematopoiesis
- Discuss hemoglobin synthesis
- For each of the following procedures, if applicable, explain the
  - Specimen collection, handling, storage and preparation requirements
  - Physiologic theory
  - Principles of method
  - General disease manifestations and clinical correlations
    And differentiate/resolve technical, instrument, physiologic causes of problems or unexpected test results
- Provide reference ranges
  a. Automated red blood cell (RBC) counts
  b. Automated white blood cell (WBC) counts
  c. Automated hemoglobin
  d. Automated hematocrit
  e. Manual hematocrit
  f. Manual platelet counts
  g. Automated platelet counts
  h. RBC morphology
  i. RBC indices
  j. RBC indices
  k. Manual WBC differentials
  l. Automated WBC differentials
  m. RBC and WBC histograms
  n. RBC and WBC scattergrams
  o. Reticulocyte count including corrected reticulocyte count and reticulocyte production index (RPI)
  p. Westergren erythrocyte sedimentation rate (ESR)
  q. Activated partial thromboplastin time (APTT)
  r. Prothrombin time (PT)
  s. Modified Ivy bleed time (IBT)
- Explain the mechanism of normal hemostasis
- Relate the results of chemical, physical and microscopic assays of body fluids to general disease processes

For each of the following fluids

- Cerebrospinal
- Amniotic
- Synovial
- Pleural
- Pericardial
- Peritoneal
Sweat
Gastric

Explain its origin
Explain its function
Describe its composition
Explain how it is analyzed
Identify normal and abnormal findings of analysis
Using case studies, correlate findings in body fluids with normal and abnormal physiological conditions

Differentiate the three types of aminoacidurias-overflow, no-threshold, and renal- by their causes
Define semen
List the components in the first and second parts of the ejaculate
Correlate abnormal semen analysis findings that may result when parts of the specimen are lost during specimen collection
Describe the parameters included in the macroscopic semen examination
Describe the parameters included in the microscopic semen examinations
Identify abnormal values for macroscopic and microscopic semen parameters
Correlate possible causes and/or explanations with abnormal semen parameters
Explain the implications abnormal values may have on other semen parameters
Identify quality control, proficiency testing and training available for the semen analysis
Differentiate between transudates and exudates
Describe and correlate the physiologic mechanism, clinical features, and laboratory testing for the following aminoacidurias: cystinuria; cystinosis; alcaptonuria; maple syrup urine disease; phenylketonuria; tyrosinuria; and melanuria.

Performance criteria for cognitive objectives: Achievement of a minimum 70%-score for Hematology Examination I and II and for the combination of all quizzes

Major Psychomotor Objectives

- Make and stain acceptable blood films
- Propose solutions to remedy unacceptable blood films
- Determine manual hematocrit values on peripheral blood specimens
- Identify the specific morphologic maturation stages of leukocytes, erythrocytes and megakaryocytes
- Distinguish between normal and abnormal peripheral blood cells
- Perform leukocyte and platelet count estimates from peripheral blood smears
- Count leukocytes and platelets by both manual and automated methods including
- Discuss quality control procedures for blood cell counts
- Explain principles and methods of multiparameter automated instruments
- Interpret histogram and scattergram data
- Perform activated partial thromboplastin times
- Perform prothrombin times
- Perform an Ivy bleeding time
- Identify and differentiate the microscopic elements seen in urine and other body fluids
- Perform assays for the chemical elements in urine and other body fluids

For each of the following procedures/tests (if checked below with an “X”)
A. Observed or demonstrated the procedure during one or more laboratory sessions
B. Performed the procedure satisfactorily on practice specimens. Criteria for satisfactory performance will be provided for each procedure or test prior to the laboratory sessions
<table>
<thead>
<tr>
<th>Procedure/Test</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin electrophoresis</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Myeloperoxidase stain</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Sudan Black stain</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Chloracetate estersae stain</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Non-specific esterase stains</td>
<td>X</td>
<td></td>
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<tr>
<td>Prussian Blue (iron) stain</td>
<td></td>
<td>X</td>
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<tr>
<td>Leukocyte alkaline phosphatase stain</td>
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<tr>
<td>Osmotic fragility</td>
<td>X</td>
<td></td>
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<tr>
<td>Sugar water test</td>
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<td></td>
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<tr>
<td>Activated Clotting Time</td>
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<td>X</td>
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<tr>
<td>Thrombin Clotting Time</td>
<td>X</td>
<td></td>
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<tr>
<td>Latex FDP Assay / Latex D-Dimer Assay</td>
<td>X</td>
<td></td>
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<tr>
<td>Bleeding Time</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Clot Retraction</td>
<td>X</td>
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</tr>
</tbody>
</table>

- Identify variant lymphocyte morphology
- On a stained peripheral smear (actual or photograph) identify morphologic abnormalities associated
  A. Anemias of ineffective erythropoiesis
  B. Anemias of abnormal nuclear development
  C. Anemias of effective erythropoiesis

Correlate the morphology seen on unknown stained peripheral smears or bone marrows (actual or photograph) with specific acute and chronic leukemias
On a stained peripheral smear (actual or photograph) correlate WBC inclusion morphology with specific non-malignant hematologic abnormalities
Identify Gaucher and Niemann-Pick cells

Identify variant lymphocyte morphology
On a stained peripheral smear (actual or photograph) identify morphologic abnormalities associated
  A. Anemias of ineffective erythropoiesis
  B. Anemias of abnormal nuclear development
  C. Anemias of effective erythropoiesis

Perform the testing for each parameter included in the semen analysis and calculate results and report findings for each parameter included in the semen analysis.
Perform the **complete strict criteria morphology**, and compare this assessment with the **basic** semen morphology assessment.
Describe the morphology of a “normal” spermatozoon using **strict criteria** as defined by WHO ‘99.
Evaluate information documented on the patient information form to determine if the semen specimen is acceptable for analyzing

**Major Affective Objectives**

Demonstrate appreciation of the role of the clinical laboratory scientist in detecting, diagnosing and monitoring hematologic disease by providing a detailed explanation of this role
Appreciate the importance of obtaining hematology valid test results through
- Proper preparation for laboratory assignments
- Diligent performance of procedures in the student laboratory
APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR

1. Submitted by College of: Allied Health Professions Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number: CLS 835 Proposed prefix & number: same
   (b) Present Title: Clinical Immunology
      New Title: same
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to
      exceed 24 characters) for use on transcripts:
   (d) Present credits: 4 Proposed credits: 3
   (e) Current lecture: laboratory ratio: 1:0 Proposed: 1:0
   (f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as: NA
   Prefix and Number Signature: Department Chair

4. Proposed change in Bulletin description:
   (c) Present description (including prerequisite(s):
      An overview of immunology with a molecular basis for the immune responses and the
      role of genetics in immunological disorders. Molecular biological techniques in the
      modern clinical laboratory will be emphasized. Pre-requisites: MLT/CLT certification
      or permission of instructor
   (d) New description:
      An overview of immunology with a molecular basis for the immune responses and the
      role of genetics in immunological disorders. Molecular biological techniques in the
      modern clinical laboratory will be emphasized.
   (c) Prerequisite(s) for course as changed: no change
      Admission into the Clinical Laboratory Sciences Professional Program

5. What has prompted this proposal?
   This course change is part of an overall program change that more clearly defines the
   4th year of the program toward instruction for supervisory and management positions in
   clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this
   course, indicate changes:
   Demonstration of serological testing has been deleted from this course and moved to
   CLS 833.

7. What other departments could be affected by the proposed change? None

8. Will changing this course change the degree requirements in one or more programs?*
   X-Yes  No
   If yes, please attach an explanation of the change.*
   See Request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program? Yes  X-No
   If yes, please attach correspondence indicating concurrence of the University
   Studies Committee.

10. If the course is a 100-200 level course, please submit evidence (e.g.,
    correspondence) that the Community College System has been consulted.
*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change?  Yes  X-No  
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?  
Name: Margaret Steinman  Phone Extension: 323-5150  

**Signatures of Approval:**  
Department Chair Date  
Dean of the College Date  
Date of Notice to the Faculty  
**Undergraduate Council Date**  
**Graduate Council Date**  
**Academic Council for the Medical Center Date**  
**Senate Council Date of Notice to University Senate**  
**If applicable, as provided by the Rules of the University Senate.**  

ACTION OTHER THAN APPROVAL

**********  
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:  
a. change in number within the same hundred series;  
b. editorial change in description which does not imply change in content or emphasis;  
c. editorial change in title which does not imply change in content or emphasis;  
d. change in prerequisite which does not imply change in content or emphasis;  
e. cross-listing of courses under conditions set forth in item 3.0;  
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]  

Rev 11/98
OBJECTIVES FOR CLS 835: CLINICAL IMMUNOLOGY

Following completion of this course, the student will be able:

1. Demonstrate familiarity with common immunological terminology and describe the functional significance of the components of the immune system.

2. Describe the anatomy and function of the various lymphoid tissues and organs.

3. Describe the formation and function of the various types of cells within the immune system including those present in fetal and adult life.

4. Describe the various effector mechanisms that provide immunity and are involved in phagocytosis, cytotoxicity, antibodies, complement and cytokines/growth factors/interleukins.

5. Explain how the immune system regulates its responses.

6. Describe common tests that are used to measure immune function for diagnosis and treatment in clinical immunology, including immunoassays.

7. Describe diseases and disorders that have as their primary cause alterations and/or malfunctions of the immune system.

8. Discuss the principles of DNA testing.

9. Demonstrate knowledge of the principles, theory and applications of gene therapy in the field of clinical immunology practice.
1. Submitted by College of: Allied Health Professions     Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number:  CLS 836               Proposed prefix & number: same
   (b) Present Title: Laboratory Organization and Management
       New Title:  Laboratory Management
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts:
   (d) Present credits: 3                                            Proposed credits: 3
   (e) Current lecture: laboratory ratio:  1:0            Proposed:  1:0
   (f) Effective Date of Change: (Semester & Year):  Fall, 2002

3. To be Cross-listed as:           NA
   Prefix and Number                         Signature: Department Chair

4. Proposed change in Bulletin description:
   (e) Present description (including prerequisite(s):
       An overview of management with an emphasis of problem solving in the clinical laboratory setting. Content will include the management process, managing change, motivation, personnel issues, regulatory issues, delegation, problem solving, leadership, quality improvement strategies and techniques and other relevant topics. Prereq: Admission to the Clinical Laboratory Sciences professional program.
   (f) New description:
       An overview of clinical laboratory management issues. Content will include the management process, managing change, personnel issues, regulatory issues, leadership, quality improvement strategies, principles of education related to the management process and other relevant topics.
   (c) Prerequisite(s) for course as changed:
       Admission into the Clinical Laboratory Sciences Professional Program

5. What has prompted this proposal?
   This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes: 
   Objectives of CLS 867 have been added to this course. Added objectives have been starred.

7. What other departments could be affected by the proposed change?  None

8. Will changing this course change the degree requirements in one or more programs?* 
   X-Yes    No
   If yes, please attach an explanation of the change.*
   See Request for Change in Undergraduate Program Form

9. Is this course currently included in the University Studies Program?       Yes   X-No
   If yes, please attach correspondence indicating concurrence of the University Studies Committee.

10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.
*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change? Yes X-No
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
Name: Raymond Olesinski Phone Extension: 323-1100 ext 291

Signatures of Approval:
Department Chair Date
Dean of the College Date
Date of Notice to the Faculty
**Undergraduate Council Date
**Graduate Council Date
**Academic Council for the Medical Center Date
**Senate Council Date of Notice to University Senate
**If applicable, as provided by the Rules of the University Senate.

ACTION OTHER THAN APPROVAL

**********
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
a. change in number within the same hundred series;
b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 836: LABORATORY MANAGEMENT

Following completion of this course, the student will be able:

Cognitive Objectives

1. List the steps involved in the selection of a laboratory information systems (LIS)
2. Explain the process involved in each step in the selection of an LIS
3. List the steps involved in the acquisition of an LIS
4. Explain the process involved in each step in the acquisition of an LIS
5. Define the following as they apply to a LIS
   - Needs analysis
   - System evaluation
   - Cost justification
   - RFP
7. Evaluate a LIS to determine if it meets the needs of a particular clinical laboratory
8. Discuss the management process as it applies to the clinical laboratory.
9. Describe management techniques used to facilitate problem solving and decision-making.
10. Apply principles of the following to real-life clinical laboratory situations:
    - Personnel motivation
    - Communication
    - Negotiation
    - Delegation
11. Apply basic principles of financial management to the preparation of a budget.
12. Describe the characteristics of effective leaders and identify leadership styles.
13. Discuss personnel issues including:
    - Preparing a job description
    - Marketing
    - Screening potential applicants
    - Interviewing
    - Disciplinary action
    - Conflict resolution
14. List the elements to consider in employee performance reviews.
15. Describe how federal and state regulations affect the role of the clinical laboratory.
16. Discuss the principles and process of continuous quality improvement.
17. Participate as a member of a committee to solve complex problems associated with clinical laboratory management.
18. Communicate group decisions in an effective manner to an administrative authority.

*19. Describe different learning styles and identify preferred learning style.

*20. Demonstrate comprehension of learning domains by writing instructional objectives for each domain.

*21. Write instructional objectives for three levels of difficulty: Level I, recall; Level II, understanding and application; and Level III, problem solving.

*22. Discuss the differences between formative, summative, norm-referenced and criterion-referenced evaluation.

*23. Write test questions for each learning domain and level of difficulty.

*24. Develop an education presentation including selection of a topic and title, written objectives, presentation handout with references and test questions.

*25. Give an oral education presentation.

*26. Develop a plan of action for effective supervision of clinical instruction.

Affective Objective

1. Appreciate the importance to the clinical laboratory of a systematic approach to evaluating, selecting and acquiring an LIS
APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR

1. Submitted by College of: Allied Health Professions       Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number: CLS 838                     Proposed prefix & number: same
   (b) Present Title: Introduction to Immunohematology
       New Title: Basic Immunohematology
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts: Basic Immunohematology
   (d) Present credits: 4                             Proposed credits: 5
   (e) Current lecture: laboratory ratio: 1:1           Proposed: 2:3
   (f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as: NA
   Prefix and Number                                      Signature: Department Chair

4. Proposed change in Bulletin description:
   (g) Present description (including prerequisite(s):
       Introduction to the principles and practice of blood banking including blood group systems, routine serologic testing, blood collection and processing and component therapy. Lecture, four hours; laboratory 12 hours per week for six weeks. Prereq: CLS 835 or consent of instructor.
   (h) New description:
       Introduction to the principles and practice of blood banking including blood group systems, routine serologic testing, blood collection and processing and component therapy.
   (i) Prerequisite(s) for course as changed:
       Admission to the Clinical Laboratory Sciences Program and CLS 835 or equivalent

5. What has prompted this proposal?
   This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:
   Additional laboratory sessions will be added to this course and deleted from the advanced level clinical hematology course, CLS 848.

7. What other departments could be affected by the proposed change? None

8. Will changing this course change the degree requirements in one or more programs?*
   X-Yes       No
   If yes, please attach an explanation of the change.*
   See Request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program? Yes  X-No
    If yes, please attach correspondence indicating concurrence of the University Studies Committee.

10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.
*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change?  Yes  X-No
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
Name: Margaret Steinman  Phone Extension: 323-5150

**Signatures of Approval:**

Department Chair Date

Dean of the College Date

Date of Notice to the Faculty

**Undergraduate Council Date**

**Graduate Council Date**

**Academic Council for the Medical Center Date**

**Senate Council Date of Notice to University Senate**

**If applicable, as provided by the Rules of the University Senate.**

**ACTION OTHER THAN APPROVAL**

**********
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
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b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 838:
BASIC IMMUNOHEMATOLOGY

Following completion of this course, the student will be able:

1. Discuss antigen/antibody reactions as applied to blood banking, including antibody structure and function, immune response and molecular structure.

2. Discuss the major antigens and clinical significance of the major blood group systems.

3. Describe the principles, techniques, reagents and interpretation of results of routine blood bank procedures.

4. Describe the guidelines for determining acceptable blood donors and deferral period for donors who are disqualified from donation.

5. Discuss the collection, preparation, storage and selection of commonly used blood components.

6. Perform and interpret routine serologic testing including:
   a. ABO and Rh grouping
   b. Antibody screening and identification
   c. Compatibility testing
   d. Direct antiglobulin testing

7. Perform and interpret basic serological testing on newborns.

8. Discuss the indications for Rh Immune Globulin.

9. Perform and interpret Rh Immune Globulin work-up, including screen for fetal-maternal hemorrhage.

10. Discuss and perform quality control procedures required in immunohematology.

11. Discuss and perform titers on serum containing antibody.

12. Discuss common adverse effects of transfusion.

13. Discuss the clinical conditions that warrant component therapy and the component of choice for each.

14. Describe hazards associated with component therapy and safeguards used to minimize hazards.
1. Submitted by College of: Allied Health Professions     Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number: CLS 843      Proposed prefix & number: same
   (b) Present Title: Advanced Clinical Hematology
       New Title: Advanced Clinical Hematology and Body Fluid Analysis
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24
       characters) for use on transcripts: Advanced Hematology
   (d) Present credits: 3                  Proposed credits: 3
   (e) Current lecture: laboratory ratio: 1:1     Proposed: 1:0
   (f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as:     NA
   Prefix and Number
   Signature: Department
   Chair

4. Proposed change in Bulletin description:
   (j) Present description (including prerequisite(s):
       A study of the principles of hematological disease processes with
       emphasis on correlation of laboratory data with disease, quality control,
       and problem solving. The lectures will cover the major hematological
       disorders as well as advanced techniques for evaluation of blood cells
       such as cytochemistry, cytoflowimetry and molecular biological methods.
       The laboratories will be devoted to practice in blood cell identification and
       problem-solving using case studies and problem-based learning
       techniques. Lecture 4 hours; laboratory 12 hours for 5 weeks. Pre-
       requisite: CLS 833 or MLT.CLT certification or consent of instructor.
   (k) New description:
       The theory and practice of clinical hematology laboratory testing as it relates to hematological disorders and disorders
       of body fluids. Anemias, hemostasis and thrombotic disorders, leukemias and non-malignant leukocyte disorders, and
       body fluid disorders, including the reproductive system are discussed as they relate to clinical laboratory practice.
       Special emphasis is placed on pathophysiology, the clinical correlation of laboratory test results with hematological and
       body fluids disorders, and the interpretation and resolution of discrepant results.
       (c) Prerequisite(s) for course as changed: CLS 833 or consent of the instructor

5. What has prompted this proposal?
   This course change is part of an overall program change that more clearly defines the
   4th year of the program toward instruction for supervisory and management positions in
   clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course,
   indicate changes:
   Laboratory sessions in the previous version of the course are removed and added to the revised CLS 833 course. See
   the revised list of objectives below.

7. What other departments could be affected by the proposed change? None

8. Will changing this course change the degree requirements in one or more programs?* X-Yes
   No
   If yes, please attach an explanation of the change.*
   See Request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program? Yes X-No
    If yes, please attach correspondence indicating concurrence of the University Studies Committee.
10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.
*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change? Yes X-No
   (NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
   Name: Raymond Olesinski Phone Extension: 323-1100 ext 291

**Signatures of Approval:**

Department Chair Date

Dean of the College Date

Date of Notice to the Faculty

**Undergraduate Council Date

Graduate Council Date

**Academic Council for the Medical Center Date

**Senate Council Date of Notice to University Senate

**If applicable, as provided by the Rules of the University Senate.

**ACTION OTHER THAN APPROVAL**

*********

The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:

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d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 843:
ADVANCED CLINICAL HEMATOLOGY AND BODY FLUIDS ANALYSIS

Following completion of this course, the student should be able to:

Cognitive Objectives

- Define the following
  - Anemia
  - Absolute anemia/polycythemia
  - Relative anemia/polycythemia
  - Aplastic anemia
  - Hemolytic anemia
  - Polycythemia

- Describe how anemias are classified according to
  - Etiology
  - Morphology
  - Physiology
    - Morphology & Physiology

- For each of the following
  - Describe the hemogram patterns (including reticulocyte count) that are likely to be associated with each anemia
  - Describe the erythrocyte morphology patterns that are likely to be associated with each anemia
    - Anemias of ineffective erythropoiesis
    - Anemias of abnormal nuclear development

- Anemias of effective erythropoiesis

- For erythrocytosis
  - Describe the associated blood cell morphology
  - Describe the associated hemogram patterns
  - Discuss how laboratory testing can differentiate among the different types of erythrocytoses

- For each of the following procedures/tests (if checked below with an “X”)
  - A. Discuss specifics of specimen collection, handling, storage, and preparation
  - B. Explain the physiologic theory relevant to the test/procedure
  - C. Explain the principle of the test/procedure
  - D. Identify the disease manifestation/clinical correlation
  - E. Differentiate or resolve technical, instrument, or physiologic causes of problems or unexpected test results

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<tr>
<th>Procedure/Test</th>
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<th>B</th>
<th>C</th>
<th>D</th>
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- For the following disorders

Suggest test(s) likely to yield diagnostic information
Predict the likely associated laboratory findings

A. Thrombocytopenia, various types
B. Thrombocytosis
C. Qualitative platelet disorders

Explain the principles of operation of platelet aggregometry
Discuss the laboratory test patterns associated with each of the following
   Hemophilia
   Other factor deficiencies
   von Willebrand’s disease
   Circulating inhibitors to coagulation factors
   Vitamin K deficiency
   Liver disease

Identify appropriate testing procedures used to monitor fibrinolytic activity
Select appropriate testing procedures used to monitor major therapeutic anticoagulants
Indicate the range of results expected for anticoagulant monitoring procedures for effective therapy
Explain how malignant hematologic disorders are categorized
List the hematologic findings associated with preleukemia and dysmyelopoietic disorders
Indicate how laboratory testing is used to distinguish among the different types of acute myelogenous and lymphocytic leukemias
Describe how acute leukemias are categorized using the French-American-British classification system
Associate patterns of immunologic markers with specific leukemias
Associate patterns of molecular markers with specific hematologic disorders
Discuss the differences between acute and chronic leukemia
Discuss the clinical relevance of flow cytometry
Discuss the effects of treatment, including chemotherapy, ionizing radiation and bone marrow transplantation, on clinical laboratory findings in hematologic malignancy
Correlate absolute or relative increases or decreases in neutrophils, eosinophils, basophils, monocytes and lymphocytes with the clinical conditions in which they occur
Describe the morphologic alterations of neutrophils encountered with infections or inflammations
Explain how the morphologic alterations of neutrophils seen in infection and inflammation differ from those seen in Alder-Reilly and May-Hegglin anomaly
Describe qualitative abnormalities of eosinophils, basophils and monocytes
Explain the clinical significance of Gaucher and Niemann-Pick cells
For each of the following fluids
   Cerebrospinal
   Amniotic
   Synovial
   Pleural
   Pericardial
   Peritoneal
   Sweat
   Gastric

   Explain its origin
   Explain its function
   Describe its composition
   Explain how it is analyzed
   Identify normal and abnormal findings of analysis
   Using case studies, correlate findings in body fluids with normal and abnormal physiological conditions
Differentiate the three types of aminoacidurias-overflow, no-threshold, and renal- by their causes
Define semen
List the components in the first and second parts of the ejaculate
Correlate abnormal semen analysis findings that may result when parts of the specimen are lost during specimen collection
Describe the parameters included in the macroscopic semen examination
Describe the parameters included in the microscopic semen examinations
Identify abnormal values for macroscopic and microscopic semen parameters
Correlate possible causes and/or explanations with abnormal semen parameters
Explain the implications abnormal values may have on other semen parameters
Identify quality control, proficiency testing and training available for the semen analysis

Affective Objectives

- Demonstrate an appreciation for the role of the clinical laboratory scientist in diagnosing, monitoring and preventing hematological and body fluids disorders
- Demonstrate an appreciation for the relationship among hematological and body fluids disorders, their pathophysiology and the results of clinical laboratory testing.
1. Submitted by College of: Allied Health Professions:  
Date: Jan 12, 2001

Department/Division offering course:  
Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:  
(a) Present prefix & number: CLS 844  
Proposed prefix & number: same
(b) Present Title: Advanced Clinical Chemistry  
New Title: Same
(c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts: Adv Clin Chem
(d) Present credits: 4  
Proposed credits: 3
(e) Current lecture: laboratory ratio: 1:1  
Proposed: 1:0
(f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as: NA
Prefix and Number  
Signature: Department Chair

4. Proposed change in Bulletin description:  
(l) Present description (including prerequisite(s)):  
A study of specialized clinical chemistry testing which will include toxicology, therapeutic drug monitoring, endocrine function and testing as well as quality assurance issues. The theory and evaluation of methodologies involved in the quantitation of these substances and compounds will be discussed in lecture and demonstrated in laboratory. Lecture 4 hours, laboratory 12 hours per week for 6 weeks. Pre-requisites: admission into the Clinical Laboratory Sciences Professional Program; CLS 832 or 872; biochemistry and immunology courses, or consent of the instructor.
(m) New description:  
A study of the theory and evaluation of specialized clinical chemistry testing, including toxicology, therapeutic drug monitoring, endocrine function, and quality assurance issues.
(n) Prerequisite(s) for course as changed:  
Admission into the Clinical Laboratory Sciences Professional Program; biochemistry, immunology (may be taken concurrently) and CLS 832 or equivalent.

5. What has prompted this proposal?  
This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:

Laboratory sessions in the present course will be added to CLS 832 or be simulated labs on the Web.
7. What other departments could be affected by the proposed change? None

8. Will changing this course change the degree requirements in one or more programs?*
   X-Yes  No
   **If yes, please attach an explanation of the change.***
   See Request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program? Yes  X-No
   **If yes, please attach correspondence indicating concurrence of the University Studies Committee.**

10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.
*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change? Yes X-No
   (NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent
directly from the
Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it
will be sent to
the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
   Name: Linda Gorman Phone Extension: 323-1100 ext 253

SIGNATURES OF APPROVAL:

Department Chair________________________________________Date______________________________

Dean of the College____________________________________Date______________________________

Date of Notice to the Faculty____________________________________

**Undergraduate Council Date____________________________________

**Graduate Council Date________________________________________

**Academic Council for the Medical Center Date______________________

**Senate Council Date of Notice to University Senate_______________

**If applicable, as provided by the Rules of the University Senate.

ACTION OTHER THAN APPROVAL

**********
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:

   a. change in number within the same hundred series;
b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]
OBJECTIVES FOR CLS 844:
ADVANCED CLINICAL CHEMISTRY

Previous Clinical Chemistry material is foundation for the following objectives to be met. Students are encouraged to review foundation material before starting this course.

Following completion of this course, the student will be able to:

1. Define relevant terms.
2. Describe significant metabolic aspects for each analyte studied.
3. Discuss pathological conditions for which each analyte is significant.
   4. Describe analyte methodologies used for each analyte including pertinent reagents, interferences, and reference ranges.
5. Given a set of laboratory information, discuss abnormalities and draw conclusions about the pathology occurring.

Psychomotor:
1. Perform clinical chemistry analyses accurately in a simulated testing laboratory, using written laboratory procedures.
2. Calculate laboratory data from raw test readings.
3. Recognize abnormal results when looking at patient results.

Affective:
1. Appreciate the interplay between the clinical chemistry laboratory and other healthcare professionals in the treatment and diagnosis of patient’s health.

Acid Base
1. State the blood gas factors that influence the following:
   a. medulla
      a. chemoreceptors in aorta and carotid
2. Briefly discuss the amino acid changes in oxyhemoglobin to deoxyhemoglobin.
3. List and briefly explain four chemical buffers active in the body maintenance of acid base balance.

5. Define the following terms:
   a. \( pCO_2 \)
   e. \( pH \)
   b. \( CO_2 \) content
   f. buffer base
   c. plasma \( HCO_3^- \)
   g. base excess
   d. \( pO_2 \)
6. With the aid of a diagram, explain the isohydric and chloride shift phenomena.
7. Explain how the ability of hemoglobin to bind \( O_2 \) is affected by:
   a. \( pCO_2 \)
   b. \( pH \)
   c. temperature
8. State the three (3) parameters that affect the Bohr factor.
9. State the four (4) factors that influence the amount of oxygen going into blood via the lungs.
10. Briefly discuss the terms “shift to the left” and “shift to the right” as they pertain to hemoglobin affinity for oxygen.
11. Define the 4 acid-base then list 2 examples of each. Describe blood gas changes for each and body compensation.
12. Determine the acid-base status which could be anticipated from information supplied by an alignment normogram and acid-base calculations.
13. State two errors in blood gas instrumentation and their causes.
14. Briefly describe the quality control measures used in blood gas instruments; tonometry.

Psychomotor:
1. Using the Henderson-Hasselback equation calculate pH, CO₂ content, H₂CO₃, HCO₃⁻ and the ratio of HCO₃⁻/H₂CO₃ given any two of the above values.
2. Using 1.39 ml O₂/gm Hb, calculate percent saturation or hemoglobin concentration.

Affective:
1. Appreciate the importance of accurate blood gas determinations on patient well-being and the role that the laboratory plays in supplying those determinations.

LIPIDS
1. Describe the general lipid characteristics and metabolic functions. Identify structures for triglycerides, cholesterol, phospholipids, fatty acids, and prostaglandins. Discuss the digestion, absorption and distribution of triglycerides and cholesterol.
2. Discuss the hormonal regulation of lipids. Define relevant lipid terms.
3. Describe the properties and metabolism of the various lipoproteins. Examine the interrelationship between the apoproteins and various enzymes involved in the metabolism of the lipoproteins.
4. Classify various lipoprotein disorders and describe the relationships between these hyper- and hypolipoproteinemias and their specific apoprotein abnormalities.
5. Describe 2 methods each for performing triglyceride and cholesterol analyses. Discuss methods for apoprotein and lipoprotein analysis.
6. Calculate LDL, given the total cholesterol, triglyceride, and HDL-cholesterol values for a patient.
7. Briefly describe non-precipitation methods for measurement of LDL-cholesterol.

Psychomotor:
1. Perform cholesterol assays in simulated testing laboratory.

Affective:
1. Understand the relationship between lipoproteins and the lipid markers that are measured in the clinical laboratory.

CHROMATOGRAPHY, TOXICOLOGY, TDM OBJECTIVES
Chromatography:
1. List the component parts and briefly describe the operation of a gas chromatography device, HPLC, and current automated devices for drugs of abuse.
2. Identify the dangers of long and short acting barbiturates.
3. Given a set of lab data, identify any drug related problem and the analytes adversely affected.

Toxicology:
1. Define poisons.
2. List four (4) methods for drug identification and give the advantages and
disadvantages of each.
3. Specify the toxic effects of barbiturates.
4. Briefly describe the procedure for handling specimens in which legal issues are involved.
5. List three (3) methods for ethanol determination and briefly describe each.
6. State and explain the effects of methanol poisoning.
7. List the metabolic effects of salicylate overdose.
8. Briefly describe why acetaminophen overdose is so dangerous.
9. List three (3) types of specimen for drug determination and specify category of drugs each excels in recovering.
10. Briefly explain why carbon monoxide poisoning results in hypoxia.

Psychomotor:
1. Watch a video on drug screening by thin layer chromatography.
2. Perform a simulated lab on drugs of abuse.

Affective:
1. Recognize the importance of confirmatory testing for drugs of abuse.
2. Appreciate the confidentiality issues of drug testing.

**Non-Chromatography Objective**
1. Define EIA, ELISA, EMIT, FPIA, and CEDIA.
2. Describe the enzymes used in EIA.
3. List 3 measurement principles used for EIA.
4. List labels used in chemiluminescence and explain why this method is a good choice for drug assays.
5. Describe how an FIA method for methotraxate would work.

**Therapeutic Drug Monitoring**
1. Briefly describe drug disposition in the following areas:
   a. Absorption
   b. Distribution
   c. Metabolism
   d. Excretion
2. List three (3) parent drugs and their active metabolites that should also be measured for TDM.
3. Define the following pharmaco-Kinetic terms.
   a. ½ life
   b. Zero order kinetics
   c. Rate of change
   d. Steady state
4. Briefly describe how age, pregnancy, and disease can alter TDM goals.
5. Discuss 3 applications of TDM as to the drug’s function, elimination, and toxicity.

Psychomotor:
1. Perform simulated laboratory on specimens for therapeutic drug monitoring (TDM).
2. Use knowledge of drug testing to solve case problems having to do with drug monitoring.

Affective:
1. Appreciate the complexity of drug testing for know drugs used in therapeutic manner.

**THYROID**
1. Describe the physiological relationship between the thyroid, pituitary and hypothalamus.
2. List at least five (5) functions of thyroid hormones.
3. Identify the mechanisms involved in the release and utilization of thyroid hormones (include cell types).
4. Delineate the significance and source of reverse T(3).
5. Define thyroid auto-antibodies and their significance in thyroid disease.
6. Define myxedema and its causes.
7. Differentiate the types of hypothyroidism.
8. Describe methods for assaying T₃, T₄, and TSH.
9. Calculate Indexes for thyroid hormones.
10. List three (3) causes of hyperthyroidism.
11. Define Graves disease as to prevalence, symptoms, and expected lab results.
12. Analyze patient case histories and lab data for presence of thyroid abnormality. Defend your stated outcome by using the data to substantiate your findings.

Psychomotor:
1. Perform thyroid calculations given appropriate data from test readings.

Affective:
1. Appreciate the role that the laboratory plays in thyroid disease identification and diagnosis.

**ENDOCRINOLOGY**

1. Define hormone.
2. Summarize the mechanism for each of the following classes of hormones and give two (2) examples for each class:
   a. steroid
   b. protein
   c. amine
3. List two (2) classical methods for hormones and briefly describe each.
4. Briefly describe each of the following methods for hormones:
   a. ELISA
   b. EMIT
   c. Fluorescent immunoassay (F.I.A.)
5. Discuss the Porter - Silber method and which hormones are quantitated.
6. Discuss the Zimmerman reaction and which hormones are quantitated.
7. List five (5) hormones released by the hypothalamus.
8. List two categories of hormones released from the anterior pituitary and two (2) examples of each category.
9. Define:
   a. Sheehan's syndrome
   b. panhypopituitarism
   c. Conn's syndrome
10. Briefly describe the effects of too much GH and of too little GH.

11. Describe the confirmation of a prolactin-secreting pituitary adenoma.
12. List two causes of posterior pituitary release of its hormones.

Psychomotor:
1. Calculate urinary hormone/metabolite output for 24 hours, given raw data.
2. Perform hormone assay through simulated laboratory.

Affective:
1. Appreciate the hypothalamus, pituitary, gland axis relationship in regards to hormones.

**Adrenals**

13. List the three layers of the adrenal cortex and which hormones are secreted by each layer.
14. Delineate the steps in the renin-angiotensin system.
15. Describe the laboratory changes seen in hyperaldosteronism and hypoaldosteronism.
16. Differentiate between Cushings and Addisons.
17. Differentiate between primary and secondary disease of the adrenal cortex.
18. Briefly explain the utility of dexamethasone and metyrapone stimulation tests.

**Adrenal Medulla**

19. Diagram the synthesis and metabolism of catecholamines.
21. List laboratory tests used to diagnose pheochromocytomas and precautions necessary.
22. Define neuroblastomas and how you would diagnose one in the laboratory.

**Psychomotor:**

1. Calculate hormone/urinary metabolite output for 24 hours, given the appropriate lab data.

**Affective:**

1. Appreciate the relationship of the adrenal gland to many of the hormones affecting the body.

**GI Tract**

1. List the anatomical regions of the stomach and briefly describe what occurs in each region.
2. List 3 analytes measured to examine stomach digestion; what is each one’s purpose.
3. Describe the process and measurement for determining gastric acid levels.
4. Briefly explain the purpose(s) of the small intestine.
5. Name 2 disease states for stomach and 4 for small intestine. Briefly describe each one.

**Affective:**

1. Appreciate the relationship of digestion to the hormones influencing the GI tract.

**Amniotic Fluid and Pediatric**

1. Discuss the function(s) of surfactant.
2. Describe the clinical disease state associated with an abnormal L/S ratio.
   List five reasons for performing an amniocentesis.
3. Describe the general deficiencies in lipid storage diseases discussed in class.
4. State the accumulated lipid in individuals with lipid storage diseases discussed in class.
5. State the placenta hormones of importance in pregnancy.
6. Briefly describe the significance of amniotic fluid volume on pregnancy. List changes in the
8. Discuss changes in renal function that occur in pregnancy.
9. Discuss the factors affecting alpha-fetoprotein levels in the mother and the infant.
10. Discuss the utility of alpha-fetoprotein as a pregnancy marker.
11. Describe the role of acetylcholinesterase in neural tube defects.

Affective:
1. Appreciate the importance of amniotic fluid testing in the diagnosis of normal versus abnormal fetal development.

NUTRITION
1. List the component parts of nutritional assessment.
2. Describe the role that a clinical chemistry lab has in nutritional assessment.
3. Discuss diseases influenced by patient nutrition.

Cancer
1. List the protein markers of cancer.
2. Describe tests in clinical chemistry that are useful in diagnosis of cancer
   Describe the principles of RIA, ELISA, transection, and DNA probes as they apply to cancer

Affective:
1. Appreciate the role that the clinical chemistry laboratory plays in nutritional assessment and cancer diagnosis and therapy.

MALABSORPTION
1. List and briefly describe methods used to assess fat malabsorption.
2. List and briefly describe methods used to assess carbohydrate malabsorption.
3. Briefly discuss protein malabsorption and the reasons for false results.
4. Define D-xylose test utility and how the test is used.
5. Describe the gastric lavage technique.
6. Describe gastrin and its use.
7. Describe how gastric malabsorption differs from intestinal malabsorption.
8. Describe some of the effects of malabsorption syndromes and explain these effects
9. Briefly summarize the interpretation of a secretin test
10. List three (3) high content components of gastric fluid and their functions
11. List four (4) reasons for doing gastric analysis.

Affective:
1. Appreciate the difficulty in assessing malabsorption.

SEX HORMONE LECTURES
1. State the function of growth hormone (GH) and briefly discuss states associated with GH.
2. Name the glycoprotein hormones. State which ones influence sexual function.
3. Discuss the methods for hormone assay.
4. Name the estrogens and state how they change in the female during her cycle; during pregnancy.
5. Discuss hypofunction and hyperfunction of sexual hormones - male and female.
6. What is the significance of hCG in pregnancy; in cancer?
7. State the function of prolactin. Briefly discuss its clinical significance.

Affective:
1. Appreciate the relationship of the brain, gland and body function as they pertain to sexual hormones.

**DEVELOPING REFERENCE RANGES**

1. Discuss reference ranges to include:
   a. definition of the terms
   b. how reference ranges are used
   c. rationale for developing reference ranges
2. Discuss the selection of a reference population
3. Describe how a reference range is developed according to NCCLS guidelines including:
   a. The number of data points necessary
   b. How to establish reference limits if the data is
      (1) normal
      (2) skewed

Affective:
1. Appreciate the many factors that go into defining a normal population.
2. Recognize the need for periodic reference range assessment.

**Methodologies**

1. Describe the methodologies used in student laboratory to assay for glucose, total protein, albumin, BUN, creatinine, electrolytes, and uric acid.
2. Name reagents of major importance for each assay performed in class.
3. Demonstrate through written examination an understanding of the principles and reagents pertinent to routine chemistry as described in this lecture.
4. Describe methodologies used to assay for cholesterol, HDL-cholesterol, triglycerides, bilirubin, Mg$^{2+}$, Ca$^{2+}$, phosphorus.
5. Name major reagents and what they do in the methodologies discussed in lecture.

Psychomotor:
1. Perform method evaluation using two methods for the same analyte.

Affective:
1. Become familiar with the typical methods used in clinical chemistry laboratories for the routine analytes.

**Iron & TIBC**

1. State the active forms of iron found in the body
2. State the storage form of iron
3. Describe briefly the absorption and incorporation of iron in the body.
4. Explain briefly the "ferrous-ferric" cycle
5. List 3 effects of gastric acid on dietary iron
6. Define TIBC & UIBC
7. Describe 3 conditions leading to an increased iron value and 3 conditions leading to a decreased iron value
8. State the relative TIBC value for conditions listed in #7
9. Compute % saturation of TIBC.
10. Describe the major reactions involved in color reaction assays for serum iron and TIBC.

Psychomotor:
1. Perform an iron assay, if available
2. Calculate the serum iron, TIBC, or UIBC, given the appropriate raw lab data.

**Metals**

1. Name the preferred method for assaying metals
2. List three (3) physiological functions of copper in the body
3. Name two genetic diseases of copper and state why copper has an influence.
4. List 3 conditions exhibiting decreased serum copper values and 3 conditions exhibiting increased serum copper values
5. Briefly discuss the effect on copper levels by growth hormone, corticotropin, and erythropoiesis
6. State why arsenic poisoning is detrimental to the body
7. Describe a qualitative test for urine arsenic detection
8. State the reasons zinc is physiologically important
9. List three (3) areas influenced in the body by zinc deficiency
10. List three (3) serum carriers of zinc.
11. Describe the functions of manganese in the body.
12. State four (4) results of manganese deficiency
13. List four (4) sources of lead poisoning
14. Describe briefly the effects of lead poisoning on children
15. List three (3) techniques for detecting lead
16. Name the hemoglobin precursors that are elevated in lead poisoning.
17. Name the specimen of choice for lead determinations and how it should be collected.
18. Name three (3) treatments for mercury poisoning
19. State the preferred method for Mercury analysis
20. Describe briefly the influence of Selenium, Cobalt, Molybdeum and Chromium, on human metabolism

Psychomotor:
1. Perform metal analysis, if available.

Affective:
1. Recognize the importance of metal analysis by clinical laboratories for the health of patients.

**VITAMINS**

1) Name the fat soluble vitamins essential to humans. Discuss each one’s biological role, metabolism and transportation route within the body.
2) Name and identify the water-soluble vitamins needed by humans. Discuss each one’s biological functions, metabolism and transport.
3) Describe the clinical effects of low or high levels for fat-soluble and water-soluble enzymes.
4) Discuss methodologies used to determine vitamin levels and/or status.

Affective:
1. Appreciate the importance of vitamin assessment for patients.

**INSTRUMENTATION AND QUALITY CONTROL ASSURANCE**

1. Describe the concept of automated chemistry with regard to major characteristics and basic principles.
2. Describe instrumentation (especially major autoanalyzers) widely used in clinical chemistry laboratories.
3. Discuss QC assurance with regard to QC materials and evaluation and correction of
out-of-control values.

Psychomotor:
1. Diagram a maintenance log for an analyzer used in the clinical laboratory.
2. Diagram a trouble-shooting flow chart for a problem that would occur on the analyzer you have chosen.

Affective:
1. Appreciate the importance of maintaining equipment in the laboratory.
2. Recognize that QC and QA are important to maintaining a working laboratory.
1. Submitted by College of: Allied Health Professions     Date: Jan 12, 2001
Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number:  CLS 848              Proposed prefix & number: same
   (b) Present Title: Advanced Immunohematology
       New title: same
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts: Adv Immunohematology
   (d) Present credits: 4/ Proposed credits: 3
   (e) Current lecture: laboratory ratio: 1:1             Proposed: 1:0
   (f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as: NA

4. Proposed change in Bulletin description:
   (o) Present description (including prerequisite(s):
This course emphasizes clinical interpretation and problem solving. Antibody identification, selection of blood components, transfusion complications, hemolytic disease of the newborn, autoimmune hemolytic anemias and quality assurance are included. Lecture, four hours; laboratory, 12 hours per week for six weeks. Prereq: CLS 838 or MLT/CLT certification or consent of instructor.
   (p) New description:
This course emphasizes clinical interpretation and problem solving. Antibody identification, selection of blood components, transfusion complications, hemolytic disease of the newborn, autoimmune hemolytic anemia and quality assurance are included.
   (q) Prerequisite(s) for course as changed:
Admission to the Clinical Laboratory Sciences Program and CLS 838 or equivalent

5. What has prompted this proposal?
This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:
Laboratory sessions in the present course will be added to CLS 838 and clinical practicum.

7. What other departments could be affected by the proposed change? None

8. Will changing this course change the degree requirements in one or more programs?*
   X-Yes    No
   **If yes, please attach an explanation of the change.**
See Request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program? Yes X-No
   **If yes, please attach correspondence indicating concurrence of the University Studies Committee.**

10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.
*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR AND MINOR PAGE 2 OF 2

11. Is this a minor change? Yes X-No
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
Name: Margaret Steinman Phone Extension: 323-5150

Signatures of Approval:

Department Chair Date
Dean of the College Date
Date of Notice to the Faculty
**Undergraduate Council Date
**Graduate Council Date
**Academic Council for the Medical Center Date
**Senate Council Date of Notice to University Senate
**If applicable, as provided by the Rules of the University Senate.

ACTION OTHER THAN APPROVAL

**********
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
- a. change in number within the same hundred series;
- b. editorial change in description which does not imply change in content or emphasis;
- c. editorial change in title which does not imply change in content or emphasis;
- d. change in prerequisite which does not imply change in content or emphasis;
- e. cross-listing of courses under conditions set forth in item 3.0;
- f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 848:
ADVANCED IMMUNOHEMATOLOGY

Following completion of this course, the student will be able:

1. Given a case study or studies, resolve and interpret ABO discrepancy work-ups.

2. Given a case study or studies, resolve and interpret antibody identification that uses special enhancement techniques.

3. Select appropriate cells to confirm and/or rule out all possible antibodies.

4. Given a patient’s clinical condition and laboratory results, recommend and select appropriate blood component therapy.

5. Describe adverse effects of transfusions, including pathogenesis, expected laboratory findings and treatment.

6. Given a case study or studies, resolve and interpret adverse effects of transfusion.

7. Describe the pathogenesis and treatment of hemolytic disease of the newborn (HDN).

8. Given a case study or studies, resolve and interpret HDN work-ups.

9. Discuss the types of autoimmune hemolytic anemia including symptoms, expected laboratory findings and treatment.

10. Given a case study or studies, resolve and interpret an auto-immune hemolytic anemia work-up.

11. Discuss the purpose and major components of the quality assurance program for a transfusion service.

12. Discuss the HLA system and its importance in transfusion therapy.

APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR
1. Submitted by College of: Allied Health Professions     Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number:  CLS 851           Proposed prefix & number: same
   (b) Present Title: Introduction to Clinical Bacteriology
       New Title: Basic Clinical Microbiology
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts: Basic Clin Micro
   (d) Present credits: 4                                             Proposed credits:  5
   (e) Current lecture: laboratory ratio: 1:1             Proposed: 2:3
   (f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as:           NA
   Prefix and Number               Signature: Department Chair

4. Proposed change in Bulletin description:
   (a) Present description (including prerequisite(s):
       This course will cover medically significant bacteria, including commensals and normal flora, as well as pathogens. Also covered will be microbial physiology, interactions between host and pathogenic bacteria, and the clinical and epidemiological consequences of these interactions. The laboratory will cover conventional microscopic, cultural and immunological techniques used for the recovery, isolation and identification of clinically significant bacteria. Lecture, four hours per week; laboratory, 12 hours per week. Prereq: Admission to the Clinical Laboratory Sciences program or consent of instructor.
   (b) New description:
       The study of medically significant microbiology, including commensal flora, normal flora and pathogens. Lectures also cover microbial physiology, interactions between host and pathogenic microorganisms, and the clinical and epidemiological consequences of these interactions. The laboratory will cover microscopic, cultural and immunological techniques used for the recovery, isolation and identification of clinically significant microorganisms.
   (c) Prerequisite(s) for course as changed: Admission to the Clinical Laboratory Sciences Program

5. What has prompted this proposal?
   This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:
   Additional laboratory sessions will be added to this course and deleted from the advanced level clinical microbiology course, CLS 856.

7. What other departments could be affected by the proposed change? None

8. Will changing this course change the degree requirements in one or more programs?*
   X-Yes    No
   If yes, please attach an explanation of the change.*
   See Request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program? Yes   X-No
If yes, please attach correspondence indicating concurrence of the University Studies Committee.

10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.

*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change? Yes X-No
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
Name: Jean Brickell Phone Extension:

**Signatures of Approval:**

Department Chair Date
Dean of the College Date
Date of Notice to the Faculty
**Undergraduate Council Date**
**Graduate Council Date**
**Academic Council for the Medical Center Date**
**Senate Council Date of Notice to University Senate**

**If applicable, as provided by the Rules of the University Senate.**

ACTION OTHER THAN APPROVAL

******
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
a. change in number within the same hundred series;
b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 851:
BASIC CLINICAL MICROBIOLOGY

Following completion of this course, the student will be able:

1. Identify the disease caused by each agent discussed.

2. Describe the epidemiology for each agent, listing the mode of transmission, reservoir, host range and port of entry.

3. List the virulence factors for each agent discussed and predict their mechanism of action on the host.

4. Discuss the major considerations in collection and handling of clinical specimens for processing and identification.

5. Develop a flow chart for the initial identification of various groups of microorganisms.

6. Describe means of identification for each agent; correlate microbiological assays with immunology assays and clinical findings.

7. List treatments and preventions of diseases of microbiological origin, and note if a vaccine is available for each agent discussed.

8. Compare and contrast the various methods for testing antimicrobial effectiveness.

9. Describe the classes of antimicrobial agents used to treat systemic infections. Correlate mode of action of each class of antimicrobial agent with organism susceptibility.

10. Interpret case studies to identify disease and causative agent.

11. Given a pure culture and knowledge of body site source, identify the microorganism, determine the significance of the organism and test for antimicrobial susceptibility when indicated.
1. Submitted by College of: Allied Health Professions  Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number: CLS 856  Proposed prefix & number: same
   (b) Present Title: Advanced Microbiology
       New Title: Advanced Clinical Microbiology
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts: Advanced Microbiology
   (d) Present credits: 3  Proposed credits: 3
   (e) Current lecture: laboratory ratio: 1:1  Proposed: 1:0
   (f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as: NA

4. Proposed change in Bulletin description:
   (a) Present description (including prerequisite(s):
       Course content will cover medically important bacteria, with an emphasis on anaerobes and mycobacteria, and clinically significant fungi, parasites and viruses. The laboratory will focus on the isolation and identification of pathogenic and opportunistic fungi, viruses, parasites, and difficult-to-isolate bacteria from clinical specimens. Knowledge from Clinical Bacteriology will be applied, and theories and advanced techniques used for the diagnosis of bacterial, fungal, viral and parasitic human disease will be presented. Lecture; four hours per week; laboratory, eight hours per week for seven weeks. Prereq: Admission to the Clinical Laboratory Sciences program or consent of instructor.
   (b) New description:
       The study of medically important bacteria, with an emphasis on anaerobes and mycobacteria, and clinically significant fungi, parasites and viruses. Clinical bacteriology knowledge will be applied through case studies.
   (c) Prerequisite(s) for course as changed: Admission to the Clinical Laboratory Sciences program and CLS 851 or equivalent.

5. What has prompted this proposal?
   This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:
   Laboratory sessions in the present course will be added to CLS 851 and clinical practicum.

7. What other departments could be affected by the proposed change?  None

8. Will changing this course change the degree requirements in one or more programs?*  
   X-Yes  No
   **If yes, please attach an explanation of the change.**
   See Request for Change in Undergraduate Program
   If yes, please attach correspondence indicating concurrence of the University Studies Committee.

9. Is this course currently included in the University Studies Program?  Yes  X-No
10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted. 
*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change? Yes X-No
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
Name: Jean Brickell Phone Extension: 1-800-851-7512 ext 263

**Signatures of Approval:**
Department Chair Date
Dean of the College Date
Date of Notice to the Faculty
**Undergraduate Council Date**
**Graduate Council Date**
**Academic Council for the Medical Center Date**
**Senate Council Date of Notice to University Senate**
**If applicable, as provided by the Rules of the University Senate.**

**ACTION OTHER THAN APPROVAL**

**********
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
a. change in number within the same hundred series;
b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 856:
ADVANCED CLINICAL MICROBIOLOGY

Following completion of this course, the student will be able:

Cognitive Objectives/Advanced Bacteriology

- Develop a flow chart for the initial identification of significant groups of bacteria.
- Classify medically important bacteria based on classic taxonomy classification and according to body sites affected.
- Identify disease caused by each agent discussed.
- Apply knowledge of epidemiology from introductory level microbiology courses to determine organisms that may be etiologic agents of disease from each of the following body sites:
  - blood
  - cerebral spinal fluid
  - respiratory tract
  - urinary tract
  - genital tract (including sexually transmitted organisms)
  - wounds, skin, abscesses and soft body tissues
  - solid tissue, bone, bone marrow, and body fluids
  - head and neck
- Discuss the major considerations in collection and handling of clinical specimens for bacterial processing and identification.
- Describe means of identification for each agent; correlate microbiological assays with immunology assays and clinical findings.
- List treatments and preventions of diseases of microbiological origin, and note if a vaccine is available for each agent discussed. List problems associated with anaerobic and mycobacterial treatments.
- Compare and contrast the various methods for testing antimicrobial effectiveness for anaerobic and mycobacterial infections.
- Interpret case studies to identify disease and causative agent.
- Participating as a member of a group, develop a quality assurance plan for a microbiology laboratory.

Cognitive Objectives/Parasitology

- Develop a flow chart for the initial identification of significant groups of parasites.
- Classify medically important parasites based on classic taxonomy classification and according to body sites affected.
- Identify disease caused by each agent discussed.
- Apply knowledge of epidemiology from introductory level microbiology courses to determine parasites that may be etiologic agents of disease from different body sites.
- Discuss the major considerations in collection and handling of clinical specimens for parasitic processing and identification.
- Describe means of identification for each parasitic agent; correlate assays with immunology assays and clinical findings.
- List treatments and preventions of diseases of parasitic origin, and note if a vaccine is available for each agent discussed. List problems associated with parasitic treatments.
- Interpret case studies to identify disease and causative agent.

Cognitive Objectives/Mycology

- List several ways in which fungi may be classified
- Discuss methods for handling fungal isolates safely
- Discuss methods for detecting fungi in clinical specimens
- Describe techniques employed in the identification of fungi from clinical specimens including culture characteristics, microscopic features, biochemical tests, assimilation assays and probe techniques
- Correlate gross and microscopic findings for the fungi pathogenic to man
- Discuss the preparation of slide cultures and tease preparations for microscopic examination
- Recognize and name the various morphologic units of the medically important fungi
- Develop a differential diagnosis for the fungal infections based on clinical manifestation and sites of involvement
- Develop a differential diagnosis for the fungal infections based on direct examination results
- Discuss the epidemiology, transmission and disease manifestations of the various fungal diseases
- Develop a differential diagnosis for fungal infections based on epidemiological information
- Discuss the therapeutic modalities used for each fungal agent

**Cognitive Objectives/Virology**

- Discuss significant highlights in the history of virology
- Describe the morphologic and reproductive characteristics of viruses
- Identify the laboratory techniques used in the detection of viruses in clinical specimens or in identifying viral infections in vivo
- Identify viruses on the basis of cytopathic effects seen in a laboratory setting
- Identify viruses on the basis of cytopathic effects detected in direct patient specimens
- Associate viruses with the disease processes they cause
- Discuss the epidemiology, transmission, and disease manifestations of the various viral infections
- Develop a differential diagnosis for viral infections based on clinical symptoms and sites of involvement
- Develop an appropriate plan for the evaluation of clinical specimens for the presence of viruses
- Discuss therapeutic management of viral diseases

**Psychomotor Objectives**

- Perform microbiological analyses accurately in a simulated testing laboratory, using written laboratory procedures.
- Recognize and respond to abnormal results

**Affective Objective**

- By adhering to a quality assurance plan, demonstrate appreciation of the importance of accurate and timely microbiology testing and reporting on patient well-being.
APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR

1. Submitted by College of: Allied Health Professions      Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number: CLS 860               Proposed prefix & number: same
   (b) Present Title: Blood Collection I
       New Title: Blood Collection
   (c) If course title is changed and exceeds 24 characters (including spaces), include a sensible title (not to exceed 24
       characters) for use on transcripts:
   (d) Present credits: 1                                            Proposed credits: 1
   (e) Current lecture: laboratory ratio: 1:1            Proposed: 1:1
   (f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as:           NA
   Prefix and Number                         Signature: Department
   Chair

4. Proposed change in Bulletin description:
   (a) Present description (including prerequisite(s):
       Experience collecting venous blood specimens for laboratory testing. Students will receive
       instructions on proper procedures for phlebotomy and will practice on mannequin arms and each
       other prior to collecting blood from adult ambulatory and bed patients. Offered on a Pass/Fail
       basis only. Prereq: Admission to the Clinical Laboratory Sciences program or consent of
       instructor.
   (b) New description:
       The theory and practice of blood collection related to routine and special specimen collection for
       clinical laboratory testing. Particular emphasis is placed on quality assurance and safe practice
       issues associated with venipuncture and skin puncture. Students perform venipunctures on
       artificial arms, actual patients and fellow students. The course includes a mandatory clinical
       component.
       Experience collecting venous blood specimens for laboratory testing. Students will receive
       instructions on proper procedures for phlebotomy and will practice on mannequin arms and each
       other prior to collecting blood from adult ambulatory and bed patients; pediatric patients; and
       nursery patients. Offered on a Pass/Fail basis only.
   (c) Prerequisite(s) for course as changed:
       Admission into the Clinical Laboratory Sciences Professional Program, or consent of the
       instructor and completion of required immunizations.

5. What has prompted this proposal?
   This course change is part of an overall program change that more clearly defines the
   4th year of the program toward instruction for supervisory and management positions in
   clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course,
   indicate changes:
   Objectives of CLS 861 have been added to this course. See the revised list of objectives below.

7. What other departments could be affected by the proposed change? None

8. Will changing this course change the degree requirements in one or more programs?* X-Yes
    No
    If yes, please attach an explanation of the change.*
See Request for Change in Undergraduate Program Form

9. Is this course currently included in the University Studies Program? Yes X-No
   **If yes, please attach correspondence indicating concurrence of the University Studies Committee.**

10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.

   *NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.*
APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR AND MINOR PAGE 2 OF 2

11. Is this a minor change? Yes X-No
   (NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
   Name: Raymond Olesinski Phone Extension: 323-1100 ext 291

   Signatures of Approval:

   Department Chair Date
   Dean of the College Date
   Date of Notice to the Faculty
   **Undergraduate Council Date
   **Graduate Council Date
   **Academic Council for the Medical Center Date
   **Senate Council Date of Notice to University Senate
   **If applicable, as provided by the Rules of the University Senate.

   ACTION OTHER THAN APPROVAL

******
   The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
   a. change in number within the same hundred series;
   b. editorial change in description which does not imply change in content or emphasis;
   c. editorial change in title which does not imply change in content or emphasis;
   d. change in prerequisite which does not imply change in content or emphasis;
   e. cross-listing of courses under conditions set forth in item 3.0;
   f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 860: BLOOD COLLECTION

Following completion of this course, the student will be able:

At the end of this course the student should be able to (unless otherwise specified the standards of the National Committee for Clinical Laboratory Standards are applied to the following objectives):

Cognitive Objectives

- Define the basal state
- Explain how the pre-collection state of the patient can affect test results
- List the mechanisms in specimen collection and processing that can lead to alteration of the specimen
- Explain specimen collection and processing procedures that minimize specimen alteration
- List criteria for specimen rejection
- Explain the relationship of needle diameter to gauge
- Describe the nomenclature of needle sizing
- Associate the stopper color with additives contained in commonly used evacuated collection tubes
- Specify the maximum allowable time of tourniquet application, according to NCCLS standards, during a venipuncture
- Explain the potential effects on test results of extended tourniquet application
- Correctly describe the order of draw for evacuated collection tubes according to NCCLS standards
- Explain the proper procedure for preventing backflow
- Describe special procedures to be followed for collecting specimens for coagulation testing
- Explain the proper technique to chill a blood specimen
- Describe special considerations when collecting specimens for glucose testing
- Explain the procedures to be followed in when the initial puncture fails to enter the vein
- Describe the effects of probing
- Explain the procedure to be followed when collecting a specimen from a patient receiving intravenous fluids
- List laboratory procedures that require specimens to be protected from light
- Explain the steps to be followed if a patient becomes non-responsive during any phase of blood collection
- Explain specimen collection and processing procedures that minimize specimen alteration in special blood collection procedures
- List the steps involved in successful capillary blood collection
- Describe the effects of warming a skin puncture collection site
- Explain how to properly warm a skin puncture collection site
- Specify the maximum acceptable length of a lancet or similar skin puncture device
- Describe the effects of tissue fluid contamination on specimens collected by skin puncture
- Describe the effects of povidone iodine on skin puncture specimens
- Describe the effects of hemolysis on laboratory testing
- List causes of unintended hemolysis in skin puncture specimens
- Describe techniques to prevent unintended hemolysis in skin puncture specimens
- Explain the steps involved in collecting a blood culture
• List the most likely phlebotomy-related causes of false negatives and false positives associated with blood cultures
• Describe techniques to be used during the collection of a specimen from a patient with cold agglutinins
• Explain the procedures to be followed for proper collection of glucose specimens for
  a
  • Post-prandial collection
  • Glucose tolerance test
• Explain the steps to be followed to collect specimens for therapeutic drug monitoring
• Describe the special precautions to be taken when collecting a specimen for alcohol testing

Psychomotor Goals

• Collect peripheral blood specimens requiring multiple collection tubes from actual patients in routine phlebotomy situations using standard evacuated tube collection equipment with a minimum 90% success rate
• Apply phlebotomy techniques that result in minimal harm to the patient and phlebotomist
• Properly identify patients in different situations according to the standards of the National Committee for Clinical Laboratory Standards
• Prepare all necessary equipment and supplies required for a routine venipuncture
• Correctly match the specimen with the
  • Test to be performed
  • Proper evacuated collection tube
  • Properly identify a suitable vein for venipuncture
  • Properly cleanse the site of venipuncture
  • Properly perform a visual inspection of a needle prior to venipuncture
  • Properly enter a vein during venipuncture
  • Properly discontinue a venipuncture
  • Safely dispose of needles and/or other collection devices following venipuncture
  • Correctly label specimens
  • Properly ensure patient well-being following phlebotomy
• Correctly apply the quality assurance/quality control procedures that pertain to the collection of routine blood specimens using standard evacuated tube equipment
• Identify the appropriate site of skin puncture in the following
  • Newborn
  • Post 1-year old child
  • Adult
• Collect acceptable capillary blood specimens using standard puncture and microcollection devices. At least one successful single and multiple tube collection must be demonstrated in the student laboratory.
• Prepare all necessary equipment and supplies required for a routine skin puncture
• Properly identify a patient prior to skin puncture
• Correctly match the skin puncture specimen with the
  • Test to be performed
  • Proper skin puncture device
  • Proper skin puncture collection device
  • Properly identify a suitable site for skin puncture
  • Properly cleanse the site of skin puncture
  • Properly perform the skin puncture
  • Properly discontinue a skin puncture
• Safely dispose of skin puncture devices
• Properly ensure patient well-being following skin puncture
• Properly label skin puncture blood specimens

• Demonstrate proper blood collection technique using a syringe and winged infusion needle
• Apply skin puncture techniques that result in minimal harm to the Patient
• Phlebotomist
• Correctly apply the quality assurance/quality control procedures that pertain to the collection of blood specimens by special procedures
• Properly fill a series of evacuated collection tubes following venipuncture using a syringe
• Correctly apply the quality assurance/quality control procedures that pertain to the collection of blood specimens by capillary puncture
• Properly perform an Ivy bleeding time including
• Informing the patient of the procedure
• Identifying an appropriate puncture site
• Preparing the puncture site
• Applying the blood pressure cuff
• Inflating the blood pressure cuff
• Performing the puncture
• Timing the procedure
• Performing post-puncture patient care

Affective Goals

• Appreciate the importance of proper phlebotomy to the purpose of the clinical laboratory
• Appreciate the role of the phlebotomist in clinical laboratory practice
• Appreciate the differences in blood collection among a variety of clinical environments
APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR

1. Submitted by College of: Allied Health Professions     Date: Jan 12, 2001
Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number: CLS 881              Proposed prefix & number: same
   (b) Present Title: Advanced Immunohematology Practicum
       New Title: Immunohematology Practicum
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts: Immunohematology Prac
   (d) Present credits: 1-4                                          Proposed credits: 1-5
   (e) Current lecture: laboratory ratio: 0:1             Proposed: 0:1
   (f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as:           NA
Prefix and Number Signature: Department Chair

4. Proposed change in Bulletin description:
   (a) Present description (including prerequisite(s):
       A supervised clinical practicum in which the student reviews routine blood banking and is then exposed to advanced/specialized techniques in the area of immunohematology. These may include but not be limited to tissue typing and bone marrow/stem cell transplant technology. Offered on a Pass/Fail basis only. Laboratory, 35-40 hours per week. The number of credits will depend on the student's prior experience and interests. Prereq: CLS 880 or MLT/CLT certification.
   (b) New description:
       A supervised practicum in which the student integrates theory and practice of immunohematology in a clinical setting. Offered on a Pass/Fail basis only. Laboratory, 35-40 hours per week. The number of credits will depend on the student's prior experience.
   c) Prerequisite(s) for course as changed:
       Admission into the Clinical Laboratory Sciences Program and CLS 848 (may be taken concurrently)

5. What has prompted this proposal?
This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:
Additional objectives will be added to this course and deleted from CLS 880. Added objectives are starred in the attachment.

7. What other departments could be affected by the proposed change? None
8. Will changing this course change the degree requirements in one or more programs?*
   X-Yes   No
   **If yes, please attach an explanation of the change.**
   See Request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program?    Yes    X-No
   **If yes, please attach correspondence indicating concurrence of the University Studies Committee.**

10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.

*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change? Yes X-No
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
Name: Raymond Olesinski Phone Extension: 323-1100 ext 291

Signatures of Approval:
Department Chair Date
Dean of the College Date
Date of Notice to the Faculty
**Undergraduate Council Date
**Graduate Council Date
**Academic Council for the Medical Center Date
**Senate Council Date of Notice to University Senate
**If applicable, as provided by the Rules of the University Senate.

ACTION OTHER THAN APPROVAL

**********
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
a. change in number within the same hundred series;
b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 881:
IMMUNOHEMATOLOGY PRACTICUM

Following completion of this course, the student will be able:

*1. Perform independently proper pre-analytical phase procedures:
   a. Evaluate acceptability of specimen and request forms
   b. Access sample into laboratory using manual or computerized methods
   c. Perform records check for previous blood bank history
   d. Discuss with supervisor steps to take if specimen is unacceptable

*2. Perform routine ABO/Rh groupings and antibody screenings:
   a. Perform minimum of 15 independently
   b. Perform or discuss weak D independently
   c. Discuss with supervisor the different types of reagent antisera available (saline & IgM)
   d. Perform or discuss with supervisor Rh phenotyping

*3. Perform direct antiglobulin test:
   a. Perform minimum 5 independently using polyspecific anti-human globulin (AHG) and mono-specific AHG
   b. Perform or discuss with supervisor Rh phenotyping

*4. Perform crossmatch techniques:
   a. Type specific blood products (discuss with supervisor)
   b. Type compatible blood products (discuss with supervisor or perform if available)
   c. Emergency release (discuss with supervisor)

*5. Perform crossmatch procedure:
   a. Perform 10-15 independently
   b. Discuss incompatible crossmatch procedures with supervisor
   c. Calculate number of units to be screened to obtain antigen compatible blood

*6. Serum antibody identification:
   a. Perform and interpret single antibody determination (minimum 3)

*7. Type for other blood group antigens:
   a. Perform 5 independently if available

*8. Pre- and post-natal work-ups:
   a. Discuss principle of antibody titers, perform if available
   b. Discuss indications for pre-natal testing with supervisor
   c. Perform independently 5 ABO/Rh groupings on infants less than 4 months of age, if available
   d. Discuss with supervisor antibody screening on infants less than 4 months of age
   e. Discuss with supervisor selection of blood for infants less than 4 months of age (perform if available)

*9. Preparation of blood components for issue:
   a. Pooling of platelets, including labeling under supervision
   b. Thaw fresh frozen plasmas under supervision
   c. Prepare other blood components if available
   d. Issue blood and blood products for transfusion under supervision
   e. Perform clerical and visual check on blood or blood components under supervision

*10. Quality control:
a. Perform daily reagent quality control (minimum 5 under supervision)
b. Perform equipment/instrument quality control under supervision
c. Perform daily component inspection under supervision

11. ABO/Rh testing:
   a. Perform ABO discrepancy work-up

12. Serum antibody identification:
   a. Perform and interpret routine antibody panel (single panel/single antibody)
   b. Perform and interpret routine antibody panel (multiple antibody)
   c. Perform under supervision or discuss with supervisor absorptions of autoantibodies
   d. Utilize p values for antibody identification

13. Special procedures (perform if available or discuss with supervisor)
   a. Use of enzymes
   b. Selected RBC panels
   c. Identification of HTLA antibodies
   d. Identification of cold antibodies
   e. Pre-warm techniques
   f. Absorptions (both homologous or autologous)

14. Typing for other blood group antigens to obtain compatible blood
   a. Review institution policy and discuss rationale with supervisor
   b. Perform independently if available

15. Elution techniques:
   a. Policy on performing elution (discuss with supervisor)
   b. Elution techniques (Lui Freeze thaw, heat, commercial), perform if available

16. Special requests/needs (discuss with supervisor/perform if available)
   a. Irradiated, leuko-poor red cells, fresh blood, deglycerolized RBC, washed RBC
   b. Autologous/directed units
   c. Use of special filters: leukocyte removal microaggregate, component infusion set

17. Transfusion reaction work-up:
   a. Review institutional policy and discuss with supervisor
   b. Recognize symptoms of various transfusion reactions
   c. Perform a transfusion reaction work-up if available

18. Crossmatch procedure:
   a. Discuss incompatible crossmatch procedure
   b. Calculate number of units to be screened to obtain antigen compatible blood
   c. Issue blood and blood products for transfusions including clerical check and visual check

19. Infant testing (on cord blood or specimens from infants less than 4 months of age), discuss with supervisor/perform if available:
   a. Perform ABO/Rh typing and direct antiglobulin test independently
   b. Perform indirect antiglobulin test with A and B cells independently
   c. Exchange transfusions (discuss with supervisor)
   d. Correlate antibody titers with Hemolytic Disease of the Newborn
   e. Select blood products for transfusions to infants less than 4 months old

20. Quality assurance (discuss with supervisor):
   a. Review institutional policy, perform under supervision and discuss rationale with supervisor
   b. Supervisory review of records
   c. Competency evaluation and new employee orientation
d. Blood usage audits
e. Blood transfusion audits
f. CAP/AABB guidelines for accreditation
g. Perform mock CAP/AABB inspection, if available, otherwise discuss inspection criteria with supervisor
1. Submitted by College of: Allied Health Professions     Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number:  CLS 882              Proposed prefix & number: same
   (b) Present Title: Advanced Clinical Chemistry Practicum
       New Title:  Practicum in Clinical Chemistry
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts: Clin Chem Prac
   (d) Present credits: 1-4                                          Proposed credits: 1-5
   (e) Current lecture: laboratory ratio: 0:1               Proposed: 0:1
   (f) Effective Date of Change: (Semester & Year):  Fall, 2002

3. To be Cross-listed as:           NA
   Prefix and Number                         Signature: Department Chair

4. Proposed change in Bulletin description:
   (b) Present description (including prerequisite(s):
       A supervised clinical practicum in which the student is exposed to advanced/specialized techniques in the area of clinical chemistry. These may include but not be limited to toxicology methods, molecular biological methods and blood gas analysis. Offered on a Pass/Fail basis only. Laboratory, 35-40 hours per week. The number of credits will depend on the student's prior experience and interests. Prereq: CLS 880 or MLT/CLT certification.
   (b) New description:
       A supervised practicum in which the student integrates theory and practice of clinical chemistry in a health care setting. Offered on a Pass/Fail basis only. Laboratory, 35-40 hours per week. The number of credits will depend on the student's prior experience.
   (c) Prerequisite(s) for course as changed:
       Admission into the Clinical Laboratory Sciences Program and CLS 844 (may be taken concurrently)

5. What has prompted this proposal?
   This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:
   Additional objectives will be added to this course and deleted from CLS 880. Added objectives are starred in the attachment.

7. What other departments could be affected by the proposed change?  None

8. Will changing this course change the degree requirements in one or more programs?*
   X-Yes   No
   **If yes, please attach an explanation of the change.**
   See Request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program?   Yes   X-No
   **If yes, please attach correspondence indicating concurrence of the University Studies Committee.**

10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.
*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change? Yes X-No

(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
Name: Raymond Olesinski Phone Extension: 323-1100 ext 291

Signature of Approval:
Department Chair Date
Dean of the College Date
Date of Notice to the Faculty
**Undergraduate Council Date
**Graduate Council Date
**Academic Council for the Medical Center Date
**Senate Council Date of Notice to University Senate

**If applicable, as provided by the Rules of the University Senate.

ACTION OTHER THAN APPROVAL

**********
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
a. change in number within the same hundred series;
b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 882:
PRACTICUM IN CLINICAL CHEMISTRY

Following completion of this course, the student will be able:

*1. General:
   e. Demonstrate safe laboratory practices, universal precautions
   f. Review and explain MSDS sheets
   g. Process specimens accurately for analysis
   h. Process specimens for shipping to commercial/reference laboratories

*2. Perform analysis using an ion specific electrode/electrolyte-measuring device:
   e. Initiate daily start-up (organize workload)
   f. Calibrate instrument under supervision
   g. Perform trouble-shooting when necessary
   h. Perform routine preventive maintenance including reagent replacement
   i. Obtain and plot quality control results, if applicable
   j. Program requested tests and patient demographics, if applicable
   k. Demonstrate knowledge of the instrument principle of operation
   l. Recognize abnormal results and take proper steps according to laboratory policy

*3. Perform analyses using an automated discrete analyzer:
   c. Same sub-categories of functions as listed under #2

*4. Perform analyses using an automated blood gas analyzer:
   a. Same sub-categories of functions as listed under #2

*5. Perform analyses using an automated electrophoresis apparatus:
   a. Same sub-categories of functions as listed under #2

6. Observe or perform under supervision (if available):
   b. Analytical procedures for diagnosing fetal lung maturity
   c. Analytical procedures for diagnosing cystic fibrosis
   d. Screening procedures for inherited metabolic diseases

7. Observe or perform under supervision TDM analyses and discuss:
   a. Basic pharmacokinetics principles applied to therapeutic drug monitoring (TDM)
   b. The principles of analysis of a TDM instrument

8. Perform toxicological procedure including:
   f. Characterizing the difference between clinical drug screening and drugs of abuse screening
   g. Performing analyses of identification and quantitation of serum alcohols by gas chromatography
   h. Observing or performing under supervision urine drug screen analysis
   i. Discussing the principles and procedures of high performance liquid chromatography

9. Perform enzyme-linked immunoassay including:
   d. Reviewing and discussing regulations for handling radioactive isotopes and their disposal, if applicable
   e. Discussing principles of competitive protein binding
   f. Performing a competitive protein binding assay
   g. Performing two-site “sandwich” type assay
   h. Discussing the operational principles of a gamma counter
   i. Performing limited assay trouble-shooting when necessary

10. Perform nucleic acid analysis by polymerase chain reaction and hybridization procedures, if available.
APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR

1. Submitted by College of: Allied Health Professions    Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number: CLS 883          Proposed prefix & number: same
   (b) Present Title: Advanced Clinical Hematology Practicum
       New Title: Practicum in Clinical Hematology
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts: Clin Heme Prac
   (d) Present credits: 1-4          Proposed credits: 1-5
   (e) Current lecture: laboratory ratio: 0:1     Proposed: 0:1
   (f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as: NA
   Prefix and Number     Signature: Department Chair

4. Proposed change in Bulletin description:
   (c) Present description (including prerequisite(s):
       A supervised clinical practicum in which the student is exposed to advanced/specialized techniques in the area of clinical hematology. These may include but not be limited to flow cytometry, electron microscopy, and specialized techniques in body fluids and hemostasis. Offered on a Pass/Fail basis only. Laboratory, 35-40 hours per week. The number of credits will depend on the student's prior experience and interests.
       Prereq: CLS 880 or MLT/CLT certification.
   (b) New description:
       A supervised practicum in which the student integrates theory and practice of clinical hematology in a health care setting. Offered on a Pass/Fail basis only. Laboratory, 35-40 hours per week. The number of credits will depend on the student's prior experience.
   c) Prerequisite(s) for course as changed:
       Admission into the Clinical Laboratory Sciences Program and CLS 843 (may be taken concurrently)

5. What has prompted this proposal?
   This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:
   Additional objectives will be added to this course and deleted from CLS 880. Added objectives are starred in the attachment.

7. What other departments could be affected by the proposed change? None

8. Will changing this course change the degree requirements in one or more programs?*
   X-Yes    No
   If yes, please attach an explanation of the change.*
   See request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program?    Yes   X-No
   If yes, please attach correspondence indicating concurrence of the University Studies Committee.

10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.
*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change? Yes X-No
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
Name: Raymond Olesinski Phone Extension: 323-1100 ext 291

Signatures of Approval:
Department Chair Date
Dean of the College Date
Date of Notice to the Faculty
**Undergraduate Council Date
**Graduate Council Date
**Academic Council for the Medical Center Date
**Senate Council Date of Notice to University Senate

**If applicable, as provided by the Rules of the University Senate.

ACTION OTHER THAN APPROVAL

**********
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
a. change in number within the same hundred series;
b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 883:
PRACTICUM IN CLINICAL HEMATOLOGY

Following completion of this course, the student will be able:

*1. Process batches of routine specimens effectively:
   i. Accurately access specimens using manual or computerized methods
   j. Accurately transcribe and disseminate test results according to policies of the laboratory

*2. Accurately and reliably perform routine hematology procedures:
   m. Prepare acceptable blood films for manual differentials
   n. Automated blood film staining
   o. Reticulocytes counts
   p. Phase microscopy platelet counts
   q. Other hemacytometer counts
   r. Manual and/or automated erythrocyte sedimentation rates

*3. Accurately and reliably obtain results using an automated multiparameter hematology analyzer:
   d. Organize workstation and perform daily set-up procedures
   e. Perform daily quality control procedures
   f. Interpret daily quality control procedures
   g. Calibrate if necessary
   h. Test specimens
   i. Take necessary remedial action for unacceptable specimens
   j. Interpret results (cell counts, indices, RDW, histograms and scattergrams) relative to quality assurance and detection of specimen abnormalities
   k. Demonstrate knowledge of the principle of instrument operation

*4. Accurately and reliably perform leukocyte differentials for:
   a. Leukocytes and platelet count estimation
   b. Correlation of analyzer results with cell count estimates and morphology
   c. Routine differentials with normal RBC morphology
   d. Abnormal differentials
   e. Evaluate abnormal erythrocyte morphology
   f. Identify qualitative leukocyte abnormalities

*5. Accurately and reliably perform routine hemostasis procedures:
   a. Prothrombin time
   b. Activated partial thromboplastin
   c. Fibrinogen assay
   d. Fibrinogen split product determination
   e. D-dimer
   f. Bleeding time

*6. Perform routine preventive maintenance procedures on the following instruments:
   e. Automated blood film stainer
   f. Multiparameter analyzer
   g. Automated or semi-automated hemostasis analyzer

*7. Perform a complete (physical examination, “dipstick”, and microscopic examination) urinalysis and quality control procedures for urinalysis
*8. Perform further testing on urine as indicated by “dipstick” results according to the policies of the laboratory

*9. Differentiate calcium pyrophosphate and monosodium urate crystals using red compensated polarized light

*10. Perform beta-HCG test on urine according to written instructions and using the appropriate controls, as indicated by policies of the laboratory

*11. Perform macroscopic and microscopic assessment of cerebrospinal fluid, seminal fluid, and other body fluids.

*12. Report urinalysis results according to the policies and guidelines of the laboratory

*13. Properly utilize a computerized laboratory information system (specimen accession, label generation, result entry, data retrieval, etc)

*14. Perform related serological testing if available and discuss principles with supervisor for:
   a. flocculation test
   b. latex or red cell agglutination
   c. immunodiffusion tests
   d. enzyme immunoassay
   e. immunofluorescent tests
   f. hemagglutination/microhemagglutination tests
   g. complement fixation
   h. DNA probes
   i. Western blotting

*15. Discuss with supervisor treponemal versus non-treponemal tests including:
   a. false positive and false negative results
   b. specimen requirements
   c. correlation with clinical picture

*16. Discuss with supervisor testing for hepatitis virus including Hepatitis A, B, C and D:
   a. Antibody/antigen markers for active disease
   b. False positive and false negative results
   c. Test results and clinical outcome for Hepatitis A, B, C and D

*17. Discuss with supervisor testing for HIV (human immunodeficiency virus) including:
   a. false positive and false negative results
   b. screening tests versus confirmatory tests
   c. antigen versus antibody testing

*18. Quality control:
   a. Perform daily reagent quality control under supervision
   b. Perform equipment and instrument maintenance under supervision

*19. Quality assurance (discuss with supervisor):
   a. Supervisory review of records
   b. Competency evaluation
   c. CAP guidelines

20. Interpret daily quality control procedures for automated hematology systems and calibrate such an instrument if necessary

22. Observe the proper utilization and maintenance of a flow cytometer for reticulocyte counts and lymphocyte subset evaluations.

23. Observe at least two of the following special procedures in each of the following three categories:
   a. Tests for red cells:
      Hemoglobin electrophoresis
      Hb A\textsubscript{2} determination
      Hb F determination
      Sugar water test or Ham’s test for paroxysmal hemoglobinuria
      G6PD or other enzyme screen
      Any other specialized procedure used to diagnose anemia
   b. Leukocyte differentiation/cytochemistry
      Leukocyte alkaline phosphatase
      Any diagnostic stain used in leukemia differentiation (e.g. peroxidase, esterase, PAS, terminal deoxynucleotidal transferase [TdT] etc)
      Bone marrow aspiration and examination
      Any other specialized procedure to diagnose leukemia (e.g. Tdt)
      Electron microscopy
      Anti-nuclear, mitochondrial, smooth muscle and DNA antibodies
   c. Special hemostasis
      Platelet function tests (retention tests, aggregation tests)
      Factor substitution assay
      Factor activity level
      Ristocetin co-factor assay
      Reptilase time
      Procedures to detect and evaluate circulating inhibitors
      Any other specialized hemostasis procedure
APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR

1. Submitted by College of: Allied Health Professions Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number: CLS 884 Proposed prefix & number: same
   (b) Present Title: Advanced Clinical Microbiology Practicum
      New Title: Practicum in Clinical Microbiology
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts: Clin Micro Prac
   (d) Present credits: 1-4 Proposed credits: 1-5
   (e) Current lecture: laboratory ratio: 0:1 Proposed: 0:1
   (f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as: NA
   Prefix and Number Signature: Department Chair

4. Proposed change in Bulletin description:
   (d) Present description (including prerequisite(s): A supervised clinical practicum in which the student is exposed to advanced/specialized techniques in the area of clinical microbiology. These may include but not be limited to virology, parasitology, mycology and the use of probes to identify microorganisms. Offered on a Pass/Fail basis only. Laboratory, 35-40 hours per week. The number of credits will depend on the student's prior experience and interests. Prereq: CLS 880 and MLT/CLT certification.
   (b) New description: A supervised practicum in which the student integrates theory and practice of clinical microbiology in a health care setting. Offered on a Pass/Fail basis only. Laboratory, 35-40 hours per week. The number of credits will depend on the student's prior experience.
   (c) Prerequisite(s) for course as changed: Admission into the Clinical Laboratory Sciences Program and CLS 856 (may be taken concurrently)

5. What has prompted this proposal?
   This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:
   Additional objectives will be added to this course and deleted from CLS 880. Added objectives are starred in the attachment.

7. What other departments could be affected by the proposed change? None

8. Will changing this course change the degree requirements in one or more programs? X-Yes No
   If yes, please attach an explanation of the change.*
   See Request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program? Yes X-No
   If yes, please attach correspondence indicating concurrence of the University Studies Committee.

10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.
*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change? Yes X-No
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
Name: Raymond Olesinski Phone Extension: 323-1100 ext 291

Signatures of Approval:
Department Chair Date
Dean of the College Date
Date of Notice to the Faculty
**Undergraduate Council Date
**Graduate Council Date
**Academic Council for the Medical Center Date
**Senate Council Date of Notice to University Senate
**If applicable, as provided by the Rules of the University Senate.

ACTION OTHER THAN APPROVAL

*******
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
- change in number within the same hundred series;
- editorial change in description which does not imply change in content or emphasis;
- editorial change in title which does not imply change in content or emphasis;
- change in prerequisite which does not imply change in content or emphasis;
- cross-listing of courses under conditions set forth in item 3.0;
- correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 884:
PRACTICUM IN CLINICAL MICROBIOLOGY

Following completion of this course, the student will be able:

*1. Perform proper inoculation procedures independently:
   k. Check for appropriate specimen and identification
   l. Log in specimen properly
   m. Select appropriate media
   n. Label media/slides properly
   o. Transfer specimen aseptically
   p. Dispose of specimen properly
   q. Process and report smears appropriately
   r. Place in appropriate atmospheric conditions

*2. Perform identification procedures independently:
   s. Gram stain
   t. Catalase test
   u. Oxidase test
   v. Coagulation test/latex test or S. aureus identification system
   w. Wet mount
   x. Differential biochemical test/system

*3. Perform antimicrobial susceptibility tests:
   l. Antibiotic selection for testing
   m. Media inoculation
   n. Beta-lactamase testing
   o. MIC
   p. MBC, as available
   q. Kirby-Bauer, as available
   r. Selective reporting/recording results

4. Interpret culture and stain characteristics to detect normal flora/potential pathogens/contaminants from specimens of:
   a. Feces
   b. Urine
   c. Respiratory tract
   d. Wound and soft tissue
   e. Blood and other body fluids
   f. Genital tract

5. Examine specimens and identify parasites:
   a. Wet mount
   b. Concentration procedures
   c. Special procedures (e.g. Trichrome, Kinyoun acid fast, fluorescent stains)
   d. Serological identification

6. Perform procedures related to identification of fungi:
   h. Media selection
   i. Media inoculation
   j. Make and interpret slide cultures
   k. Wet mounts (e.g. India Ink, lactophenol cotton blue, KOH)
   l. Identify common yeasts and molds biochemically and morphologically
   m. Serological identification as applicable
n. Read and report results

7. Perform procedures related to acid-fast bacilli (Level III or IV laboratory as available):
   c. Concentration of specimen
   d. Smear
   e. Media selection and inoculation
   f. Read culture

8. Perform or observe testing for virology:
   j. Process specimens for reference laboratories
   k. CPE as available
   l. Serology as available

9. Perform procedures for bacteriology, mycobacteriology, parasitology, mycology and virology, if available.
   a. Identification of organisms based on nucleic acid probes and/or amplification tests
   b. Toxin assays
   c. GLC
   d. Additional special procedures
1. Submitted by College of: Allied Health Professions Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Changes proposed:
   (a) Present prefix & number: CLS 890 Proposed prefix & number: same
   (b) Present Title: Research in Clinical Laboratory Sciences
      New Title: Independent Laboratory Investigation
   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts: Lab Investigation
   (d) Present credits: 1-5 Proposed credits: 1-3
   (e) Current lecture: laboratory ratio: 1:1 Proposed: 1:0
   (f) Effective Date of Change: (Semester & Year): Fall, 2002

3. To be Cross-listed as: NA
   Prefix and Number Signature: Department Chair

4. Proposed change in Bulletin description:
   (a) Present description (including prerequisite(s)):
      Students will participate in defining and solving problems within the clinical laboratory. Students will apply the principles of research technique to identify, correlate and analyze problems arising from technical methods, disease correlation, or other pertinent problem areas in laboratory sciences. Students will use library sources, computer skills, and presentation skills in the pursuit of solutions to identified problems. Pre-requisite: CLS 839 and senior standing within the professional curriculum
   (b) New description:
      Students will demonstrate knowledge and expertise in CLS through interpretation and integration of CLS issues. Student will analyze laboratory data through patient-focused scenarios and integrate information from multiple laboratory reports for the patient care management. Students will apply the principles of research technique to analyze problems arising from technical methods, disease correlation, or other pertinent problem areas in laboratory sciences and will use library sources, computer skills, and presentation skills in the pursuit of solutions to identified problems. Requirements of the CLS program for CLS 890: total of 3 credit hours.
      c) Prerequisite(s) for course as changed: admission into the clinical laboratory sciences program and STA 291 or equivalent

5. What has prompted this proposal?
   This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:
   Problem-solving exercises have been substituted for laboratory research.

7. What other departments could be affected by the proposed change? None

8. Will changing this course change the degree requirements in one or more programs?*
   X-Yes No
   If yes, please attach an explanation of the change.*
   See Request for Change in Undergraduate Program

9. Is this course currently included in the University Studies Program? Yes X-No
   If yes, please attach correspondence indicating concurrence of the University Studies Committee.
10. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted. *NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.
11. Is this a minor change? Yes X-No
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

12. Within the Department, who should be consulted for further information on the proposed course change?
Name: Jean Brickell Phone Extension: 1-800-851-7512 ext 263

**Signatures of Approval:**

Department Chair Date

Dean of the College Date

Date of Notice to the Faculty

**Undergraduate Council Date
**Graduate Council Date

**Academic Council for the Medical Center Date

**Senate Council Date of Notice to University Senate

**If applicable, as provided by the Rules of the University Senate.

ACTION OTHER THAN APPROVAL

*******
The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:
a. change in number within the same hundred series;
b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Rev 11/98
OBJECTIVES FOR CLS 890:
INDEPENDENT LABORATORY INVESTIGATION

Following completion of this course, the student will be able:

1. Discuss the development, establishment, oversight, and performance of the pre-analytical, analytical, and post-analytical phases of testing on body fluids, cells and other specimens.

2. Demonstrate statistical analysis of data for use in laboratory epidemiology, examining the relationships of tests to treatment decisions, and to health care outcomes.

3. Establish and use quality assurance and performance measurements to develop solutions to problems and to assure the validity and accuracy of information concerning laboratory data, generated both within and external to the laboratory.

4. Discuss utilization of the results of laboratory diagnostic procedures and employ algorithms to achieve optimal, full value patient outcomes.

5. Use library sources, computer skills, and other research techniques in the pursuit of solutions to identified problems in CLS issues.

6. Communicate findings of CLS integrative analysis by oral and written presentation for problems arising from technical methods, disease correlation, or other pertinent problem areas in laboratory sciences.

APPLICATION TO DROP A COURSE
1. Submitted by College of: Allied Health Professions Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Prefix and Number: CLS 845 Title: Clinical Immunology and Serology I Credits: 3

3. Effective Date (semester & year): Fall, 2002

4. Why is the course to be dropped?
   This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

5. Will dropping this course change the degree requirements in one or more programs?*
   X-Yes No
   If yes, explain the change(s) below
   This course will no longer be required for the Bachelor of Health Science degree in Clinical Laboratory Sciences. The objectives for this course will be added to the required objectives of CLS 835 & 833.

6. Has the course been taken by a significant number of students in other departments/colleges? Yes X-No
   a. If yes, list the college(s) or department(s) from which student enrollment in this course has come, if known.
   b. What provision has been made for meeting the needs of these students?

7. Is this course in current use in any of the Community Colleges? Yes X-No
   If so, please submit evidence (e.g., correspondence) that the Community College System has been consulted.

8. Is this course currently included in the University Studies Program? Yes X-No

9. Within the Department, who should be contacted for further information about this proposal?
   Name: Jean Brickell Phone Extension: 1-800-851-7512 ext 263

*NOTE: Approval to drop the course will constitute approval of the program change unless additional modifications are proposed.
**Signatures of Approval:**

<table>
<thead>
<tr>
<th>Position</th>
<th>Date</th>
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<tbody>
<tr>
<td>Department Chair</td>
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<td>Senate Council</td>
<td>Date of Notice to University Senate</td>
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*If applicable, as provided by the Rules of the University Senate*

**ACTION OTHER THAN APPROVAL**
1. Submitted by College of: Allied Health Professions    Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Prefix and Number: CLS 855   Title: Clinical Immunology and Serology II    Credits: 3

3. Effective Date (semester & year): Fall, 2002

4. Why is the course to be dropped?
   This course change is part of an overall program change that more clearly defines the
   4th year of the program toward instruction for supervisory and management positions in
   clinical health care settings.

5. Will dropping this course change the degree requirements in one or more programs?*
   X-Yes   No
   If yes, explain the change(s) below
   This course will no longer be required for the Bachelor of Health Science degree in
   Clinical Laboratory Sciences. The objectives for this course will be added to the
   required objectives of CLS 835 & 833.

6. Has the course been taken by a significant number of students in other
   departments/colleges?   Yes  X-No
   c. If yes, list the college(s) or department(s) from which student enrollment in this
      course has come, if known.
   d. What provision has been made for meeting the needs of these students?

7. Is this course in current use in any of the Community Colleges?    Yes   X-No
   If so, please submit evidence (e.g., correspondence) that the Community College System
   has been consulted.

8. Is this course currently included in the University Studies Program?    Yes   X-No

9. Within the Department, who should be contacted for further information about this
   proposal?
   Name: Jean Brickell    Phone Extension: 1-800-851-7512 ext 263

   *NOTE: Approval to drop the course will constitute approval of the program change
   unless additional modifications are proposed.
Signatures of Approval:

Department Chair                                      Date
Dean of the College                                    Date
Date of Notice to the Faculty
*Undergraduate Council                                Date
*University Studies                                    Date
*Graduate Council                                     Date
Academic Council for the Medical Center                Date
Senate Council                                         Date of Notice to University Senate

*If applicable, as provided by the Rules of the University Senate

ACTION OTHER THAN APPROVAL

Rev 11/98
1. Submitted by College of: Allied Health Professions  
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences  
   Date: Jan 12, 2001
2. Prefix and Number: CLS 861  
   Title: Blood Collection II  
   Credits: 1
3. Effective Date (semester & year): Fall, 2002
4. Why is the course to be dropped?  
   This course change is part of an overall program change that more clearly defines the  
   4th year of the program toward instruction for supervisory and management positions in  
   clinical health care settings.
5. Will dropping this course change the degree requirements in one or more programs?*  
   X-Yes  No
   If yes, explain the change(s) below
   This course will no longer be required for the Bachelor of Health Science degree in  
   Clinical Laboratory Sciences. The objectives for this course will be completed in CLS  
   860.
6. Has the course been taken by a significant number of students in other  
   departments/colleges? Yes  X-No  
   e. If yes, list the college(s) or department(s) from which student enrollment in this  
      course has come, if known.
   f. What provision has been made for meeting the needs of these students?
7. Is this course in current use in any of the Community Colleges? Yes  X-No  
   If so, please submit evidence (e.g., correspondence) that the Community College System  
   has been consulted.
8. Is this course currently included in the University Studies Program? Yes  X-No
9. Within the Department, who should be contacted for further information about this  
   proposal?  
   Name: Raymond Olesinski  
   Phone Extension: 323-1100 ext 291

*NOTE: Approval to drop the course will constitute approval of the program change  
unless additional modifications are proposed.
Signatures of Approval:

Department Chair  
Date

Dean of the College  
Date

Date of Notice to the Faculty

*Undergraduate Council  
Date

*University Studies  
Date

*Graduate Council  
Date

Academic Council for the Medical Center  
Date

Senate Council  
Date of Notice to University Senate

*If applicable, as provided by the Rules of the University Senate

ACTION OTHER THAN APPROVAL

Rev 11/98
1. Submitted by College of: Allied Health Professions  Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Prefix and Number: CLS 867  Title: Educational Principles in CLS  Credits: 1

3. Effective Date (semester & year): Fall, 2002

4. Why is the course to be dropped?
   This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

5. Will dropping this course change the degree requirements in one or more programs?*
   X-Yes  No
   If yes, explain the change(s) below
   This course will no longer be required for the Bachelor of Health Science degree in Clinical Laboratory Sciences. The objectives for this course will be added to the required objectives of CLS 836.

6. Has the course been taken by a significant number of students in other departments/colleges? Yes  X-No
   g. If yes, list the college(s) or department(s) from which student enrollment in this course has come, if known.
   h. What provision has been made for meeting the needs of these students?

7. Is this course in current use in any of the Community Colleges? Yes  X-No
   If so, please submit evidence (e.g., correspondence) that the Community College System has been consulted.

8. Is this course currently included in the University Studies Program? Yes  X-No

9. Within the Department, who should be contacted for further information about this proposal?
   Name: Raymond Olesinski  Phone Extension: 323-1100 ext 291

   *NOTE: Approval to drop the course will constitute approval of the program change unless additional modifications are proposed.
Signatures of Approval:

Department Chair  Date

Dean of the College  Date

Date of Notice to the Faculty

*Undergraduate Council  Date

*University Studies  Date

*Graduate Council  Date

Academic Council for the Medical Center  Date

Senate Council  Date of Notice to University Senate

*If applicable, as provided by the Rules of the University Senate

ACTION OTHER THAN APPROVAL

Rev 11/98
1. Submitted by College of: Allied Health Professions       Date: Jan 12, 2001
   Department/Division offering course: Clinical Sciences/Clinical Laboratory Sciences

2. Prefix and Number: CLS 880   Title: Clinical Practicum in Clinical Laboratory Sciences   Credits: 8

3. Effective Date (semester & year): Fall, 2002

4. Why is the course to be dropped?
   This course change is part of an overall program change that more clearly defines the 4th year of the program toward instruction for supervisory and management positions in clinical health care settings.

5. Will dropping this course change the degree requirements in one or more programs?*
   X-Yes   No
   If yes, explain the change(s) below
   This course will no longer be required for the Bachelor of Health Science degree in Clinical Laboratory Sciences. The objectives for this course will be added to the required objectives of CLS 881, 882, 883, and 884.

6. Has the course been taken by a significant number of students in other departments/colleges?  Yes   X-No
   i. If yes, list the college(s) or department(s) from which student enrollment in this course has come, if known.
   j. What provision has been made for meeting the needs of these students?

7. Is this course in current use in any of the Community Colleges?   Yes   X-No
   If so, please submit evidence (e.g., correspondence) that the Community College System has been consulted.

8. Is this course currently included in the University Studies Program?   Yes   X-No

9. Within the Department, who should be contacted for further information about this proposal?
   Name: Jean Brickell       Phone Extension: 1-800-851-7512 ext 263

*NOTE: Approval to drop the course will constitute approval of the program change unless additional modifications are proposed.
APPLICATION TO DROP A COURSE PAGE 2 of 2

Signatures of Approval:

Department Chair                               Date
Dean of the College                             Date
Date of Notice to the Faculty
*Undergraduate Council                        Date
*University Studies                            Date
*Graduate Council                              Date
Academic Council for the Medical Center        Date
Senate Council                                 Date of Notice to University Senate

*If applicable, as provided by the Rules of the University Senate

ACTION OTHER THAN APPROVAL

Rev 11/98
University of Kentucky Center for Rural Health
Clinical Lab Science Counties of Practice

*Out of State Counties Include: Vanderburgh, IN
Davidson, OH

Fiscal Year 2001