



Pharmaco nuclear inc.

100 NORTH EUCLID AVENUE • SUITE 900
ST. LOUIS, MISSOURI 63108
(314) 367-9300

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0572

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March 27, 1981

Re; Control No. 06422

U.S. NUCLEAR REG.
COMM. DIV.
MAIL SECTION

Mr. Joseph Del Medico
Materials Licensing Branch
Division of Fuel Cycle and Material Safety
United States Nuclear Regulatory Commission
Washington, D.C. 20555

24-16617-01MD

03011339

Dear Mr. Del Medico:

Our letter of January 15, 1981 requested Lic. No. 24-19360-01MD to be amended by adding Frank M. Comer and Michael J. Clements to this license as authorized users. Your letter of Feb. 11, 1981 indicated that we want to amend Lic. No. 24-16617-01MD. Please note this is not correct.

The enclosed information is presented in support of Michael J. Clements' qualifications and in answer to your questions presented in your letter of Feb. 11, 1981.

We were informed by the administrative personnel of Belleville Area College that they were unwilling to release an indepth description of courses since this information could allow an individual to plagiarize this information for his benefit and personal gain. However, they did supply a catalog summary description of these courses which are enclosed.

Also enclosed is a letter of recommendation and copies of the transcript from Belleville Area College.

In addition enclosed is an outline of the course that Mr. Clements presented when he taught at Centreville Township Hospital and Belleville Area College. He had incorporated in this course acquired academic knowledge and on hands experience in Nuclear Medicine. This course is detailed and should support the fact that Mr. Clements has the expertise and training in Nuclear Medicine to qualify him as a user on our license.

We would like to reiterate, NRC License No. 24-19360-01MD is to be amended.

Your consideration of these requests is appreciated.

William C. McHugh
William C. McHugh, Ph.D.
Manager

Enclosures

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All

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PITTSBURGH • CLEVELAND • KANSAS CITY • ST. LOUIS

Belleville Area College

2500 CARLYLE ROAD
BELLEVILLE, ILLINOIS 62221

0572

March 13, 1981

TO WHOM IT MAY CONCERN:

RE: Michael Clements

Michael Clements enrolled in the Radiologic Technology program at Belleville Area College in 1970, graduated in 1972, and became certified in radiography in 1972. Michael was an excellent student, advanced quickly and was made clinical instructor at Centreville Township Hospital under my direction in 1972-74.

Michael's prime interest was in nuclear medicine, which he pursued and became certified in, doing an excellent job at both Centreville Township Hospital and St. Mary's Hospital in East St. Louis. He taught the nuclear medicine section of the Radiologic Technology program from 1975 thru 1979. He was an excellent teacher with a profound interest in nuclear medicine technology.

I am sure you will find that Mr. Clements will be an asset to your company, as he was to Belleville Area College.

If I can be of any further assistance, please feel free to call on me.

Sincerely,

B. R. Vallino

B. R. Vallino, RT, FASRT
Coordinator
Radiologic Technology

BRV:ml
Enc: R.T. Program
curriculum

DELEVILLE AREA COUNCILOR - 1964-1965

NAME OF PARENT¹

| | | | | | |
|--------------------|---------|--------------|---------|------------------|---------|
| DATE OF GRADUATION | 6/10/66 | GRADE AVG | 1.86206 | RANK IN CLASS | 585/821 |
|--------------------|---------|--------------|---------|------------------|---------|

| | | | |
|--------------|---------|------------------|---------|
| GRADE AVE | 1.86206 | RANK IN CLASS | 585/821 |
|--------------|---------|------------------|---------|

GRADE and POINT SYSTEM

| | |
|--------------|----------|
| A - SUPERIOR | 4 POINTS |
| B - GOOD | 3 POINTS |
| C - FAIR | 2 POINTS |
| D - POOR | 1 POINT |
| E - FAILURE | 0 POINTS |

WP - WITHDRAWN PASSING
WF - WITHDRAWN FAILING
WX - WITHDRAWN BEFORE
QUALITY OF WORK WAS
DETERMINED

| | |
|-----|--------------|
| AUD | AUDIT |
| P | PASSED |
| W | WITHDRAWN |
| INC | INC COMPLETE |

| | | | |
|-----|------|---------------|---------|
| SEX | MALE | DATE OF BIRTH | 9/20/48 |
|-----|------|---------------|---------|

PLACE OF BIRTH EAST ST. LOUIS, IL

DATE ENTERED: SEPTEMBER 1966

PROGRAM

DATE OF GRADUATION: JUNE 2, 1972

DEGREE ASSOCIATE IN APPLIED SCIENCE

| | | | |
|--------------|------|------------------|---------|
| GRADE AVE | 2.66 | RANK IN CLASS | 200/380 |
|--------------|------|------------------|---------|

Passed. U.S. and Illinois
Constitution Test, Section
27-3 School Code of Ill.

IN GOOD STANDINGS UNLESS OTHERWISE STATED

INSTITUTIONAL COPY

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Central Association of Colleges
and Secondary Schools

Date _____

Registrar

第 10 章 数据库

FILED #2

 NAME CLEMENTS, MICHAEL JOHN
 ADDRESS 4) 1005 CAROLINE ST
 BELLEVILLE IL

 SOC SEC NO 341-42-3518
 SEX MALE
 DATE OF BIRTH 9/20/48
 PLACE OF BIRTH EAST ST LOUIS IL
 DATE ENTERED SEPTEMBER 1966

NAME OF PARENT

 HIGH SCHOOL AND ADDRESS BELLEVILLE TWSP. HIGH, BELLEVILLE, IL.
 DATE OF GRADUATION 5/10/66 GRADE AVE 1.86206 RANK IN CLASS 585/821

 PROGRAM
 DATE OF GRADUATION JUNE 2, 1972
 DEGREE ASSOCIATE IN APPLIED SCIENCE
 GRADE AVE 2.66 RANK IN CLASS 200 / 380

 A - SUPERIOR 4 POINTS
 B - GOOD 3 POINTS
 C - FAIR 2 POINTS
 D - POOR 1 POINT
 F - FAILURE 0 POINTS

 WP - WITHDRAWN PASSING
 WF - WITHDRAWN FAILING
 WX - WITHDRAWN BEFORE
 QUALITY OF WORK WAS
 DETERMINED

 AUD P AUDIT
 PASSED
 WITHDRAWN
 INCOMPLETE

| SEMESTER | DEPT. | COURSE NO. | DESCRIPTIVE TITLE | SEM. HRS. | GRADE | Dept. | Course No. | Course Description | Sem Hrs | Grade |
|-------------|-------|------------|--------------------|-----------|-------|-------|------------|--------------------|---------|-------|
| FALL 1973 | | | | | | | | | | |
| | BUS | 101 | INTRO BUSINESS | 03 | C | | | | | |
| | EE | 120 | AC-DC CIRCUITS | (03) | W | | | | | |
| SPRING 1974 | | | | | | | | | | |
| | BUS | 215 | BUSINESS LAW I | 03 | C | | | | | |
| | PSYC | 200 | APPLIED PSYCHOLOGY | 03 | B | | | | | |
| SUMMER 1974 | | | | | | | | | | |
| | ED | 252 | EDUCATIONAL PSYCH | 03 | C | | | | | |
| FALL 1974 | | | | | | | | | | |
| | CHEM | 101 | GENERAL CHEMISTRY | 05 | B | | | | | |
| SPRING 1976 | | | | | | | | | | |
| | BUS | 216 | BUSINESS LAW II | C3.00 | A | | | | | |
| FALL 1976 | | | | | | | | | | |
| | BUS | 110 | PRIN ACCOUNTING I | C3.00 | C | | | | | |

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 Central Association of Colleges
 and Secondary Schools

Date

Registrar

BELLEVILLE AREA COLLEGE

COURSE TITLE

RT-298

INTRODUCTION TO
NUCLEAR MEDICINEMichael J. Clements RT.
Radiologic Technology Program

PREREQUISITES

RT-298

Introduction To Nuclear Medicine

The student must satisfactorily complete RT100-110-131-151-180-241-242 before entering RT-298.

COURSE TARGET POPULATION

This course is a restricted course, that is it is only open to second year final semester Radiologic Technology students.

A Radiologic Technology student must be 18 years of age, and meet the entrance requirements of the college. There is no discrimination according to racial background, sex, or religion.

CLINICAL OBJECTIVES

RT-293

Introduction To Nuclear Medicine

OBJECTIVE:

After completing the lecture and clinical hours, and when given a nuclear medicine facility, patient, and prescribed nuclear medicine examination, and under the direct supervision of a certified Nuclear Medicine Technologist. The student will be able to demonstrate a fundamental knowledge of the field of Nuclear Medicine and it's role in the health care team.

TEACHING METHOD:

- A. Classroom lectures, audio-visuals, case reviews, and discussion.
- B. Under the direct supervision of the clinical instructor.

EVALUATION METHOD:

- A. Objective and Subjective testing within the classroom environment. Grading to be according to the established standards set up by the college.
- B. Clinical evaluation by supervisor/instructor.

TIME FRAME:

Second Year Spring Semester

COURSE OUTLINE

RT-298

Introduction To Nuclear Medicine

- WEEK 1: Introduction to course; Movie: Nuclear Medicine; Yesterday, Today, and Tomorrow. Basic Nuclear Physics.
- WEEK 2: Radiation Biology, units of measurement. Radiation Protection (NRC Title 10).
- WEEK 3: Radiation counting, imaging, surveying devices. Instrument Quality Control (NRC Title 10).
- WEEK 4: Test I: 60 points. Nuclear Pharmacology I.
- WEEK 5: Review test, Nuclear Pharmacology II. Nuclear Decay and Doseage calculation. Basic Radiopharmaceutical Accountability Systems.
- WEEK 6: Field Trip: Mallinckrodt Nuclear Inc.
- WEEK 7: Reports due on findings made during the field trip. Quality Control procedures. Movie: Abbott Laboratories.
- WEEK 8: Duties and responsibilities of a Registered Nuclear Medicine Technologist. Review for Mid-term. Mid-Term Examination: 100 points.
- WEEK 9: Nuclear Invivo procedures; Brain Imaging (Static and Dynamic), Bone Imaging. Review Mid-term Examination.
- WEEK 10: Nuclear Invivo procedures; Lung Imaging (Perfusion and Ventilation), Liver Imaging (Structural and functional), Spleen Imaging.
- WEEK 11: Nuclear Invivo procedures; Thyroid Imaging (Physiological and structural), Kidney Imaging (Structural, Glomerular and Tubular Filtration). Review for Test II.
- WEEK 12: Test II: 60 points. Nuclear Invivo procedures; Pancreatic Imaging, Cardiac Imaging I

- WEEK 13: Nuclear Invivo procedures; Cardiac Imaging II.
Common Pathologies; Radiographic vs. Nuclear Medicine.
- WEEK 14: Nuclear Invitro procedures; Thyroid (T3, T4, T7, ETR),
Schillings Test.
- WEEK 15: Nuclear Invitro procedures; Red Blood Cell Survival
(Chromium 51), Digoxin, Digitoxin.
Basic Radioimmuno Assay.
Review for Final Examination.
- WEEK 16: Current job trends in Nuclear Medicine, Entry level
requirements, Educational opportunities.
Final Examination: 200 points.

UNIT: Unit II Physics

TIME FRAME: Weeks 2 thru 8

UNIT OBJECTIVE: To familiarize the student with the principles of Radiation Biology, Nuclear Pharmacology, and Nuclear Instrumentation.

| PROCEDURE | TEACHER ACTIVITY | STUDENT ACTIVITY | ESTIMATED TIME | EQUIPMENT NEEDED |
|---|------------------|------------------|----------------|----------------------------------|
| Lesson I: Radiation Biology | | | | |
| A. Radiation Physics | Lecture | note taking | 20min | over-heads blackboard |
| B. Radiobiological Effects | Lecture | " | 65min | blackboard |
| C. Radiation Protection | Lecture | " | 40min | blackboard |
| D. NRC Title 10 | Lecture | " | 25min | blackboard |
| Lesson II: Nuclear Pharmacology I | | | | |
| NOTE: This lesson takes place within working Nuclear Medicine Dept. | | | | |
| A. Radiotracers | Lec/Demo | observation | 40min | |
| B. Radiopharmaceutical Accountability | " | " | 20min | |
| C. Quality Control Testing | " | " | 40min | |
| D. Dosage Computation | " | " | 25min | |
| E. Question and answer for Test I | informing | asking | 25min | |
| Lesson III: Nuclear Pharmacology II | | | | |
| A. Test I 60 points | observing | | 60min | TEST I |
| B. Scoring and reviewing test | Lec/demo | grading | 40min | |
| C. Nuclear Decay and dosages | Lec/Demo | note taking | 35min | blackboard |
| D. Radiation Protection | Lec/Demo | " | 10min | blackboard |
| Lesson IV: Field Trip to Mallinckrodt Clear Inc. St. Louis Mo. | Lecture | observing | 4Hrs. | |
| Lesson V: Instrumentation I | | | | |
| A. Principles of Pulse Detection | Lec/demo | note taking | 15min | blackboard GM Counter |
| B. Scintillation Counting Systems | " | " | 30min | over-heads |
| C. Photomultiplier Circuitry | Lecture | " | 20min | over-heads |
| Pulse-height Analysis | Lec/demo | " | 45min | over-heads |
| D. Applications | Lecture | " | 30min | over-heads |
| Lesson VI: Instrumentation II | | | | |
| A. Scintillation Imaging Systems | Lecture | " | 60min | over-heads blackboard |
| B. Collimation/field of view | Lec/demo | " | 25min | over-heads |
| C. Quality Control Testing | Lecture | " | 35min | blackboard |
| D. Review for Mid-Term Exam | Lecture | questioning | 30min | blackboard |
| Lesson VII: Instrumentation III | | | | |
| A. Mid-term Exam 100 points | grading | | 60min | blackboard Mid-Term slides |
| B. Computer applications | Lecture | note taking | 60min | |

DAILY LESSON PLAN

LESSON: Radiation Biology TIME FRAME: Week Two; Three hour classLESSON OBJECTIVE: To familiarize the student with the principles of Radiation Biology, Emission Sources, Protection, and Federal Regulations.

| PROCEDURE | TEACHER ACTIVITY | STUDENT ACTIVITY | ESTIMATED TIME | EQUIPMENT NEEDED |
|---|------------------|------------------|----------------|----------------------|
| REVIEW: A. Basic elements B. Atomic structure C. Nuclear Valences D. Tri-linear Chart of Radio nuclides. | Lec/Demo | note taking | 20min | over-head blackboard |
| RADIOBIOLOGICAL EFFECTS: I Particulate Emitters A. REM B. Ionization C. Energy dissipation D. Use within the field E. Types of emissions 1. ALPHA EMITTERS a) emission source b) interaction with matter c) decay schemes 2. BETA EMITTERS a) emission sources 1) Beta Positive 2) Beta Negative b) interaction with matter c) decay schemes 1) Beta Positive 2) Beta Negative d) applications | Lec/Demo | note taking | 60min | blackboard |
| II Photon Emitters A. Gamma Sources 1. emission sources 2. interaction with matter 3. naturally occurring 4. man-made sources 5. decay schemes 6. applications | Lec/Demo | note taking | 40min | blackboard |
| PROTECTION: A. Distance B. Inverse Square Law C. Shielding 1. primary 2. secondary D. common sense | Lec/Demo | note taking | 30min | blackboard |
| NRC TITLE 10 A. Standards for protection B. Accountability records C. Emergency planning | Lec/Demo | note taking | 30min | blackboard |

REFERENCES

Instructional material handed out in class is all the material that the student would need in order to successfully complete the required material. The course is a lecture course there is no book presently used by the college for this course.

Below is a list of reference books for those who feel that they want or need more in depth information concerning the material covered in the course:

Bland's Nuclear Medicine; 1975 edition. Mosby Publishing Co.

Nuclear Medicine; 1966 edition, Paul Sodde author.

Clinical Nuclear Medicine; 1971 edition. Maynard Publishing Co.

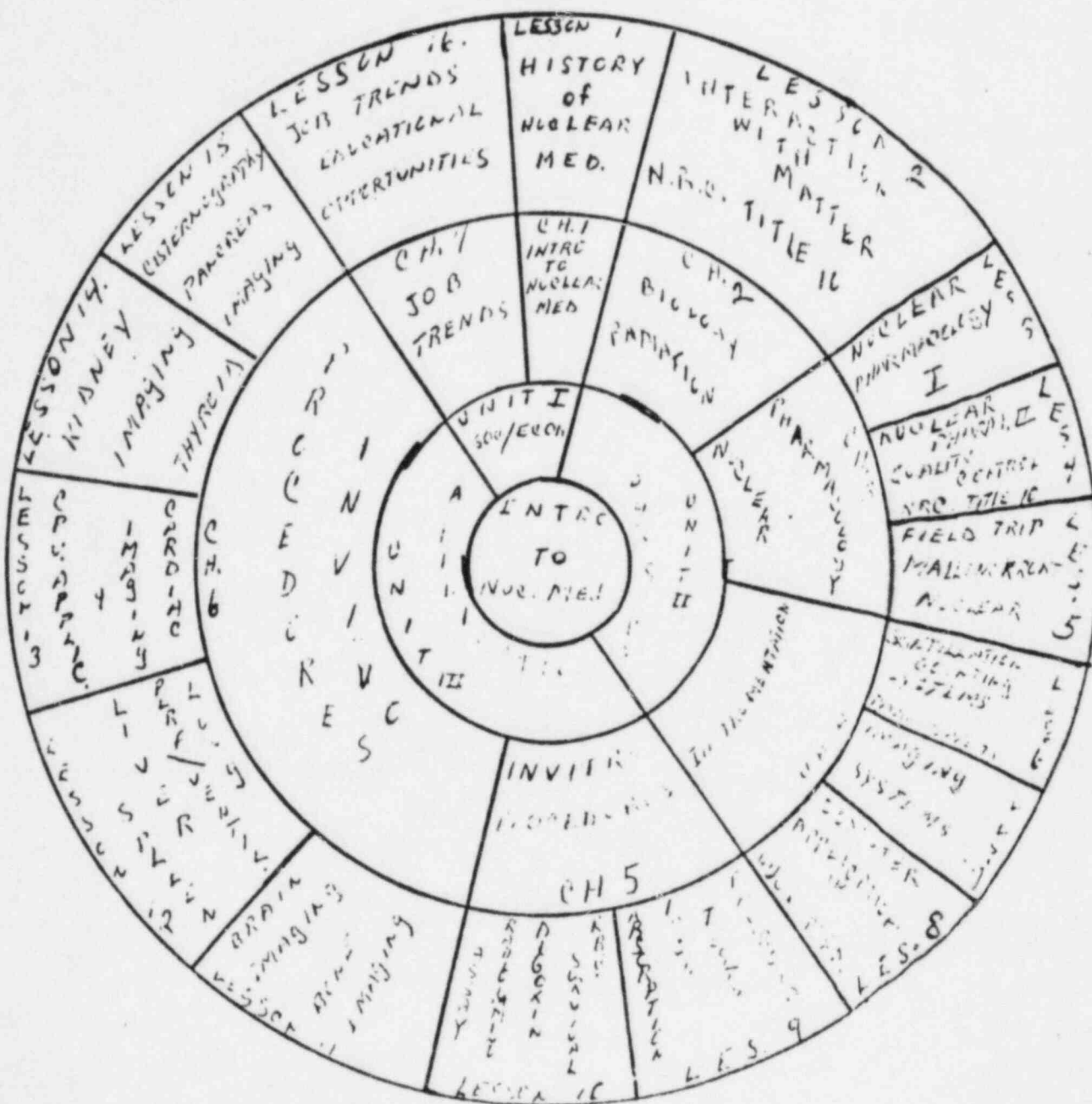
Quality Control in Nuclear Medicine; 1978 edition. Mosby Pub. Co.

Merrill Volume III; 1975 edition. Mosby Publishing Co.

COURSE BIBLIOGRAPHY

- A. Bender & Elahd M.D., Nuclear Medicine, Mosby Pub. Co., 1975
- B. Crotty, John M.D., Introduction to Nuclear Medicine, 1973
- C. Journal of Nuclear Medicine, American Society of Nuclear Medicine, Periodical.
- D. Journal of Nuclear Medicine Technology, Technologist Section of the Society of Nuclear Medicine, Periodical.
- E. Maynard, C.L. M.D., Clinical Nuclear Medicine, 1971
- F. Merrill R.T., Merrill's Vol III Atlas of Radiology, 1977
- G. Nuclear Regulatory Commission, NRC Title 10, U.S. Publishing Office, 1978.
- H. Ravaskz, George Ph.D., Quality Control in Nuclear Medicine, Mosby Publishing Co., 1978.
- I. Rosenfeld & White, Nuclear Medicine Technology Review Manual, St. Louis, Mo. 1975.
- J. Sodee, Paul M.D., Clinical Nuclear Medicine, Archives Pub. Co. 1971.
- K. Wright, David C., Thyroid Anatomy and Physiology I & II, Abbott Laboratories, 1974.

ZONE ANALYSIS



INTRO. TO NUCLEAR MEDICINE

CHART PROGRESSIVE PLANNING

137113

area

college

BELLEVILLE, ILLINOIS

CATALOG 1971 - 1972



RADIOLOGIC TECHNOLOGY

ASSOCIATE IN APPLIED SCIENCE DEGREE

(Career Program)

A program designed to prepare the student to become eligible for the National Examination of the American Registry of Radiologic Technologists.

FIRST YEAR

| Fall Semester | Hours | Spring Semester | Hours |
|-----------------------------------|-------|---|-------|
| H.R.O. 100—Med. Term. | 1 | Speech 151—Fund. of Public Speaking | 3 |
| Eng. 100—Fundamental Eng. | 3 | Bio. 156—Integrated Human Bio. II | 5 |
| or | | Psychology 151—Gen. Psych. | 3 |
| Eng. 101—Rhet. and Comp. 1.... | 3 | Radiologic Tech. 151— | |
| Bio. 155—Integ. Human Bio. I | 5 | Radiologic Tech. II | 5 |
| Radiologic Tech. 100— | | P.E.—Physical Education | 1 |
| Orientation to X-ray Lab. | 2 | | |
| Technology 110—Radiologic | | | |
| Tech. I | 5 | | |
| P.E.—Physical Education | 1 | | |

| Summer Session | Hours |
|----------------------------------|-------|
| RT 160—Clinical Experience | 4 |

SECOND YEAR

| Fall Semester | Hours | Spring Semester | Hours |
|----------------------------|-------|---------------------------------|-------|
| Radiologic Tech. 231—X-ray | | Radiologic Tech. 298—Nuclear | |
| Physics | 3 | Medicine | 5 |
| Radiologic Tech. 241— | | Radiologic Tech. 299— | |
| Radiologic Tech. III | 10 | Radiologic Tech. IV | 9 |
| Radiologic Tech. 242— | | Elective (Social Studies) | 3 |
| Radiation Ther. and | | | |
| Radiobiology | 4 | | |

| Summer Session | Hours |
|----------------------------------|-------|
| RT 260—Clinical Experience | 4 |

Note:

1. Candidates for graduation must pass a citizenship examination or receive credit in Political Science 261 and 262, or Political Science 150 or 200.
2. Health requirements are satisfied by students successfully completing Biology 155, Biology 156, Psychology 151, and this Health Related Curriculum.

Students shall meet all institutional requirements for the Associate in Applied Science degree.

280. Clinical Seminar II**2 hours**

Formal discussions related to the experiences and progress of the participants in the clinical area. Review of techniques, procedures, and modalities used in treatment programs. (2 hours lecture per week or 32 hours of time scheduled in the semester) Prerequisites: concurrent registration in PTA 270

Radiologic Technology**100. Orientation to X-Ray Lab****2 hours**

A hospital-based course designed to familiarize the student with the Radiology Department, the professional personnel assigned to that department and the interaction of radiology with the total hospital operation. Classroom instruction will emphasize professional ethics. History, radiology, and nursing procedures pertinent to radiology will be taught. (2 hours lecture, 0 hours lab)

110. Radiologic Technology I**5 hours**

Basic positioning of the patient to be radiographed taught, with emphasis on darkroom chemistry and technique and on anatomy radiographically. (4 hours lecture, 9 hours lab)

151. Radiologic Technology II**5 hours**

A hospital-affiliated course designed to teach and practice continued radiographic positioning procedures using Contrast Media and Pediatric Radiology. (4 hours lecture, 9 hours lab)

231. X-Ray Physics**3 hours**

The objectives are to teach fundamentals of Electrical and Radiation Physics, the basic principles underlying the operation of X-ray equipment and auxiliary devices. (3 hours lecture, 0 hours lab)

241. Radiologic Technology III**10 hours**

Technique and practice in specialized radiographic procedures will be taught. The student will use and maintain special equipment designed to aid the radiologist in more complicated procedures. (8 hours lecture, 18 hours lab)

242. Radiation Therapy and Radiobiology**4 hours**

Introduction to radiation therapy, both Orthovoltage and Cobalt, is accomplished in this course. The student will be taught advanced techniques and protection both to the patient and himself. (3 hours lecture, 9 hours lab)

298. Nuclear Medicine**5 hours**

The student will be taught the utilization of isotopes and detection equipment to understand the theory of radioactive isotopes and their relationship to diagnostic procedures. (3 hours lecture, 18 hours lab)

HEALTH RELATED

299. Radiologic Technology IV 9 hours

A continuation of theory and practice in the techniques involving intraoral radiography, film critique, advanced exposure factors and departmental administration. (6 hours lecture, 27 hours lab)

160. Clinical Experience I, Radiologic Technology 4 hours

Advanced clinical experience during the summer is designed to aid the student to complete requirements for graduation and to become eligible to write the national examination for the American Registry of Radiologic Technology. Forty contact hours to four credit hours. (0 hours lecture, 36 hours lab)

**260. Clinical Experience II,
Radiologic Technology 4 hours**

Continuation of work to meet the requirements for the American Registry of Radiologic Technology. (0 hours lecture, 36 hours lab)