

**APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR**

1 Submitted by College of Lexington Community College Date 10-10-03

Department/Division offering course

Nuclear Medicine Technology / Natural Science & Health Technologies

2. Changes proposed:

(a) Present prefix and number NMT 150 Proposed prefix and number No change

(b) Present Title Nuclear Medicine Technology II

New Title No change

(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:

No change

(d) Present credits: 5 Proposed credits: 6

(e) Current lecture:laboratory ratio 1:6 Proposed: No change

(f) Effective Date of Change: (Semester & Year) Spring 2005

3. To be Cross-listed as NA NA  
(Prefix and Number) (Signature: Dept. Chair)

4. Proposed change in Bulletin description:

(a) Present description (including prerequisite(s):

NMT 150 Nuclear Medicine Technology II (5)

Nuclear Medicine instrumentation, quality control, radiation safety, and radionuclide imaging procedures of the central nervous system, gastrointestinal system, and genitourinary system are studied. Lecture: 3 hours, laboratory: 12 hours. Prerequisite: NMT 140 and computer literacy course; concurrent: CHE 106 and PH 172.

(b) New description:

NMT 150 Nuclear Medicine Technology II (6)

Nuclear Medicine instrumentation and quality control procedures, clinical applications of computers, and radionuclide cardiovascular and pulmonary system imaging procedures are studied. Lecture: 4 hours, clinic: 12 hours.

(c) Prerequisite(s) for course as changed: NMT 140; concurrent: CHE 106.

5. What has prompted this proposal?

There are three major reasons for revising the NMT curriculum. (1) The last revision of this curriculum was implemented in 1995. (2) The Academic Committee of the Society of Nuclear Medicine Technologist Section published a revised Curriculum Guide in early 2003 to assist programs to update curriculum content. (3) The Nuclear Medicine Technology Certification Board has published revised competencies and will finish a revision of the examination matrix in 2004.

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

With the increased clinical utilization of positron emission tomography (PET) in the past five years and with nuclear medicine technologists being the major pool of candidates for PET imaging jobs, both the Curriculum Guide and the competencies of the NMTCB now require an elementary knowledge base of instrumentation and quality control, new and specific radiopharmaceuticals, and patient procedures. This will substantially increase the amount of time spent on nuclear medicine instrumentation in this course.

Some topics of radiation safety/protection will be moved from this course to the first course as part of the orientation to the clinical setting and the remainder of the topics dealing with mainly regulatory issues will be moved to the last NMT course.

Current:

Upon completion of this course, the student can:

- A. describe and demonstrate both nonimaging and imaging radiation detectors, their applications, functions, and limitations;
- B. explain and apply quality control procedures for clinical equipment;
- C. describe and perform the application of computers in clinical data acquisition and presentation;
- D. demonstrate the attitudes and techniques consistent with radiation safety requirements for working with and handling radioactive materials; and
- E. perform radionuclide imaging procedures related to the central nervous system, gastrointestinal system, and genitourinary system under the supervision of a nuclear medicine technologist.

Proposed:

Upon completion of this course, the student can:

- A. describe and demonstrate the use of both non-imaging and imaging radiation detectors, their applications, functions, and limitations;
- B. explain and apply quality control procedures for clinical equipment;
- C. describe and perform the application of computers in clinical data acquisition and presentation;
- D. demonstrate the attitudes and techniques consistent with radiation safety requirements for working with and handling radioactive materials;
- E. perform radionuclide imaging procedures related to the cardiovascular system under the supervision of a nuclear medicine technologist; and
- F. perform radionuclide imaging procedures related to the pulmonary system under the supervision of a nuclear medicine technologist.

7. What other departments could be affected by the proposed change?

Nuclear Medicine Technology (NMT) has no dedicated classroom space in the college. Physics lab space (OB 331) and PHY lecture space (OB 319) are also used by NMT courses. The addition of 1 credit hour of lecture to 4 of the 5 NMT courses has the potential to overlap with PHY lecture and lab space. After contacting the Division Chair of the Physical Sciences and Engineering Technology Division and the Physics Area Coordinator, it appears that class room space will be available for

additional NMT lecture assuming the PHY schedule of classes remains the same as 2002-2003. This will be addressed annually as Division Chairs schedule classroom space.

8. Will changing this course change the degree requirements in one or more programs?  
 No  Yes (If yes, attach an explanation of the change.)\*
9. Is this course currently included in the University Studies Program?  No  Yes (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.

This course change has been forwarded to Aloris Owens, Nuclear Medicine Technology program coordinator, Jefferson Community College, and Dr. Carolyn O'Daniel, Executive Director for Academic Affairs at KCTCS. (see attached)

11. Is this a minor change?  No  Yes (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: Charles H Coulston, NMT Program Coordinator Phone Extension: 257-4872 x 4099

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 Med. Ctr: \_\_\_\_\_ Date: \_\_\_\_\_

\*\*Senate Council: \_\_\_\_\_ Date of Notice to Univ. Senate: \_\_\_\_\_

ACTION OTHER THAN APPROVAL: \_\_\_\_\_

\*NOTE: Approval of this change will constitute approval of the program change unless other program modifications are proposed.

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

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. crosslisting of courses under conditions set forth in item 3.0;
- f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

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**Additional Information on CCS Forms**

1 Course Outline: (Two-level outline required)

***Current Course Outline***

Instrumentation: Nonimaging

- A. Introduction
- B. Gas-filled Detector Systems
- C. Scintillation Detection Systems
- D. Counting Statistics

II. Instrumentation: Imaging

- A. Scintillation Camera (Planar Imaging)
- B. Multicrystal Scintillation Cameras
- C. Tomographic Systems

III. Quality Assurance / Quality Control

- A. Introduction
- B. Instrument Quality Control (Nonimaging)
- C. Instrument Quality Control (Imaging Equipment)

IV. Instrumentation: Computers

- A. Types of Computers
- B. Number Systems
- C. General Structure of Computer Hardware
- D. Software
- E. The Nuclear Medicine Computer System

V. Radiation Safety

- A. Introduction
- B. Units of Radiation Protection
- C. MPD Limits / Recommendations
- D. Radiation Safety Devices and Instrumentation
- E. Personnel Monitoring
- F. Practical Methods of Radiation Protection
- G. Licensing
- H. NRC Rules and Regulations
- I. Radioactive Material Packages
- J. Surveys
- K. Decontamination
- L. Waste Disposal
- M. Radiopharmaceutical Therapy

VI. Central Nervous, Gastrointestinal, and Genitourinary Imaging Procedures

- A. Indication for Study
- B. Radiopharmaceutical
- C. Contraindications / Adverse Reactions
- D. Patient Preparation

- E. Equipment
- F. Procedure
- G. Alterations to / Interventions in the Procedure
- H. Scan Patterns (Image Analysis)

***Proposed Course Outline***

- I. Instrumentation: Non-imaging
  - A. Introduction
  - B. Gas-filled Detectors
  - C. Scintillation Detection Systems
  - D. Counting Statistics
  - E. Nuclear Counting Statistics
  - F. Laboratory Equipment
  
- II. Instrumentation: Imaging
  - A. Planar Scintillation Cameras
  - B. Multicrystal Scintillation Cameras
  - C. Solid-state Detector Systems
  - D. Single Photon Emission Computed Tomography (SPECT) Systems
  - E. Positron Emission Tomography (PET) Systems
  - F. Quality Control of Imaging Systems
  - G. Care and Maintenance of Film and Film Processors
  
- III. Instrumentation: Computers
  - A. Types of Computers
  - B. Number Systems
  - C. General Structure of Computer Hardware
  - D. Software
  - E. Communications
  - F. Data Management
  - G. Internet
  - H. Nuclear Medicine Computer Systems
  - I. Quality Control
  
- IV. Cardiovascular Imaging
  - A. Review of Anatomy & Physiology
  - B. Pathology
  - C. Cardiac Stress Testing Methods
  - D. Myocardial Perfusion / Viability, Planar, SPECT and Gated SPECT
  - E. Equilibrium Radionuclide Angiography (MUGA or RVG), Rest, Stress and SPECT
  - F. First-pass Angiography
  - G. Major Vessel Flow Study
  - H. Deep Vein Thrombosis Detection and Venography
  - I. Cardiac Shunt
  
- V. Pulmonary / Respiratory System Imaging
  - A. Review of Anatomy & Physiology
  - B. Pathology
  - C. Pulmonary Perfusion Imaging
  - D. Radiogas Ventilation Studies
  - E. Aerosol Ventilation Studies
  - F. Ventilation / Perfusion Imaging
  - G. Pulmonary Aspiration

2. List of Experiments/Activities: (If laboratory or clinic is involved)

**Current Clinical Activities**

The student will:

- A. perform procedures for accuracy, constancy, geometric variation, and linearity for the dose calibrator as available;
- B. perform quality assurance procedures and radiation counting activities utilizing a scintillation detector as available;
- C. perform uniformity and resolution evaluations for scintillation imaging equipment;
- D. demonstrate the use of computers related to diagnostic patient procedures;
- E. perform constancy, area surveys, and appropriate monitoring activities utilizing the Geiger-Müller detector; and
- F. assist the nuclear medicine technologist with central nervous system, gastrointestinal system, and genitourinary system radionuclide imaging procedures as well as to perform procedures under the direct supervision of the technologist.

**Proposed Clinical Activities**

The student will:

- A. perform quality control procedures for accuracy, constancy, geometric variation, and linearity on the dose calibrator as available;
- B. perform quality control procedures and radiation counting activities utilizing a scintillation detector as available;
- C. perform uniformity and resolution evaluations for planar, SPECT and PET scintillation imaging equipment;
- D. demonstrate the use of computers related to diagnostic patient procedures;
- E. perform constancy, area surveys, and appropriate monitoring activities utilizing the Geiger-Müller detector;
- F. evaluate quality control data from clinical nuclear medicine instrumentation and procedures to assess quality of function; and
- G. assist the nuclear medicine technologist with cardiovascular and pulmonary system radionuclide imaging procedures as well as to perform procedures under the direct supervision of the technologist.

3. Changes in Suggested Learning Resources:

Bernier, Donald R., Paul E. Christian, James K. Langan. *Nuclear Medicine: Technology and Techniques*, 4<sup>th</sup> ed. St Louis MO: Mosby-Year Book, Inc., 1997.

Chandra, Ramesh. *Nuclear Medicine Physics: The Basics*, 5<sup>th</sup> ed. Baltimore, MD: Williams & Wilkins, 1998.

Early, Paul J. and, D. Bruce Sodee. *Principles and Practice of Nuclear Medicine*, 2<sup>nd</sup> ed. St Louis MO: Mosby-Year Book, Inc., 1995.

English, Robert J. *SPECT Single-Photon Emission Computed Tomography: A Primer*. Reston VA: The Society of Nuclear Medicine, 1995.

Harkness, Beth, Paul Christian, Katherine L. Rowell. *Clinical Computers in Nuclear Medicine*. New York, NY: The Society of Nuclear Medicine - Technologist Section, 1992.

Lee, Kai. *Computers in Nuclear Medicine: A Practical Approach*. New York, NY: The Society of Nuclear Medicine, 1991.

Lombardi, Max H. *Radiation Safety in Nuclear Medicine*. Boca Raton FL: CRC Press, 1999.

Mettler, Fred A., Jr. and Milton J. Guiberteau. *Essentials of Nuclear Medicine Imaging*, 4<sup>th</sup> ed. Philadelphia, PA: W.B. Saunders Company, 1998.

Saha, Gopal B. *Fundamentals of Nuclear Pharmacy*, 4<sup>th</sup> ed. New York, NY: Springer, 1998.

Tortorici, Marianne. *Administration of Imaging Pharmaceuticals*. Philadelphia, PA: W.B. Sanders Company, 1996.

The Journal of Nuclear Medicine. Reston, VA: The Society of Nuclear Medicine, Inc.

*The Journal of Nuclear Medicine Technology*. Reston, VA: The Society of Nuclear Medicine, Inc.

4. Impact of Change on Enrollment:

No impact is expected.

5. For Inclusion on LCC General Education List: Not applicable

- A. Degree Area (AA/AS or AAS or both)
- B. Competency Area
- C. General Education Competency Statement (List and provide examples of implementation methods/activities)
- D. Across the Curriculum Competencies (List and provide examples of implementation methods/activities)

6. For Removal from General Education List: Not applicable

- A. Competency Area
- B. Rationale

7. For Inclusion on University Studies List: (A syllabus must be attached.) Not applicable

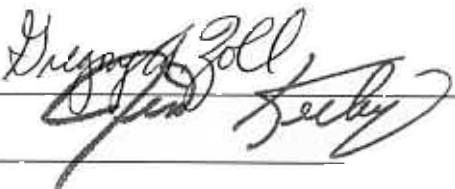
- A. Area
- B. Course Competencies
- C. Description of Writing Component

If a course has not been revised during the last five (5) years, the major change route must be used.



Signatures of Approval:

Department Chair: \_\_\_\_\_  
Dean of the College: \_\_\_\_\_



Date: 10-17-03

Date: 10-21-03

Date of Notice to the Faculty: \_\_\_\_\_

\*\*Undergraduate Council: \_\_\_\_\_

Date: \_\_\_\_\_

\*\*Graduate Council: \_\_\_\_\_

Date: \_\_\_\_\_

\*\*Academic Council for the Med. Ctr: \_\_\_\_\_

Date: \_\_\_\_\_

\*\*Senate Council: \_\_\_\_\_ Date of Notice to Univ. Senate: \_\_\_\_\_

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