

**NEW YORK CITY COLLEGE OF TECHNOLOGY**

THE CITY UNIVERSITY OF NEW YORK

**Radiologic Technology & Medical Imaging**

RAD MAJOR CURRICULUM MODIFICATION

FOR AAS AND BS PROGRAMS

September 28, 2017

**Evans Lespinasse**

**Chairperson**

Prepared by: Professors Lobel, Sarkar, and Lespinasse

Revised 4-16-2018

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New York City College of Technology, CUNY

CURRICULUM MODIFICATION PROPOSAL FORM

This form is used for all curriculum modification proposals. See the [Proposal Classification Chart](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-09-Proposal_Classification_Chart.pdf) for information about what types of modifications are major or minor. Completed proposals should be emailed to the Curriculum Committee chair.

|  |  |
| --- | --- |
| **Title of Proposal** | RAD Major Curriculum Modification for AAS and BS Programs |
| **Date** | September 28, 2017 |
| **Major or Minor** | Major |
| **Proposer’s Name** | Eric Lobel & Subhendra Sarkar |
| **Department** | Radiologic Technology & Medical Imaging |
| **Date of Departmental Meeting in which proposal was approved** | June 14, 2017 |
| **Department Chair Name** | Evans Lespinasse |
| **Department Chair Signature and Date** | Evans Lespinasse **9/25/2017, 2-22-2018** |
| **Academic Dean Name** | **David Smith** |
| **Academic Dean Signature and Date** | **2017-09-29, 2018-04-09** |
| **Brief Description of Proposal**  (Describe the modifications contained within this proposal in a succinct summary. More detailed content will be provided in the proposal body. | The modifications in this proposal include:  1. Changes to the current Associate program prerequisites and minor changes to first-semester courses.  2. Changes to the Bachelor of Science in Radiological Science degree program, creating three concentrations with students choosing one. The changes include twelve new courses, integrating content to allow the merger of two courses into one course, minor changes, and adjusting the math and prerequisite requirements. |
| **Brief Rationale for Proposal**  (Provide a concise summary of why this proposed change is important to the department. More detailed content will be provided in the proposal body). | To better serve our students, COM 1330 will be moved from the AAS to the BS program, and BIO 1101 will become a prerequisite of the AAS program.  CT and MR are advanced imaging modalities that have been and remain in high demand in the industry. Program graduates often look outside the college for continuing education programs in these areas. By making these modalities part of the BS program, students will receive superior training in these modalities and be better prepared for advanced certifications and career progression. |
| **Proposal History**  (Please provide history of this proposal: is this a resubmission? An updated version? This may most easily be expressed as a list). | This is a revised submission dated 4-9-2018.  Upon consideration with full department, division Dean, Biology department and Provost Office, we have addressed the hidden prerequisite as recommended by the Curriculum Chair.  A waiver of 1 additional credit for the degree is being pursued by the Division Dean and the Provost office. |

Please include all appropriate documentation as indicated in the Curriculum Modification Checklist.

For each new course, please also complete the New Course Proposal and submit in this document.

Please submit this document as a single .doc or .rtf format. If some documents are unable to be converted to .doc, then please provide all documents archived into a single .zip file.

**ALL PROPOSAL CHECK LIST**

|  |  |
| --- | --- |
| Completed CURRICULUM MODIFICATION FORM including: | X |
| * Brief description of proposal | X |
| * Rationale for proposal | X |
| * Date of department meeting approving the modification | X |
| * Chair’s Signature | X |
| * Dean’s Signature | X |
| Evidence of consultation with affected departments  List of the programs that use this course as required or elective, and courses that use this as a prerequisite. | X |
| Documentation of Advisory Commission views (if applicable). | X |
| Completed [Chancellor’s Report Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-09-Chancellor_Report_Quick_Reference_Guide1.doc). | X |

**EXISTING PROGRAM MODIFICATION PROPOSALS**

|  |  |
| --- | --- |
| Documentation indicating core curriculum requirements have been met for new programs/options or program changes. | N/A |
| Detailed rationale for each modification (this includes minor modifications) | X |

**Major Changes Proposed in the AAS in Radiologic Technology & Medical Imaging**

**Effective Date: Spring 2019**

|  |  |
| --- | --- |
| **Admission Requirements**   * **A high school diploma or its equivalent (GED)** * **CUNY proficiency in reading, writing and mathematics** * **~~Prerequisites for BIO 2311: BIO 1101 and BIO 1101 Lab, a college-level general biology course with a lab and a minimum grade of “CP or a score of 85 or above on the New York State Regent’s exam.~~**   **GENERAL EDUCATION COMMON CORE 1 21** **CREDITS**  **I – REQUIRED CORE 2 (3 COURSES, 11 CREDITS)**  **English Composition (2 courses, 6 credits)**  ENG 1101\* English Composition I 3  **Mathematical and Quantitative Reasoning**  **(1 course, 3-4 credits)**  MAT 1275 College Algebra and Trigonometry or higher ~~3,\* 4~~ 4  **Life and Physical Sciences (1 course, 4 credits)**  ~~BIO 2311~~ ~~4,\*~~ ~~Human Anatomy and Physiology I~~  4  **II – FLEXIBLE CORE (3 COURSES, 10 CREDITS)**  **Individual and Society**  PHIL 2203\* Health Care Ethics 3  PSY 1101\* Introduction to Psychology 3  **Scientific World**  ~~BIO 2312\* Human Anatomy and Physiology II 4~~  **Writing Intensive Requirement**  Students at New York City College of Technology must complete two courses designated WI for the associate level, one from GenEd and one from the major; and two additional courses designated WI for the baccalaureate level, one from GenEd and one from the major.  **~~PROGRAM-SPECIFIC DEGREE REQUIREMENTS 44~~****~~CREDITS~~**  RAD 1124 Introduction to Radiologic Technology  and Medical Imaging 1 RAD 1125 Radiographic Procedures I 2 RAD 1126 Image Production and Evaluation I 2 RAD 1127 Patient Care and Management 2 ~~RAD 1128 Radiation Protection and Applied Radiobiology 2~~ RAD 1225 Radiographic Procedures II 2 RAD 1226 Image Production and Evaluation II 2 RAD 1227 Radiographic Pathology 3 RAD 1228 Clinical Education I 2 RAD 1229 Clinical Education II 3 RAD 2325 Radiographic Procedures III 2 RAD 2326 Radiographic Physics 2 RAD 2327 Cross-Sectional Anatomy 2 RAD 2328 Clinical Education III 3 RAD 2425 Advanced Radiographic Procedures 2 RAD 2426 Imaging Modalities 2 RAD 2427 Seminar: Film Critique 2 RAD 2428 Clinical Education IV 3 RAD 2429 Clinical Education V 2  MAT 1275\* College Algebra and Trigonometry or higher  Met as GenEd  BIO 2311\* Human Anatomy and Physiology I Met as GenEd ~~BIO 2312\* Human Anatomy and Physiology II Met as GenEd~~ PHIL 2203\* Health Care Ethics Met as GenEd PSY 1101\* Introduction to Psychology Met as GenEd  ~~COM Public Speaking 3~~  **~~TOTAL PROGRAM-SPECIFIC REQUIRED AND ELECTIVE COURSES 44 TOTAL NYSED LIBERAL ARTS/SCIENCE CREDITS 21~~ ~~TOTAL CREDITS REQUIRED FOR THE DEGREE 65~~**  1 Although students enrolled in AAS programs are not required to meet all of the CUNY Pathways requirements, the college and program general education requirements are organized by Pathways categories to inform students of their standing should they transfer to a CUNY baccalaureate program  2 Specific courses listed are degree requirements that also meet CUNY Pathways general education requirements in that category.  ~~3 Students who elect to take MAT 1275 without the requisite math background will be required to take MAT 1175 in preparation, depending upon initial placement. This will increase the number of required credits for the degree by 4.~~  ~~4 Students without requisite science background for BIO 2311 will be required to take BIO 1101 in preparation. This will increase the number of credits required for the degree by 4.~~  ~~5~~ A semester-specific list of writing intensive courses is available online at the City Tech Pathways website. | **Admission Requirements**  • A high school diploma or its equivalent (GED)  • CUNY proficiency in reading, writing and mathematics   * Because of great demand for this program, the lowest GPA of entering students has historically been approximately 3.2.   **GENERAL EDUCATION COMMON CORE 1 21** **CREDITS**  **I – REQUIRED CORE 2 (3 COURSES, 11 CREDITS)**  **English Composition (2 courses, 6 credits)**  ENG 1101\* English Composition I 3  **Mathematical and Quantitative Reasoning**  **(1 course, 3-4 credits)**  MAT 1275 College Algebra and Trigonometry or higher STEM-Track 4  **Life and Physical Sciences (1 course, 4 credits)**  BIO 11013 Biology I or BIO 2311 Human Anatomy and Physiology I 4  **II – FLEXIBLE CORE (3 COURSES, 10 CREDITS)**  **Individual and Society**  PHIL 2203\* Health Care Ethics 3  PSY 1101\* Introduction to Psychology 3  **Scientific World**  BIO 23113 Human Anatomy and Physiology I 4  **Writing Intensive Requirement** 3  Students at New York City College of Technology must complete two courses designated WI for the associate level, one from GenEd and one from the major; and two additional courses designated WI for the baccalaureate level, one from GenEd and one from the major.  **PROGRAM-SPECIFIC DEGREE REQUIREMENTS (45** **CREDITS)**  RAD 1124 Introduction to Radiologic Technology  and Medical Imaging 1 RAD 1125 Radiographic Procedures I 2 RAD 1126 Image Production and Evaluation I 2 RAD 1127 Patient Care and Management 2 RAD 1129 Radiation Protection and Applied Radiobiology 2 RAD 1225 Radiographic Procedures II 2 RAD 1226 Image Production and Evaluation II 2 RAD 1227 Radiographic Pathology 3 RAD 1228 Clinical Education I 2 RAD 1229 Clinical Education II 3 RAD 2325 Radiographic Procedures III 2 RAD 2326 Radiographic Physics 2 RAD 2327 Cross-Sectional Anatomy 2 RAD 2328 Clinical Education III 3 RAD 2425 Advanced Radiographic Procedures 2 RAD 2426 Imaging Modalities 2 RAD 2427 Seminar: Film Critique 2 RAD 2428 Clinical Education IV 3 RAD 2429 Clinical Education V 2  MAT 1275 College Algebra and Trigonometry or higher STEM-Track 4  Met as GenEd  BIO 1101\* Biology I Met as GenEd  BIO 2311\* Human Anatomy and Physiology I Met as GenEd PHIL 2203\* Health Care Ethics Met as GenEd PSY 1101\* Introduction to Psychology Met as GenEd BIO 2312\* Human Anatomy and Physiology II 4  **TOTAL PROGRAM-SPECIFIC REQUIRED AND ELECTIVE COURSES 45 TOTAL NYSED LIBERAL ARTS/SCIENCE CREDITS 21 TOTAL CREDITS REQUIRED FOR THE DEGREE 66**  1 Although students enrolled in AAS programs are not required to meet all of the CUNY Pathways requirements, the college and program general education requirements are organized by Pathways categories to inform students of their standing should they transfer to a CUNY baccalaureate program  2 Specific courses listed are degree requirements that also meet CUNY Pathways general education requirements in that category.  3 Students who place out of BIO 1101 (those with a College level general biology course with lab or a score of 85 or above on the New York State Regent’s exam) may take BIO 2311 to satisfy the Life and Physical Science requirement, and then choose any Scientific World course.  4 A semester-specific list of writing intensive courses is available online at the City Tech Pathways website. |
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**Major Changes Proposed in the BS in Radiological Science Program**

**Effective Date: Spring 2019**

|  |  |
| --- | --- |
| **GENERAL EDUCATION COMMON CORE 1 45** **CREDITS**  **I – REQUIRED CORE 2 (4 COURSES, 14 CREDITS)**  **English Composition (2 courses, 6 credits)**  ENG 1101\* English Composition I 3 ENG 1121 English Composition II 3  **Mathematical and Quantitative Reasoning**  **(1 course, 3-4 credits)**  MAT 1275 College Algebra and Trigonometry or higher ~~3,\* 4~~ 4  **Life and Physical Sciences (1 course, 4 credits)**  ~~BIO 2311~~ ~~4,\*~~ ~~Human Anatomy and Physiology I~~  4  **II – FLEXIBLE CORE (6 COURSES, 19 CREDITS)**  In addition to the required courses listed below, select one course from each of the other two areas; no more than two courses may be selected from any discipline. 6  **World Cultures and Global Issues**  Any Approved Course  **US Experience in its Diversity**  Any Approved Course  ECON 1101 Macroeconomics (recommended) 3  **Individual and Society**  PHIL 2203\* Health Care Ethics 3  **Creative Expression**  Any Approved Course  **Scientific World**  ~~BIO 2312\* Human Anatomy and Physiology II 4~~  **One additional course from any Flexible Core area**  PSY 1101\* Introduction to Psychology 3  **III – COLLEGE OPTION REQUIREMENT ~~5~~ (12 CREDITS)**  • One course in Speech/Oral Communication ~~6~~  COM 1330\* Public Speaking or higher 3  • One interdisciplinary Liberal Arts and Sciences  course 3  • Two additional liberal arts courses 6 In meeting their general education requirements overall, students must take at least one advanced liberal arts course or two sequential courses in a foreign language.  **Writing Intensive Requirement**  Students at New York City College of Technology must complete two courses designated WI for the associate level, one from GenEd and one from the major; and two additional courses designated WI for the baccalaureate level, one from GenEd and one from the major.  **PROGRAM-SPECIFIC DEGREE REQUIREMENTS ~~60~~****~~CREDITS~~ Associate-Level Courses in Radiologic Technology and Medical Imaging (41 credits)**  RAD 1124 Introduction to Radiologic Technology  and Medical Imaging 1 RAD 1125 Radiographic Procedures I 2 RAD 1126 Image Production and Evaluation I 2 RAD 1127 Patient Care and Management 2 ~~RAD 1128 Radiation Protection and Applied Radiobiology 2~~ RAD 1225 Radiographic Procedures II 2 RAD 1226 Image Production and Evaluation II 2 RAD 1227 Radiographic Pathology 3 RAD 1228 Clinical Education I 2 RAD 1229 Clinical Education II 3 RAD 2325 Radiographic Procedures III 2 RAD 2326 Radiographic Physics 2 RAD 2327 Cross-Sectional Anatomy 2 RAD 2328 Clinical Education III 3 RAD 2425 Advanced Radiographic Procedures 2 RAD 2426 Imaging Modalities 2 RAD 2427 Seminar: Film Critique 2 RAD 2428 Clinical Education IV 3 RAD 2429 Clinical Education V 2  **Baccalaureate-Level Courses in Radiological Science**  **~~(19 credits)~~**  RAD 3527 Advanced Patient Assessment – Pharmacology 3 ~~RAD 3627 Advanced Sectional Anatomy 2 RAD 3628 Pathophysiology for Medical Imaging 2~~ ~~RAD 4726 Advanced Medical Imaging I 3~~ RAD 4826 Advanced Medical Imaging II 3 RAD 4828 Medical Informatics/QM HIS 3 RAD 4830 Capstone Leadership Roles in Medical Imaging 3  **Other Program-Specific Required Courses ~~(15 credits)~~**  MAT 1275\* College Algebra and Trigonometry or higher  ~~Met as GenEd~~  BIO 2311\* Human Anatomy and Physiology I ~~Met as GenEd~~ ~~BIO 2312\* Human Anatomy and Physiology II Met as GenEd~~ PHIL 2203\* Health Care Ethics ~~Met as GenEd~~ PSY 1101\* Introduction to Psychology ~~Met as GenEd~~ ~~ECON 1101 Macroeconomics 3~~ ~~MAT 1272 Statistics 3~~ PHYS 2603 Physical Principles of Medical Imaging 3 ~~PSY 3405~~ ~~7~~ ~~Health Psychology 3~~ LIB 1201 Research and Documentation in the  Information Age 3  **Elective Credits as needed to equal 60 credits of Liberal Arts and Sciences or otherwise meet degree requirements**  **TOTAL PROGRAM-SPECIFIC REQUIRED AND ELECTIVE COURSES 78 TOTAL NYSED LIBERAL ARTS/SCIENCE CREDITS ~~42~~ TOTAL CREDITS REQUIRED FOR THE DEGREE ~~120~~**  \* Courses required for associate degree  1 The BS in Radiologic Science is built on the AAS in Radiologic Technology and Medical Imaging using a 2+2 model. Courses required for the AAS in Radiologic Technology and Medical Imaging at New York City College of Technology are indicated by \*. Requirements for transfer students from CUNY institutions will be governed by CUNY Pathways policy and existing articulation agreements. Transfers from outside of CUNY will be evaluated individually.  2 Students are strongly urged to consult degree requirements for “double-duty” courses: degree requirements that also meet CUNY Pathways general education requirements in that category.  ~~3 Students who elect to take MAT 1275 without the requisite math background will be required to take MAT 1175 in preparation, depending upon initial placement. This will increase the number of required credits for the degree by 4.~~  ~~4 Students without requisite science background for BIO 2311 will be required to take BIO 1101 in preparation. This will increase the number of credits required for the degree by 4.~~  ~~5~~ Complete lists of liberal arts and sciences courses and advanced liberal arts courses, as well as semester-specific lists of interdisciplinary courses and writing intensive courses, are available online at the City Tech Pathways website.  ~~6~~ Students who have already met this requirement may choose any other liberal arts and science course in its place.  ~~7 Acceptable substitutes for this requirement are PSY 2302, PSY 2401, PSY 2402, PSY 2403, PSY 2404, and PSY 2501.~~ | **GENERAL EDUCATION COMMON CORE 1 45** **CREDITS**  **I – REQUIRED CORE 2 (4 COURSES, 14 CREDITS)**  **English Composition (2 courses, 6 credits)**  ENG 1101\* English Composition I 3  ENG 1121 English Composition II 3  **Mathematical and Quantitative Reasoning**  **(1 course, 3-4 credits)**  MAT 1275 College Algebra and Trigonometry or higher STEM-Track 4  **Life and Physical Sciences (1 course, 4 credits)**  BIO 1101 3 \* Biology I or BIO 2311 Human Anatomy and Physiology I 4  **II – FLEXIBLE CORE (6 COURSES, 19 CREDITS)**  In addition to the required courses listed below, select one course from each of the other two areas; no more than two courses may be selected from any discipline. 6  **World Cultures and Global Issues**  Any Approved Course  **US Experience in its Diversity**  Any Approved Course  ECON 1101 Macroeconomics (recommended) 3  **Individual and Society**  PHIL 2203\* Health Care Ethics (recommended) 3  **Creative Expression**  Any Approved Course  **Scientific World**  BIO 23113 Human Anatomy and Physiology I 4  **One additional course from any Flexible Core area**  PSY 1101\* Introduction to Psychology 3  **III – COLLEGE OPTION REQUIREMENT 4 (12 CREDITS)**  • One course in Speech/Oral Communication 5  COM 1330\* Public Speaking or higher 3  • One interdisciplinary Liberal Arts and Sciences  course 3  • Two additional liberal arts courses 6 In meeting their general education requirements overall, students must take at least one advanced liberal arts course or two sequential courses in a foreign language.  **Writing Intensive Requirement**  Students at New York City College of Technology must complete two courses designated WI for the associate level, one from GenEd and one from the major; and two additional courses designated WI for the baccalaureate level, one from GenEd and one from the major.  **PROGRAM-SPECIFIC DEGREE REQUIREMENTS 59** **CREDITS Associate-Level Courses in Radiologic Technology and Medical Imaging (41 credits)**  RAD 1124 Introduction to Radiologic Technology  and Medical Imaging 1 RAD 1125 Radiographic Procedures I 2 RAD 1126 Image Production and Evaluation I 2 RAD 1127 Patient Care and Management 2 RAD 1129 Radiation Protection and Applied Radiobiology 2 RAD 1225 Radiographic Procedures II 2 RAD 1226 Image Production and Evaluation II 2 RAD 1227 Radiographic Pathology 3 RAD 1228 Clinical Education I 2 RAD 1229 Clinical Education II 3 RAD 2325 Radiographic Procedures III 2 RAD 2326 Radiographic Physics 2 RAD 2327 Cross-Sectional Anatomy 2 RAD 2328 Clinical Education III 3 RAD 2425 Advanced Radiographic Procedures 2 RAD 2426 Imaging Modalities 2 RAD 2427 Seminar: Film Critique 2 RAD 2428 Clinical Education IV 3 RAD 2429 Clinical Education V 2  **Baccalaureate-Level Courses in Radiological Science**  **(18 credits)**  Students must complete all courses in one of the following concentrations: (9 credits)  General Concentration  RAD 3629 Advanced Anatomy with Pathophysiology 3  RAD 3726 Advanced Medical Imaging I 3 RAD 4826 Advanced Medical Imaging II or RAD 3100 Principles of Mammography 6 3  CT Concentration  RAD 3525 CT Anatomy, Pathophysiology & Instrumentation 3  RAD 3728 CT Clinical Education I 1 RAD 4628 CT Clinical Education II 1 RAD 4728 CT Clinical Education III 1  RAD 4827 Advanced CT Theory and Applications 3  MR Concentration  RAD 3737 MR Anatomy, Pathophysiology & Instrumentation 3  RAD 3739 MR Clinical Education I 1 RAD 4629 MR Clinical Education II 1 RAD 4729 MR Clinical Education III 1  RAD 4828 Medical Informatics/QM HIS 3  **All Concentrations (44 credits)**  RAD 3527 Advanced Patient Assessment – Pharmacology 3  RAD 4828 Medical Informatics/QM HIS 3 RAD 4830 Capstone Leadership Roles in Medical Imaging 3  **Other Program-Specific Required Courses**  MAT 1275\* College Algebra and Trigonometry or higher STEM-Track 4    BIO 11013\* Biology I \_\_\_\_\_\_\_\_\_\_\_\_ 4  BIO 23113\*Human Anatomy and Physiology I 4  PHIL 2203\* Health Care Ethics 3  PSY 1101\* Introduction to Psychology 3  BIO 2312 Human Anatomy and Physiology II 4 MAT 1375 Pre-Calculus or higher STEM-Track 4 PHYS 2603 Physical Principles of Medical Imaging 3  Any PSY 2000 or above 3 LIB 1201 Research and Documentation in the Information Age 3  **Elective Credits as needed to equal 60 credits of Liberal Arts and Sciences or otherwise meet degree requirements**  **TOTAL PROGRAM-SPECIFIC REQUIRED AND ELECTIVE COURSES 78 TOTAL NYSED LIBERAL ARTS/SCIENCE CREDITS 62 TOTAL CREDITS REQUIRED FOR THE DEGREE 121**  \* Courses required for associate degree  1 The BS in Radiologic Science is built on the AAS in Radiologic Technology and Medical Imaging using a 2+2 model. Courses required for the AAS in Radiologic Technology and Medical Imaging at New York City College of Technology are indicated by \*. Requirements for transfer students from CUNY institutions will be governed by CUNY Pathways policy and existing articulation agreements. Transfers from outside of CUNY will be evaluated individually.  2 Students are strongly urged to consult degree requirements for “double-duty” courses: degree requirements that also meet CUNY Pathways general education requirements in that category.  3 Students who place out of BIO 1101 (those with a College level general biology course with lab or a score of 85 or above on the New York State Regent’s exam) may take BIO 2311 to satisfy the Life and Physical Science requirement, and then choose any Scientific World course.  4 Complete lists of liberal arts and sciences courses and advanced liberal arts courses, as well as semester-specific lists of interdisciplinary courses and writing intensive courses, are available online at the City Tech Pathways website.  5 Students who have already met this requirement may choose any other liberal arts and science course in its place.  6 Students who aspire to pursue a career or additional knowledge in mammography may request departmental permission and subsequently choose RAD 3100 in place of RAD 4826.  7. Students wishing to switch concentration must fill out a department change of curriculum form. |

# 

# DESCRIPTION AND RATIONALE FOR MAJOR MODIFICATIONS - AAS

**AAS Program Modification Rationale for Hidden Prerequisite:**

To better serve our students, COM 1330 will be removed from the AAS, and BIO 1101 will become a prerequisite of the AAS program. This change addresses the hidden prerequisite that BIO1101 presents while staying close to credit limit.

## Table 1: AAS - Prerequisite Changes & Updating Instruction Content of RAD 1129

|  |  |  |  |
| --- | --- | --- | --- |
| Original Course Description | Proposed Course Description | Major change | Rationale |
| 1. **COM 1330 Public Speaking**   3 cl hrs, 3 cr  **Course Description:** Fundamental principles of speaking in public situations and the preparation and delivery of informative and persuasive presentations. Subjects include ethics in public speaking, audience analysis, selecting and researching speech topics, constructing well-reasoned arguments, extemporaneous delivery, and peer evaluation. Students are expected to develop outlines and speaking notes, use visual aids, and improve on verbal and nonverbal delivery skills. Prerequisite: CUNY proficiency in reading and writing | None | **Removal of COM 1330 as a degree requirement** | This course is no longer required for the AAS program, however, will remain a required College Option for the BS program. |
|  | BIO 1101 Biology 1  3 cl hrs, 3 lab hrs, 4 cr The fundamental principles of biology, focusing on topics including taxonomy, structure, nutrition, reproduction, heredity, development and evolution. The concepts of molecular biology and DNA fingerprinting using representative plants and animals are introduced. The course also includes the use and care of the microscope. Prerequisite: CUNY proficiency in reading | **Inclusion as a prerequisite** | To address the hidden prerequisite nature of BIO 1101. This will bring uniformity and enhance the background preparation of students taking BIO 2311. |
| **(3) RAD ~~1128~~ Radiation Protection and Applied Radiobiology**  ~~2 cl hrs, 2 cr~~  A study of general methods of radiation protection when exposing patients to ionizing radiation critical to patient safety and the safety of ~~the radiographer~~. Biological effects and the basic mechanism of short-term and long-term effects of ionizing radiation are covered. Prerequisite: ~~CUNY proficiency in reading, writing and mathematics;~~ ~~Corequisites:~~ ~~RAD 1124,~~ ~~RAD 1125, RAD 1126, RAD 1127, BIO 2311~~ | 1. **RAD 1129 Radiation Protection and Applied Radiobiology**   1 cl hr, 2 lab hrs, 2 cr  A study of general methods of radiation protection when exposing patients to ionizing radiation critical to patient safety and the safety of radiologic personnel. Biological effects and the basic mechanism of short-term and long-term effects of ionizing radiation are covered. Prerequisite: ENG 1101, BIO 1101, BIO 2311, MAT 1275 or higher, RAD 1124  Corequisites: RAD 1125, RAD 1126, RAD 1127, BIO 2312 | **Number of hours increased to include 1 lecture hour and 2 lab hours, without changing number of credits.** | As a result of the approved Radiography Curriculum Update of 2017 from the American Society of Radiologic Technologists (ASRT), that is required by the accrediting agency (JRCERT), Radiation Protection and Applied Radiobiology has been expanded requiring hands on practicum (see Addendum A & B: Required ASRT Curriculum and Sample Labs). |

COURSE MODIFICATION PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | Radiation Protection and Applied Radiobiology |
| **Proposal Date** | 5-15-2018 |
| **Proposer’s Name** | Evans Lespinasse |
| **Course Number** | RAD 1129 |
| **Course Credits, Hours** | 1 class hour, 2 lab hours, 2 credits |
| **Course Pre** | ENG 1101, BIO 1101, BIO 2311, MAT 1275, RAD 1101 |
| **Co-Requisites** | RAD 1125, RAD 1126, RAD 1127, BIO 2312 |
| **Catalog Course Description** | A study of general methods of radiation protection when exposing patients to ionizing radiation critical to patient safety and the safety of imaging personnel. Biological effects and the basic mechanism of short-term and long-term effects of ionizing radiation are covered. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | Ionizing radiation carries potential risk of causing cancer in biologic tissues. Dose reduction is required by law in order to protect the patients, radiographer and other radiation workers from unsafe practices or unnecessary exposure. Students, therefore, must possess substantial knowledge and skills in applying radiation protection methods, and safety procedures when performing diagnostic examinations.  The approved curriculum that is required by the accrediting agency, the JRCRT, has been updated by the American Society of Radiologic Technologists (ASRT), requiring hands on practicum. (see Addendum A & B: Required ASRT Curriculum and Sample Labs). |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No. |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | N/A |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**ALL PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | X |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific*

|  |  |
| --- | --- |
| 1. Describe the ALARA concept. Identify the basis for occupational exposure limits. | Classroom discussions, lab practicum on Exposure levels and effectiveness of radiation barriers. |
| 1. Indentify sources of electromagnetic and particulate ionizing radiations Discriminate between the direct and indirect effects of radiation. | Reading, discussions evaluated by in-class and lab exercise on mA vs. Dose Rate. |
| 1. Express the need and importance of personnel monitoring for radiation workers. Describe personnel monitoring devices, including applications, advantages and limitations for each device. | Students will be assessed on applicability of various techniques to differentiate pathology in various quizzes and during mid term. |
| 1. Perform calculations of exposure with varying time, distance and shielding. Compare values for individual effective dose limits for occupational radiation exposures (annual and lifetime). | Students will be evaluated on methods of minimizing radiation dose rate for specific examination procedures. These will then be practiced in the lab. |
| 1. Discuss the relationship between workload, energy, half-value layer (HVL), tenth-value layer (TVL), use factor and shielding design. | Discussions, classroom and lab activities. Students will be assessed in exam and lab quiz on the Pocket Dosimeter vs. Ion Chamber. |
| 1. Identify the radiosensitivity of specific cells, and examine effects of limited vs. total body exposure. | Classroom discussions, oral presentation, and in-class group activities. |
| 1. Identify methods to measure radiation response and Describe physical, chemical and biologic factors influencing the radiation response of cells and tissues. | Classroom discussions, in-class exercises and lab practicum utilizing an ion chamber, Plexiglas abdomen phantom and lab quiz. |
| 1. Describe principles of cellular biology and differentiate between ionic and covalent molecular bonds. | Reading, discussions evaluated by in-class and lab exercises |
| 1. Discuss and differentiate between stochastic (probabilistic) and nonstochastic (deterministic) effects of radiation exposure. | Reading, discussions evaluated by in-class and lab exercises |
| 1. Describe radiation-induced chemical reactions and potential biologic damage.   Evaluate factors influencing radiobiologic and biophysical events at the cellular and subcellular level. | These will be evaluated in quizzes and via class work, homework. |

*General Education*

|  |  |
| --- | --- |
| **Learning outcomes** | **Assessment** |
| 1. Employ effective communication methods through speaking, listening and writing as a means of reducing patient dose. | Following classroom discussions, and lab exercises, students will be tested through quizzes and lab practicum. |
| 2. Demonstrate proper professional and ethical requirements in applying radiation safety fundamentals. | On this topic, students will be evaluated on their ability critically think and solve problems where ethical dilemmas are manifested. Assessment will occur during class discussions on a regular basis as well as during Mid Term, Final exams, and lab practicum. |
| 3. Integrate expression of the effects of radiation on a child, adult and the elderly patient from radiographic exams, therapeutic procedures and other nuclear disasters in various parts of the globes. | Students will be evaluated during quizzes, and other exams on their ability to integrate expression of the effects of radiation exposure from imaging exam, therapy or nuclear disaster. |

Homework assignments and the final exam are based on the topics presented in class and will involve questions and answers on radiation biology/radiation protection. Final exam will be comprehensive and cumulative.

**Example Weekly Course Outline:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **Topic** | **Chapters** | **Quizzes and Exams** | **Lab Experiments** |
| 1 | Introduction to Radiation Protection, Definitions. | Sherer 1 and related chap in Bushong |  | Introduction to Lab room and equipment |
| 2 | Radiation: Types, Sources, and Doses Received | Sherer 2 and related chap in Bushong |  | mA vs. Dose Rate |
| 3 | Interaction of Ionizing Radiation with Matter | Sherer 3 and related chap in Bushong | Quiz 1 | Dose comparison analysis |
| 4 | Radiation Quantities and Units of Measurements | Sherer 4 and related chap in Bushong |  | Dose calculations varying time, distance and shielding |
| 5 | Radiation Monitoring and Radiation Detection Devices | Sherer 5 and related chap in Bushong | Quiz 2 | OSL vs. Ionization Chamber |
| 6 | Overview of Cell Biology and Molecular and Cellular Radiation Biology | Sherer 6, 7, and related chap in Bushong |  | Lab review for Midterm |
| 7 |  |  | Midterm |  |
| 8 | Early Tissue Reactions and Their Effects on Organ Systems | Sherer 8 and related chap in Bushong |  | Lab evaluation on Dose Rate and Dose comparison analysis |
| 9 | Stochastic Effecs and Late Tissue Ractions of Radiation in Organ Systems | Sherer 9 and related chap in Bushong |  | Lab evaluation on Dose Rate and Dose comparison analysis cont. |
| 10 | Dose Limits for Exposure to Ionizing Radiation | Sherer 10 and related chap in Bushong | Quiz 3 | Lab evaluation on OSL vs. Ionization Chamber |
| 11 | Equipment Design for Radiation Protection | Sherer 11 and related chap in Bushong |  | Lab evaluation on OSL vs. Ionization Chamber cont. |
| 12 | Management of Patient Radiation Dose During Diagnostic Radiographic Procedures | Sherer 12 and related chap in Bushong |  | Apply and evaluate safety procedures in diagnostic radiography |
| 13 | Radiation Safety in Fluoroscopic, CT and Mammography | Sherer 13 and related chap in Bushong | Quiz 4 | Experiment on safety procedures in fluoroscopy, and Mammography |
| 14 | Management of Imaging Personnel Radiation Dose During Diagnostic Radiographic Procedures | Sherer 14 and related chap in Bushong |  | Experiment on safety procedures for imaging personnel and Review for Final exam |
| 15 | Cumulative Final Exam |  |  |  |

**Grading Policy and Procedure**

*Scope of assignments and other course requirements*: Students will prepare homework assignments regularly, participate in all in-class exercises, lab practicum, and present their results to the class and instructor for evaluation and reflection. There will be 4 quizzes, 2 exams including the final exam.

*Method of grading*: The final grade will be based on a weighted average of the grades from the following:

Class Participation 15%

Quizzes 15% (includes lecture and lab assessment)

Midterm 25%

Final Exam 45% (Cumulative)

**Required and Recommended Instructional Materials**

*Required textbooks*:

1. Statkiewicz-Sherer, Mary Alice, Radiation Protection in Medical Radiography, 8th Ed. ISBN: 9780323446662
2. Statkiewicz-Sherer, Mary Alice, Workbook for Radiation Protection in Medical Radiography, 8th Ed. ISBN: 9780323555098

*Recommended Textbook:*

1. Bushong, Stewart C., Radiologic Science for Technologists - 11th ed. ISBN: 9780323353779

**College academic integrity policy**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**Class Participation**

Students must be able to devote sufficient time to complete all lecture, classroom exercises, Lab practicum, homework, and other course work. Deficiency in any particular areas on a student’s part due to non-participation will significantly affect his/her preparedness to commence the clinical internship. Students are expected to fully and actively participate in all classes and labs through discussion, inquiry individual and/or group activities both in the classroom and in the laboratory sessions.

**Technology statement**

This course is web enhanced. Therefore, before entering the course, students should be comfortable with Blackboard.

**Course Need Assessment**

**Target Students and Projected Head Counts:** This course is required as a first-semester course in the clinical phase of the AAS program in Radiologic Technology and Medical Imaging. The course will run in the fall semester only with a headcount of approximately 35.

.

**Physical Resources:** The radiography lab has all the necessary equipment needed for this course. The lab is also equipped with all accessories materials to successfully run the required hand-s on experiments. No other physical resources are needed at this time.

**Overlap with Other Courses:** This course does not overlap with any other course in the program or other courses in the college.

**Full Time Faculty:** The department currently has full-time faculty and adjuncts capable of teaching this course.

**Course Design**

RAD 1129 Radiation Protection and Applied Radiobiology consists of 1 hour lecture, 2 hours of lab, 2 credits hours of lecture classes, twice per week, during day time hours. Topics will be introduced, and applicable techniques will first be demonstrated on the equipment in the laboratory suite and students will practice their experiments, followed with analysis and reflection. Classroom and homework activities will be assigned on a regular basis, which will prepare the students for their midterm and cumulative final exams.

**Relationship to Programmatic Learning Outcomes**

Consistent with the department's mission, this course will help students acquire the necessary knowledge and skills for life-long learning and be better prepared for their certification/licensure board exam.

**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiologic Technology |
| **Course Prefix** | RAD |
| **Course Number** | 1129 |
| **Course Title** | Radiation Protection and Applied Radiobiology |
| **Catalog Description** | A study of general methods of radiation protection when exposing patients to ionizing radiation critical to patient safety and the safety of imaging personnel. Biological effects and the basic mechanism of short-term and long-term effects of ionizing radiation are covered. |
| **Prerequisite** | ENG 1101, BIO 1101, BIO 2311, MAT 1275 or higher STEM-Track, RAD 1124 |
| **Corequisite** | RAD 1125, RAD 1126, RAD 1127, BIO 2312 |
| **Credits** | 2 |
| **Contact Hours** | 1 class hour, 2 lab hours |
| **Liberal Arts** | **[ ] Yes  [X ] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** | N/a |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[ ] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | Fall 2019 |

**Rationale**:

Ionizing radiation carries potential risk of causing cancer in biologic tissues. Dose reduction is required by law in order to protect the patients, radiographer and other radiation workers from unsafe practices or unnecessary exposure. Students, therefore, must possess substantial knowledge and skills in applying radiation protection methods, and safety procedures when performing diagnostic examinations.

The approved curriculum that is required by the accrediting agency, the JRCRT, has been updated by the American Society of Radiologic Technologists (ASRT), requiring hands on practicum. (see Addendum A & B: Required ASRT Curriculum and Sample Labs).

# DESCRIPTION AND RATIONALE FOR MAJOR MODIFICATIONS - BS

The Radiologic Technology and Medical Imaging Department (Rad Tech) with input from our Advisory Committee and strong interest from the student body would like to modify the current Bachelor of Science in Radiological Science degree (BSRS) program curriculum to offer three separate medical imaging concentrations (concentrations). Currently all BSRS students are required to take the same cohort of classes with the only difference being arts and science, plus elective credits.

The Rad Tech department proposes a concentration in either Magnetic Resonance (MR), Computed Tomography (CT), or the modified general concentration as a default, if neither MR nor CT are chosen. Each student would initially make their choice known to the department during the application process based on their training, professional background and future plans, and will be required to subscribe to a specific set of curricula.

Medical imaging continues to undergo rapid advances in technology, and examination counts continue to rise. MR and CT studies now account for over 100 million exams annually in the United States. As MR and CT continue to develop advanced and more specialized applications, patient throughput continues to rise, and their operational principles tend to go well beyond the introductory education students receive during their entry level didactics and professional certifications in radiography or in other radiologic modalities. More often than not radiology administrators are seeking to hire multi-competent (cross-trained) radiologic technologists. 1

To better serve our students the MR and CT concentrations will concentrate on the physical principles of each modality, analysis of cross-sectional images, pathologic processes, and advanced applications. Students will be prepared to sit for a nationally administered advanced certification exam for either CT or MR.

Advanced certification is almost 100% required by healthcare institutions in New York and nationally. Advanced certification is highly recommended by radiology department accreditors such as The Joint Commission and often required by insurance providers as a precursor to Medicare reimbursement.2, 3

In addition to the didactic course work described, Rad Tech strongly feels that a clinical component be included for each concentration since a number of diagnostic examinations performed on actual patients is a prerequisite each applicant must fulfill before they can sit for the American Registry of Radiologic Technologists (ARRT) advanced level certification examinations.

To prepare students toward this growing trend, Rad Tech is proposing to restructure its current BSRS curriculum to offer three distinct concentrations.

<http://go.galegroup.com/ps/i.do?id=GALE%7CA57642994&sid=googleScholar&v=2.1&it=r&linkaccess=fulltext&issn=00338397&p=AONE&sw=w&authCount=1&u=kingslrc&selfRedirect=true>

2 <http://allhealthcare.monster.com/training/articles/3029-career-guide-radiologic-technologists-and-technicians?print=true>

3 <https://www.jointcommission.org/assets/1/6/TJC_Persp_Imaging_0716.pdf> (page 9)

There are currently three institutions listed on the JRCERT website offering an accredited bachelor's degree in New York State. Several other institutions, including NYCCT, offer a bachelor's degree in Radiological Science that are accredited through Middle States instead of JRCERT. CUNY currently offers one such accredited BS program at the New York City College of Technology from the Department of Radiologic Technology and Medical Imaging of which the CUNY Chancellor, City Tech’s President, Provost, and the Dean of the School of Professional Studies are supportive of. If modified as proposed, credit totals for each individual concentration in the BS would slightly increase from 120 to 121. A waiver has been requested for the additional credit.

Rad Tech offers the only bachelor's-level education in radiological science in the City University of New York (CUNY), with competitive tuition and enrollment capacity.  Rad Tech, known for its workplace-oriented curriculum, cutting-edge technologies and student-focused environment, is well positioned to provide students with this logical next step. Our bachelor's program will be enhanced in providing opportunities for students to engage in real-world applications through its energized x-ray laboratories, sophisticated equipment, and clinical affiliations. The proposed modification for our BSRS degree with the addition of a concentration choice will offer our diverse students a stronger and more efficient path toward achieving additional certifications, increased recognition in the profession, and enhance employment opportunities.

As detailed here, the proposed multi-concentration modification provides a stronger basis for all program students with either emphasis on an advanced modality practice or a better designed general concentration. It offers to firmly place a structure that separately and more efficiently prepares either broad-base or technologically specialized graduates from our current cohort depending on student’s prior background, workplace needs and individual career goals. However, all three concentrations will aim to provide a vastly enhanced technical background, building beyond AAS level, to help students keep up with the fast advancing radiologic fields.

Briefly stated, the changes will involve the following:

**Modify the Approved Curriculum to become the General Concentration:**

1. Modification of RAD 3627 Advanced Sectional Anatomy and RAD 3628 Pathophysiology for Medical Imaging courses into one course, RAD 3629 Advanced Anatomy with Pathophysiology.

This change will provide more application and integrated medical knowledge and less mechanism or specialized content.

1. Minor Modification of RAD 4726 Advanced Medical Imaging I.

**CT Concentration - New Courses:**

1. Introduce a new course, RAD 3525 CT Anatomy, Pathophysiology and Instrumentation
2. Introduce a new course, RAD 3728 CT Clinical Education I
3. Introduce a new course, RAD 4628 CT Clinical Education II
4. Introduce a new course, RAD 4728 CT Clinical Education III
5. Introduce a new course, RAD 4827 Advanced CT Theory and Applications

**MR Concentration - New Courses:**

1. Introduce a new course, RAD 3737 MR Anatomy, Pathophysiology and Instrumentation
2. Introduce a new course, RAD 3739 MR Clinical Education I
3. Introduce a new course, RAD 4629 MR Clinical Education II
4. Introduce a new course, RAD 4729 MR Clinical Education III
5. Introduce a new course, RAD 4829 Advanced MR Theory and Applications

**All Concentrations**

Minor Modification RAD 4830 Capstone Leadership Roles in Medical Imaging

* + - 1. Replace MAT 1272 Statistics with MAT 1375 Pre-Calculus

*Note: MAT 1275 is a required pre-requisite course in the A.A.S degree*

3. Introduce a new elective course, RAD 3100 Principles of Mammography for all credentialed Radiologic Technologists. This elective course will be an option for all BS concentrations, for both matriculated and non-matriculated students; but only is part of the General Concentration.

This proposal seeks to balance the need for advanced training, specifically in MR or CT for the working AAS professionals that need the specialized knowledge to perform as a dedicated specialist in the work place, while we recognize that a broad-base integration of multiple technologies beyond AAS would serve well to those who have already acquired specializations or gathered significant professional experience after AAS. These changes maintain and enhance the viability of the BSRS as a stand-alone degree that offers our students a strong modality-focused technical excellence or an integrated general assimilation. Note the general category will be offered to the experienced radiology professionals that require integration of multiple radiologic tools beyond AAS level for upper level hospital leadership or wider medical/graduate education or university level teaching. The tables below detail the proposed course changes:

## Table 2: General Concentration - Combine RAD 3627 and 3628 into RAD 3629

|  |  |  |  |
| --- | --- | --- | --- |
| Original Course Description | Proposed Course Description | Major change | Rationale |
| 1. **RAD 3627 Advanced Sectional Anatomy**   2 cl hrs, 0 lab hrs, 2 cr  **Course Description:** Students locate and identify structures in the axial, sagittal, coronal and oblique planes. Volumetric data sets and three-dimensional reconstruction of the body structures critical to diagnosis and treatment of diseases are explored. This enhances the students’ ability to provide patients in critical care with independent patient care and assist physicians with the prognosis, radiologic science professionals must understand cross-sectional anatomy in each of the imaging modalities. Prerequisite: Admission to BS Program   1. **RAD 3628 Pathophysiology for Medical Imaging**   2 cl hrs, 0 lab hrs, 2 cr  **Course Description:** Focus on various pathological conditions as they are demonstrated by each imaging modality. Emphasis on accurately identifying structures and recognizing abnormalities during advanced radiological imaging procedures. Clinical features of tissue characteristics and the imaging modality best indicated for a specific pathology are discussed. *Prerequisite: Admission to the Baccalaureate Program* | **RAD 3629 Advanced Anatomy with Pathophysiology**  3 cl hrs, 0 lab hrs, 3 cr  **Course Description:** This course allows students to locate and identify both normal and pathological conditions for structures in all body planes. Sectional Computed Tomography and Magnetic Resonance images will be reviewed. Emphasis on accurately identifying structures and recognizing abnormalities are critical to diagnosis and treatment and can assist physicians with a prognosis. Clinical features of tissue characteristics and the imaging modality best indicated for a specific pathology are discussed. *Prerequisite: Admission to the Baccalaureate Program* | **New Course**  **Incorporates material from original courses RAD 3627 and RAD 3628** | The credit and meeting hours of the merged course will reduce the two, two-credit courses into one cohesive three-credit course. The merged content will result in an extra credit that expands the mathematical component of the program. |

## 

## Table 3: New CT- Concentration Courses

|  |  |
| --- | --- |
| Proposed Course Description | Rationale |
| **RAD 3525 CT Anatomy, Pathophysiology and Instrumentation.** 2 cl hrs, 2 lab hrs, 3 cr  Both normal and pathologic computed tomography (CT) specific anatomy are reviewed.  A thorough understanding of both normal and abnormal anatomy as they appear with and without CT contrast is required for the student to perform in clinical rotations, correlate with other CT courses and, to some extent, with other relevant modalities including MR, Ultrasound and Nuclear Medicine. There is also a laboratory/tutorial component based on CT physics and problem solving for learning how to adjust technical parameters, patient positioning, and equipment controls for the major equipment manufacturers without direct physician interaction.  *Prerequisite: Admission to the Baccalaureate Program* | Mastery of normal and pathologic tissues is essential to a CT technologist’s performance in other courses as well as in clinical rotation learning. |
| **RAD 3728 CT Clinical Education I**  8 clinical hrs per week, (4hrs 2x/wk) 1 cr  Is aninternship designed to integrate and complement the didactic and practical concepts learned in the CT Anatomy with Pathophysiology within CT Technology courses. Emphasis is placed on patient care, radiation protection, contrast administration and parameter setting as per examination protocol(s). Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Computed Tomography for students seeking this option.  *Prerequisite: Admission to the Baccalaureate Program*  *Corequisites: RAD 3525* | In the first clinical rotation student learns hospital based policies that are integral for safe operation of CT scanners. He/she applies concepts learned concurrently in the didactic courses and practices some of the simple diagnostic exams as required in the basic categories toward professional ARRT licensure exam. |
| **RAD 4628 CT Clinical Education II**  8 clinical hrs per week, (4hrs 2x/wk) 1 cr  Further develop techniques acquired in the CT Anatomy with Pathophysiology within CT Technology courses. Continued emphasis are placed on patient care and safety and more advanced procedures. Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Computed Tomography for students seeking this option. *Prerequisite: RAD 3728* | Applies more advanced concepts learned didactically into clinical practice.  Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination. |
| **RAD 4728 CT Clinical Education III**  8 clinical hrs per week, (4hrs 2x/wk) 1 cr  Thisinternship is the final clinical course in the three part sequence fully integrate concepts learned in didactic courses to the clinical environment. Emphasis are placed on more difficult and advanced procedures as well as quality control and quality assurance methodologies. Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Computed Tomography for students seeking this option.  *Prerequisite: RAD 4628* | Continues the application of concepts learned didactically into clinical practice. Student is expected to show greater independence and develop protocols and policies that meets expectation of clinical sites.  Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination. |
| **RAD 4827 Advanced CT Theory and Applications**  3 cl hrs, 0 lab hrs, 3 cr  Focuses on the latest technologies, trends and areas of scientific study in the field of Computed Tomography. Topics include but not be limited to 3D multiplanar reconstruction techniques, coronary artery calcium scoring, computed aided diagnosis and artificial intelligence technologies, molecular fusion imaging (PET/CT), dose optimization methodologies, cardiac CT with gating, and dual-energy CT.  *Prerequisite: RAD 4628* | Student assimilates most advanced concepts and learns to compare risk/benefits of high and low dose CT techniques. He/she learns about cutting edge CT applications and relative roles of CT in comparison to other modalities and prepares reports from advanced journal articles as instructed in class. |

## Table 4: New MR-Concentration Courses

|  |  |
| --- | --- |
| Proposed Course Description | Rationale |
| **RAD 3737 MR Anatomy, Pathophysiology and Instrumentation** 2 cl hrs, 2 lab hrs, 3 cr  Both normal and pathologic magnetic resonance (MR) specific anatomy are reviewed.  A thorough understanding of both normal and abnormal anatomy as they appear with and without MR contrast is required for the student to perform in clinical rotations, to correlate with other MR courses and, to some extent, with other relevant modalities including CT, Ultrasound and Nuclear Medicine. There is also a laboratory/tutorial component based on MR physics and problem solving for learning how to adjust technical parameters, patient positioning as well as operating and optimizing imaging equipment from major equipment manufacturers without direct physician interaction.  *Prerequisite: Admission to the Baccalaureate Program* | Mastery of normal and pathologic tissues is essential to a MR technologist’s performance in other courses as well as in clinical rotation learning. |
| **RAD 3739 MRI Clinical Education I**  8 clinical hrs per week, (4hrs 2x/wk) 1 cr  Is aninternship designed to integrate and complement the didactic and practical concepts learned in the MR Anatomy with Pathophysiology within MR Technology courses. Emphasis is placed on patient safety and magnetic field patient contradictions, pulse sequence selection, slice selection, contrast administration and parameter setting as per examination protocol(s). Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Magnetic Resonance Imaging for students seeking this option. *Prerequisite: Admission to the Baccalaureate Program*  *Corequisites: RAD 3737* | In the first clinical rotation student learns hospital based policies that are integral for safe operation of MR scanners. He/she applies concepts learned concurrently in the didactic courses and practices some of the simple diagnostic exams as required in the basic categories toward professional ARRT licensure exam. |
| **RAD 4629 MRI Clinical Education II**  8 clinical hrs per week, (4hrs 2x/wk) 1 cr  Is an internship and a continuation of RAD 3739. It is designed to further develop techniques acquired in the MR imaging Anatomy with Pathophysiology within MR Technology courses. Continued emphasis are placed on patient care and magnetic field safety and more advanced procedures. Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Magnetic Resonance Imaging for students seeking this option. *Prerequisite RAD 3729.* | Applies concepts learned didactically into clinical practice.  Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination. |
| **RAD 4729 MRI Clinical Education III**  8 clinical hrs per week, (4hrs 2x/wk) 1 cr  Is aninternship and the final MRI clinical course. The student having taken the majority of the didactic courses is fully able to integrate materials learned in class into the MR procedures. Emphasis is on more difficult and advanced procedures as well as quality control and quality assurance methodologies. In this course, patient care and magnetic field safety and advanced procedures are the primary goals of learning. Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Magnetic Resonance Imaging for students seeking this option.  *Prerequisite: RAD 4629* | Continues the application of concepts learned didactically into clinical practice. Student is expected to show greater independence and develop protocols and policies that meets expectation of clinical sites.  Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination. |
| **RAD 4829 Advanced MRI Theory and Applications**  3 cl hrs, 0 lab hrs, 3 cr  Focuses on the latest technologies, trends and areas of scientific study in the field of Magnetic Resonance Imaging. Topics include but not be limited to Functional Magnetic Resonance Imaging (fMRI), Spectroscopy, Perfusion & Diffusion Weighted Imaging, Molecular Fusion Imaging (PET/MR), Computed Aided Diagnosis and Artificial Intelligence technologies, Special Reconstruction & 3D techniques, Advanced Pulse Sequences (MRA), Cardiac MRI with gating, and informatics integration.  *Prerequisite: RAD 4629* | Student assimilates most advanced concepts and learns to compare risk/benefits of high and low field MR techniques. He/she learns about cutting edge MR applications and relative roles of MR in comparison to other modalities and prepares reports from advanced journal articles as instructed in class. |

## 

## Table 5: Proposed Minor Course Changes

|  |  |  |  |
| --- | --- | --- | --- |
| Original Course Description | Proposed Course Description | Minor Change | Rationale |
| **RAD 4726 (BS)**  **Advanced Medical Imaging I**  3 cl hrs, 0 lab hrs, 3 cr  Introduction to the major components and processes needed to acquire, manipulate, store, and transmit digital MRI and CT information. Students are introduced to general examination protocol and procedures. Current trends and future applications of these technologies are discussed. *Prerequisite: PHYS 2603* | **RAD 3726**  **Advanced Medical Imaging I**  3 cl hrs, 0 lab hrs, 3 cr  Introduction to the major components and processes needed to acquire, manipulate, store, and transmit digital MRI and CT information. Students are introduced to general examination protocol and procedures. Current trends and future applications of these technologies are discussed. *Prerequisite: Admission to the bachelor's program.* | Minor change in course code (from 4726 to 3726), and prerequisite (from PHYS 2603 to Admission to the bachelor's program. | The level at which this course is taught best fit a 3000 level, due the various imaging background of the students who populate this course. Material is not dependent on PHYS 2603 and therefore need to be removed as a prerequisite. |
| **RAD 4830 (BS) Capstone Leadership Roles in Medical Imaging**  3 cl hrs, 0 lab hrs, 3 cr  Focus on substantive medical imaging ethical and legal aspects, accreditation compliance and non compliance issues. Additional topics include political context of health care organization and delivery, mechanisms for policy formulation and implementation, reporting, and risk management techniques. Students will examine various methods of health delivery and explore complex issues and themes that affect medical imaging, radiation therapy, and allied health education in a substantial writing assignment. Prerequisites: LIB 1201, RAD 3527, RAD 3627, RAD 3628, RAD 4726, RAD 4828 | **RAD 4830**  **Capstone Leadership Roles in Medical Imaging**  3 cl hrs, 0 lab hrs, 3 cr  Focus on substantive medical imaging ethical and legal aspects, accreditation compliance and non-compliance issues. Additional topics include political context of health care organization and delivery, mechanisms for policy formulation and implementation, reporting, and risk management techniques. Students will examine various methods of health delivery and explore complex issues and themes that affect the role of the medical imaging leader in a substantive writing assignment*. Pre-req: LIB 1201; Co-req: RAD 4828.* | Minor change in course description and prerequisites. | This minor change in course description is necessary to better align the title with the course description.  The proposed concentrations necessitate a minor change in the prerequisites in order to be consistent with program required curriculum offering. |

|  |  |  |
| --- | --- | --- |
| Original Course Description | Proposed Course Description | Rationale |
| **MAT 1272 (BS)**  **Statistics Pathways: Math and Quantitative Reasoning, Scientific World**  3 cl hrs, 3 cr  An introduction to statistical methods and statistical inference. Topics include descriptive statistics, random variables, distributions, sampling, estimation and inference, t-tests, chi-square tests and correlation.  Prerequisite: MAT 1180 or higher. Not open to students who have completed MAT 1372 or MAT 2572 | **MAT 1375**  **Precalculus Pathways: Math and Quantitative Reasoning, Scientific World**  4 cl hrs, 4 cr  Topics include an in-depth study of functions such as polynomial functions, inverse functions, radical functions, rational functions, trigonometric functions, exponential and logarithmic functions; solving inequalities; elements of vectors and complex numbers; solving trigonometric equations and identities involving sum, double and half-angle formulas; Binomial Theorem; and progressions. A graphing calculator is required.  Prerequisite: MAT 1275 or for new students, scores of at least 80 on the ACCUPLACER College Algebra Test | MAT 1375 (Pre-Calculus) would be more valuable to students than MAT 1272 for BSRS students and specifically those enrolled in the CT/MRI Concentrations.  Will complement the advanced CT and MRI courses. MAT 1375 offers an explanation and study of various mathematical functions which is critical for understanding various technical concepts in the radiological disciplines. |
| **RAD 1125 (AAS) Radiographic Procedures I** (fall only) 1.5 cl hrs, 1.5 lab hrs, 2 cr ~~Materials fee $30~~ This course introduces the student to basic radiographic positioning and related anatomy with emphasis on the skeletal system and extremities. In the laboratory, students develop positioning skills needed for clinical practices. Prerequisite: ~~CUNY proficiency in reading, writing and mathematics;~~ Corequisites: ~~RAD 1124,~~ RAD 1126, RAD 1127, ~~RAD 1128,~~ ~~BIO 2311~~ | **RAD 1125 Radiographic Procedures I** (fall only) 1.5 cl hrs, 1.5 lab hrs, 2 cr This course introduces the student to basic radiographic positioning and related anatomy with emphasis on the skeletal system and extremities. In the laboratory, students develop positioning skills needed for clinical practices. Prerequisite: ENG 1101, BIO 1101, BIO 2311, MAT 1275, RAD 1124;  Corequisites: RAD 1126, RAD 1127, RAD 1129, BIO 2312 | The current prerequisites for this course does not support student's success in the clinical phase of the associate program. With ENG 1101, BIO 1101, MAT 1275, BIO 2311 and RAD 1124, students' foundational knowledge will be strengthened and progress toward their degree completion. |
| **RAD 1126 (AAS) Image Production and Evaluation I** (fall only) 1.5 cl hrs, 1.5 lab hrs, 2 cr This course introduces the student to accessory radiographic equipment, darkroom procedure, radiographic mathematics and principles of exposure techniques. In the laboratory, students develop technical skills needed for image production. Prerequisite: ~~CUNY proficiency in reading, writing and mathematics;~~ Corequisites: ~~RAD 1124,~~ RAD 1125, RAD 1127, ~~RAD 1128, BIO 2311, MAT 1275 or higher~~ | RAD 1126 Image Production and Evaluation I (fall only) 1.5 cl hrs, 1.5 lab hrs, 2 cr This course introduces the student to accessory radiographic equipment, digital image processing, radiographic mathematics and principles of exposure techniques. In the laboratory, students develop technical skills needed for image production. Prerequisite: ENG 1101, BIO 1101, BIO 2311, MAT 1275 or higher, RAD 1124; Corequisites: RAD 1125, RAD 1127, RAD 1129, BIO 2312 | The current prerequisites for this course does not support student's success in the clinical phase of the associate program. With ENG 1101, BIO 1101, MAT 1275, BIO 2311 and RAD 1124, students' foundational knowledge will be strengthened and progress toward their degree completion. |
| **RAD 1127 (AAS) Patient Care and Management** (fall only) 1.5 cl hrs, 1.5 lab hrs, 2 cr  In this course the students learn general patient care and safety; first aid in emergencies; infection control and aseptic techniques; fundamentals of ethics and the law and basic medical terminology. Prerequisite: ~~CUNY proficiency in reading, writing and mathematics;~~ Corequisites: ~~RAD 1124,~~ RAD 1125, RAD 1126 ~~RAD 1128, BIO 2311~~ | RAD 1127 Patient Care and Management (fall only) 1.5 cl hrs, 1.5 lab hrs, 2 cr  In this course the students learn general patient care and safety; first aid in emergencies; infection control and aseptic techniques; fundamentals of ethics and the law and basic medical terminology. Prerequisite: ENG 1101, BIO 1101, BIO 2311, MAT 1275 or higher, RAD 1124; Corequisites: RAD 1125, RAD 1126, RAD 1129, BIO 2312 | The current prerequisites for this course does not support student's success in the clinical phase of the associate program. With ENG 1101, BIO 1101, MAT 1275, BIO 2311 and RAD 1124, students' foundational knowledge will be strengthened and progress toward their degree completion. |

## 

## Table 6: Proposed New Elective (Principles of Mammography)

|  |  |
| --- | --- |
| Proposed Course Description | Rationale |
| **RAD 3100 Principles of Mammography**  3 cl hrs, 0 lab hrs, 3 cr  This elective course builds on prior knowledge in radiologic technology and provides the Mammography Quality Standards Act (MQSA) required cognitive skills underlying the intelligent performance of mammographers. Emphasis is placed on routine breast imaging procedures and advanced techniques in Digital Breast Tomosynthesis, breast anatomy, physiology and pathology, patient interactions and management, positioning, equipment operation, quality management, and new technologies.  *Prerequisite: Admission to the Baccalaureate Program or departmental permission.* | The Mammography course is part of the BS General Concentration and a great option for the CT and MR Concentrations. This course is in high demand from both current and former Radiologic Technology students. In 2017, this course was offered to the BS in RS students in January and in March, to graduates of the program in collaboration with Continuing Studies. Both sections were successful. As the only medical imaging procedure using ionizing radiation that is under FDA regulations (MQSA), we anticipate possibly offering the course in fall and spring semesters. |

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | RAD 3629 Advanced Anatomy with Pathophysiology |
| **Proposal Date** | 9-28-2017 |
| **Proposer’s Name** | Eric Lobel & Subhendra Sarkar |
| **Course Number** | RAD 3629 |
| **Course Credits, Hours** | 3 class hours, 3 credits |
| **Course Pre / Co-Requisites** | Admission to the Baccalaureate Program |
| **Catalog Course Description** | This course allows students to locate and identify both normal and pathological conditions for structures in all body planes. Sectional Computed Tomography and Magnetic Resonance images are reviewed. Emphasis on accurately identifying structures and recognizing abnormalities are critical to diagnosis and treatment and can assist physicians with a prognosis. Clinical features of tissue characteristics and the imaging modality best indicated for a specific pathology are discussed. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | Thiscourse addresses the need to continue patient-centered education in the General BSRS Concentration but reduce the highest level of detail offered by having two separate courses, currently RAD 3627, Advanced Sectional Anatomy and RAD 3628, Pathophysiology for Medical Imaging.  The intention behind combining the two courses is to create a more fluid and synergistic interaction between the course contents. Originally it was necessary to separate the two in order provide a higher subject specific content for students seeking employment in CT or MR modalities. Merging these courses will create a complementary course where normal anatomy and physiology can be directly compared and discussed within a pathologic framework. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | N/A |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

Please include all appropriate documentation as indicated in the NEW COURSE PROPOSAL Combine all information into a single document that is included in the Curriculum Modification Form.

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | X |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific:*

|  |  |
| --- | --- |
| **Learning outcomes:** *For the successful completion of this course, students should:* | ***Assessment:*** *Instructional Activity, Evaluation Methods and Criteria* |
| 1. recognize and identify normal cross-sectional anatomy on CT and MR sections and compare with ultrasound, nuclear medicine and interventional modalities. | Writing assignments and in-class quizzes (frequency determined by instructor) to evaluate student’s understanding of multi-modal, cross-sectional images of normal appearance. |
| 1. Distinguish common pathologies recorded on multiplanar images. | Analysis of diseases and common appearance of pathology will be tested in homeworks, midterm and final exams. |
| 1. Describe the principles and mechanisms of disease including the role of genetics | This will be measured through evaluation of class discussion of assigned readings on disease mechanisms. |
| 1. Identify preferred diagnostic test or sequence of tests to diagnose disease or injury | Students will be asked to compare efficacy and diagnostic utility of various diagnostic tests in both midterm and final exams. |

*General Education*

|  |  |
| --- | --- |
| **Learning outcomes** | **Assessment** |
| 1. Understand and employ both qualitative and quantitative analysis to describe problems and compare solutions. | This will be measured in every quiz and exam in the form of short questions on relevant topics. |
| 1. Develop reading, writing and listening skills. | Students will be assessed on written summaries of particular lecture/s, class discussions or textbook chapter/s submitted as part of assignments. |
| 1. Will be able to integrate cause and expression of diseases with age, among various cultures, and ethical questions in treatment of diseases. | Students will be tested during the final exam controversial ethical issues requiring understanding of cultural, genetic, ageing and bias components as part of personalized medicine. |

Homework assignments and the final exam are based on the topics presented in class and will involve brief answer to image or pathology based questions. Some topics will cover pre-assigned review papers from Radiology journals. Typically, the homework and class participation will comprise 20% of final grade while midterm and final will cover the rest 80% and will be decided by the course instructor based on student suggestions at the beginning of the course.

**Example Weekly Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Topic | Chapters | LOs |
| 1 | Introduction to Pathophysiology and various websites relevant to course and how to navigate. | VH: 1  Websites: 2-4 | 1-3 |
| 2 | Neurological Disorders | VH: 14 | 1-4, 8 |
| 3 | Neurological Disorders continued | Websites 2-5 | 1-4, 8, GLO 1,2 |
| 4 | Digestive System Disorders and Urinary System Disorders | VH: 17, 18 | 1-8 |
| 5 | Cardiovascular System Disorders | VH: 12 | 1-8 |
| 6 | Cardiovascular System Disorders continued | Websites 2-4 | 1-8, GLO 1,2 |
| 7 | Musculoskeletal and  Respiratory System Disorders | VH: 9, 10 | 1-4 |
| 8 | Blood / Circulatory System and  **--------------Midterm Exam--------------** | VH: 13 | 1-4 GLO 3 |
| 9 | Neoplasms and Cancer | VH: 20 | 1-8, GLO 1,2 |
| 10 | Neoplasms and Cancer continued | Websites 2-4 | 1-8, GLO 1,2 |
| 11 | Infection | VH: 6 | 1-6 |
| 12 | Congenital and Genetic Disorders: manifestation and examples of affected anatomy | TBD | 4-8. GLO 1,2 |
| 13 | Complications Due to Aging: common diseases like stroke, dementia: CT and MR roles in stroke. **Review for Final** | Website 6  VH: 24 | 4-8, GLO 1,2 |
| 14 | Substance Abuse and Associated Problems: examples of psychiatric disorders: use of PET and MR spectroscopy | VH: 27  TBD | 4-7, GLO 1,2 |
| 15 | **--------------Final exam----------------** |  |  |

**Grading Policy and Procedure**

*Scope of assignments and other course requirements*: Students will prepare homework assignments regularly. There will be at least 3 exams and a final exam.

*Method of grading*: Students will be evaluated though homework and exams. The final grade will be based on a weighted average of the grades from the homework and exams as follows:

Final Exam 50%

Midterm 30%

HW/quizzes 20%

**Required Instructional Materials**

VanMeter, K.C. & Hubery, R. J. *Gould’s* *Pathophysiology for the Health Professions*. 5th ed. St. Louis, MO: Elsevier Saunders; 2014. ISBN 978-1-4557-5411-3 (abbreviated as VH)

**Recommended Instructional Materials (OER)**

[Interactive Radiology and Cross-Sectional Anatomy Guide](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&uact=8&ved=0ahUKEwiihrLBsbXWAhVC0YMKHSekDpwQFgg4MAM&url=https%3A%2F%2Fwww.unmc.edu%2Fdissection%2Fradiology%2Funit4.html&usg=AFQjCNH7j0GqvY8WzYNDl-h87xPrGhh_jw)

<https://www.unmc.edu/dissection/radiology/unit4.html>  
sectional-anatomy.org - radiologic anatomy of CT, MRI

<https://sectional-anatomy.org/en/>

Cross sectional google images

<https://www.google.com/search?q=cross+sectional+anatomy+in+radiology&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKEwiihrLBsbXWAhVC0YMKHSekDpwQsAQITw&biw=1366&bih=638>

[Spine MRI lecture2 - Indiana University Bloomington](http://r.search.yahoo.com/_ylt=A0LEVif9qcJZlR4AezMnnIlQ;_ylu=X3oDMTBydWNmY2MwBGNvbG8DYmYxBHBvcwM0BHZ0aWQDBHNlYwNzcg--/RV=2/RE=1505958526/RO=10/RU=http%3a%2f%2fwww.indiana.edu%2f%7Emri%2fseminars%2fslides%2fFall_2012%2fSpine%2520MRI%2520lecture%2520online%2520version.pdf/RK=1/RS=oOqKRWWNKZTpmXeR2caxGMq2cac-). (PDF)

[www.indiana.edu/~mri/seminars/slides/Fall\_2012/Spine%20MRI%2](http://www.indiana.edu/~mri/seminars/slides/Fall_2012/Spine%20MRI%252)...

[Carotid Artery Stenosis Imaging: Overview, Radiography, Computed...](http://r.search.yahoo.com/_ylt=A0LEVi1Xw8JZJo0Ay40nnIlQ;_ylu=X3oDMTByMHZ0NG9yBGNvbG8DYmYxBHBvcwM3BHZ0aWQDBHNlYwNzcg--/RV=2/RE=1505965015/RO=10/RU=http%3a%2f%2femedicine.medscape.com%2farticle%2f417524-overview/RK=1/RS=I6qJ2HYSNULVX7ofWq.1OPkH8rM-)

emedicine.medscape.com/article/417524-overview

**College academic integrity policy**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**Class Participation**

A student must be able to devote sufficient time to integrate and assimilate the anatomy and pathophysiology available today from main digital modalities at a level greater than AAS level. The course may not follow anatomical sequence from head to toe although it will be decided by the instructor. Due to the interdependence of anatomic relationships and distribution of pathologies across the whole human body, student should attend all lectures.

**Technology statement**

Before entering the course, students should be familiar with the American Registry of Radiologic Technologists (ARRT) content specifications in radiology in associate level.

**Course Need Assessment**

**Target Students and Projected Head Counts:**

This course will be a required upper-level science course for BSRS general concentration students. We will offer the course at least once per year, ideally in the Fall Semester and again in the spring if needed. All students would take this upon initial entry into the program. We anticipate that there will be approximately 20 students taking the course. As the program grows, the class enrollment will also.

**Physical Resources:** No additional physical resources are necessary.

**Overlap with Other Courses:** This course will have a small overlap (<20%) with specialized Anatomy and Pathophysiology courses planned for MR and CT concentrations (RAD 3525 and 3737) and will include new areas like ultrasound and nuclear medicine and mammography not covered by the specialized 3525 and 3737 courses.

**Full Time Faculty**

The department currently has a full-time and an adjunct faculty member capable of teaching this course.

**Course Design**

RAD 3629, Advanced Anatomy with Pathophysiology, is a classic course in all bachelor programs in advanced imaging and a required course for the BSRS (general concentration). It will consist of three hours of lecture classes, one evening per week, where the topics are introduced, and applicable pathologies are reviewed. Homework will be assigned on a regular basis, which will prepare the students for their midterm and final exams.

**Relationship to Programmatic Learning Outcomes**

This course will help students reach several programmatic learning outcomes of the Baccalaureate degree in Radiologic Sciences major. In particular, through this course students will:

* Develop a modest, unified background in anatomy and pathophysiology commonly encountered in the Radiology services offered today.
* Will be able to connect the learned principles with those in other BSRS and later graduate level courses (if pursued).
* This is the single-most pivotal course that will enable BSRS students in general concentration to have adequate discussions and scope of practice in the interactions with patients and physicians.

**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiological Science |
| **Course Prefix** | RAD |
| **Course Number** | 3629 |
| **Course Title** | **Advanced Anatomy with Pathophysiology** |
| **Catalog Description** | This course allows students to locate and identify both normal and pathological conditions for structures in all body planes. Sectional Computed Tomography and Magnetic Resonance images are reviewed. Emphasis on accurately identifying structures and recognizing abnormalities are critical to diagnosis and treatment and can assist physicians with a prognosis. Clinical features of tissue characteristics and the imaging modality best indicated for a specific pathology are discussed. |
| **Prerequisite** | Admission to the Baccalaureate Program in General Concentration |
| **Corequisite** |  |
| **Pre- or corequisite** |  |
| **Credits** | 3 |
| **Contact Hours** | 3 class hours |
| **Liberal Arts** | **[] Yes  [X  ] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[ ] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | **Spring 2019** |

**Rationale**

Thischange addresses the need to continue patient-centered education in the general BSRS Concentration but reduce the highest level of detail offered by having two separate courses. The intention behind combining the two courses is to create a more fluid and synergistic interaction between the course contents. Originally it was necessary to separate the two in order provide a higher subject specific content for students seeking employment in CT or MRI modalities. Merging these courses will create a complementary course where normal anatomy and physiology can be directly compared and discussed within a pathologic framework. The credit and meeting hours of the merged course will reduce the two, two credit courses into one cohesive three-credit course.

## New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | RAD 3525 CT Anatomy, Pathophysiology and Instrumentation |
| **Proposal Date** | 9-1-2017 |
| **Proposer’s Name** | Eric Lobel & Subhendra Sarkar |
| **Course Number** | RAD 3525 |
| **Course Credits, Hours** | 2 class hours, 2 lab hours, 3 credits |
| **Course Pre / Co-Requisites** | Admission to the Baccalaureate Program in Radiological Science (CT Concentration) |
| **Catalog Course Description** | Both normal and pathologic computed tomography (CT) specific anatomy are reviewed.  A thorough understanding of both normal and abnormal anatomy as they appear with and without CT contrast is required for the student to perform in clinical rotations, correlate with other CT courses and, to some extent, with other relevant modalities including MR, Ultrasound and Nuclear Medicine. There is also a laboratory/tutorial component based on CT physics and problem solving for learning how to adjust technical parameters, patient positioning, and equipment controls for the major equipment manufacturers without direct physician interaction. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | This course will address the sectional as well as 3D anatomy and pathophysiology associated with CT examinations that are one of the most useful diagnostic procedures available today for chronic and acute conditions. Clinical rotations for students of CT concentration are most effective when students get both didactic and practice based teachings. An integrated lab component increases the theoretical and applied knowledge for effective equipment operations and the physical principles behind various techniques in today’s CT technology. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | N/A |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | X |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific*

|  |  |
| --- | --- |
| **Learning outcomes (LOs)** | **Assessment** |
| 1. Describe the anatomy of various human body parts as needed to position and understand CT images effectively for efficient CT operation. | In-class quizzes (frequency determined by instructor) to evaluate students grasp of 3D relationships of normal anatomy |
| 1. Describe the common pathologies usually encountered in a hospital CT department for various body parts as needed to generate CT images reflecting the affected body parts. | Analysis of diseases and common appearance of pathology will be tested in home works, midterm and final exams. |
| 1. Apply safety, sensitivity and specificity principles of various CT techniques for specific chronic and acute conditions. | Students will be asked to compare efficacy and diagnostic utility of various diagnostic tests in both midterm and final exams |
| 1. Compute and implement protocol parameters as applicable to CT systems from different manufacturers per workplace standards. | Students will present to the rest of the class the range of workable protocols for various CT scans. |
| 1. Build policies specific to CT protocol variation for safety, patient tolerability and diagnostic efficacy as per regulations and priorities. | This will be evaluated during mid-term and final exams. |

*General Education*

|  |  |  |
| --- | --- | --- |
| **Learning outcomes** | | **Assessment** |
| 1. Understand and employ both qualitative and quantitative analysis to describe disease screening challenges. | Students will be tested through several quizzes both qualitative and quantitative importance of disease screening by competing techniques. | |
| 1. Develop an in-depth appreciation of risks as related to technology. | Students will be assessed on written summaries of particular lecture/s or other sources comparing risk benefit ratios for various CT procedures. | |
| 1. Will be able to integrate expression and effects of diseases at various ages, in different cultures, and the role of society in healthcare. | Students will be tested during the final exam controversial ethical issues requiring understanding of cultural, genetic, ageing and bias components as part of personalized medicine. | |

Homework assignments and the final exam are based on the topics presented in class as well as practice problems and applications in the lab. Typically, the homework and class participation will comprise 20% of final grade while midterm and final will cover the rest 80% and will be decided by the course instructor based on student suggestions at the beginning of the course.

**Example Weekly Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Topic | Chapters/Sections | LOs |
| 1 | -Introduction to CT Thorax, Abd/Pelvis  -Normal & vascular mediastinal anatomy  Lab practice for CT equipment | Ch 1, 2, 3, 8: RW  Ref 10. | L.O. 1, 2 |
| 2 | - Mediastinum- Lymph  Abnormalities & Masses - Lung Disease  - Pleura, Chest Wall, and Diaphragm  -Lab practice for CT equipment | Ch 4-7: RW  Ref 10 | L.O. 1, 2 |
| 3 | - Peritoneal cavity, vessels, abdominal  Wall, liverand abdominal trauma  -Lab practice for CT physics | Ch 9-11: RW  Ref 10 | L.O. 1,2 |
| 4 | - Biliary tree, GB, Pancreas, Spleen,  Kidneys, GI tract and Pelvis  - Lab practice for CT physics | Ch 12-18: RW  Ref 10 | L.O. 1, 2 |
| 5 | * CT in Musculoskeletal trauma and * Non-trauma Musculoskeletal pathology * Various CT protocols: head/neck | Ch 19, 20: RW  Ref 10 | L.O. 1, 2 |
| 6 | [BASIC APPROACH TO EVALUATING HEAD CT](http://r.search.yahoo.com/_ylt=A0LEVvMIvcJZlQUAiaonnIlQ;_ylu=X3oDMTBydWNmY2MwBGNvbG8DYmYxBHBvcwM0BHZ0aWQDBHNlYwNzcg--/RV=2/RE=1505963401/RO=10/RU=http%3a%2f%2fwww.brighamandwomens.org%2fDepartments_and_Services%2fradiology%2fRadiologyClerkship%2ffiles%2fBasicApproachToEvaluatingAHeadCT.pdf/RK=1/RS=v7uMknuWz7dt7suBtWg93cZ.0AU-) ANATOMY & PATHOLOGY  -Various CT protocols: Chest | Ref 2. Zimmerman  Ref 10 | L.O. 1, 2 |
| 7 | Carotid Artery Stenosis Imaging: Overview and CT Findings.  -CT protocols: head/neck angiography  -Various CT protocols: Abdomen/Pelvis | Ref 4. E-medicine Medscape review  Ref 10 | L.O. 1-4 |
| 8 | CT of the Abdomen with Reduced Tube Voltage in Adults – quality comparison  **----Mid Term ------** | Ref 7. Seyal | L.O. 1-5  GLO 6 |
| 9 | New and Evolving Concepts in CT for Abdominal Vascular Imaging – dual voltage advantages in pathology. Various CT protocols: chest angiography | Ref 8. Fuentes-Orrego  Ref 10 | L.O. 1-5 |
| 10 | Dynamic 4D CTA for Neurovascular Pathologies  -Various CT protocols: body angiography | Ref 6. Alnemari  Ref 10 | L.O. 1-5 |
| 11 | Intravenous Contrast Medium Administration and Scan Timing: Considerations and Approaches  -Various CT protocols: cancer of spine | Ref 5. Bae  Ref 10 | L.O. 1-5  GLO 7 |
| 12 | Silent embolism in diagnostic cerebral angiography: Making the case for CTA  -Various CT protocols: spine trauma | Ref 9. Bendszus  Ref 10 | L.O. 1- 5  GLO 6, 7 |
| 13 | Comparison of Low-Dose with Standard-dose Multidetector CT in Spine Trauma, Various CT protocols: musculoskeletal | Ref 3. Mulkens  Ref 10 | L.O. 1- 5  GLO 6, 7 |
| 14 | Comparison of CT, MR, Ultrasound, Nuclear medicine pathologies  -CT licensing examination review | T.B.D.  Ref 10 | L.O. 1- 5  GLO 6, 7 |
| 15 | **--------------Final exam----------------** | Ref 10 |  |

**Grading Policy and Procedure**

*Scope of assignments and other course requirements*: Students will prepare homework assignments regularly. There will be at least 3 exams and a final exam.

*Method of grading*: Students will be evaluated though homework and exams. The final grade will be based on a weighted average of the grades from the homework and exams as follows:

Final Exam 50%

Midterm 30%

HW/quizzes 20%

**Required Instructional Materials**

1. Fundamentals of Body CT. 4th Ed. Richard Webb, William Brant, Nancy Major, Saunders 2015

2. Computed Tomography: Physical Principles, Clinical Applications, and Quality Control, by Euclid Seeram, Latest Ed. Saunders Elsevier

**Recommended Instructional Materials**

1. [BASIC APPROACH TO EVALUATING A HEAD CT](http://r.search.yahoo.com/_ylt=A0LEVvMIvcJZlQUAiaonnIlQ;_ylu=X3oDMTBydWNmY2MwBGNvbG8DYmYxBHBvcwM0BHZ0aWQDBHNlYwNzcg--/RV=2/RE=1505963401/RO=10/RU=http%3a%2f%2fwww.brighamandwomens.org%2fDepartments_and_Services%2fradiology%2fRadiologyClerkship%2ffiles%2fBasicApproachToEvaluatingAHeadCT.pdf/RK=1/RS=v7uMknuWz7dt7suBtWg93cZ.0AU-) - David Zimmerman,

[www.brighamandwomens.org/Departments\_and\_Services/radiology/](http://www.brighamandwomens.org/Departments_and_Services/radiology/)...

1. Comparison of Low-Dose with Standard-Dose Multidetector CT in Cervical Spine Trauma. T.H. Mulkens, P. Marchal, S. Daineffe, R. Salgado, P. Bellinck, B. te Rijdt, B. Kegelaers and J.-L. Termote. AJNR 2007
2. Carotid Artery Stenosis Imaging: Overview, Radiography, Computed...

emedicine.medscape.com/article/417524-overview

1. Intravenous Contrast Medium Administration and Scan Timing at CT: Considerations And Approaches. *Kyongtae T*. *Bae*, Radiology 2010
2. Dynamic Four-Dimensional Computed Tomography Angiography for Neurovascular Pathologies- *Ahmed Alnemari*, World Neurosurgery 2017
3. CT of the Abdomen with Reduced Tube Voltage in Adults: A Practical Approach – *Adeel R. Seyal,*  Radiographics 2015
4. New and Evolving Concepts in CT for Abdominal Vascular Imaging – *Jorge M. Fuentes-Orrego,*  Radiographics 2014

Materials for laboratory sessions (A-C):

A. ARRT Clinical Experience Requirements for Post-Primary Computed Tomography Examination

B. Department/ hospital specific CT procedure / policy manual

C. Appropriate vendor supplied scanner / application manuals

**College academic integrity policy**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**Class Participation**

A student must be able to devote sufficient time to complete assimilation of anatomy and pathophysiology of all body parts. The laboratory component will involve physical science concepts to safely modify existing protocols for greater accuracy or to meet changing departmental policy. Clinical rotations and performance in CT licensure examinations will depend on the proficiency achieved in this course. Deficiency in any particular areas of human anatomy and pathology or radiation dose control parameters on a student’s part due to non-participation will significantly affect his/her functioning in all clinical courses since every clinical week may involve disease detection and safe delivery of radiation for anywhere in the whole body. Students should attend all lectures.

**Technology statement**

Before entering the course, as expected from AAS radiologic technology graduates, students should be comfortable with basic visualization of human anatomy, basic disease processes, assimilation of radiation concepts and introductory college level physics/chemistry/biology and mathematics as stipulated for BS admission.

**Course Need Assessment**

**Target Students and Projected Head Counts:** This course will be a required upper level science course for BS in Radiologic Sciences students. We will offer the course at least once per year, ideally in the Fall Semester and again in the spring if possible. All students would take this upon their entry point into the program. We anticipate that there will be approximately 20 students taking the course. As the program grows, also the class enrollment will grow.

**Physical Resources:** No additional physical resources are necessary.

**Overlap with Other Courses:** There is a small overlap (<10%) expected of this course with PHYS 2603.

**Full Time Faculty:** The department currently has a full-time faculty capable of teaching this course.

**Course Design**

RAD 3525, CT Anatomy, Pathophysiology and Instrumentation is a common course in many bachelor programs in advanced imaging and a required course for the BSRS CT concentration. It will consist of 2.0 hours of didactic and 2.0 hours of lab practice sessions, one evening per week, where the topics are introduced, and applicable pathology and equipment operations are reviewed in lecture, tutorial format. Homework will be assigned on a regular basis to prepare the students for the midterm and final exams and for professional CT certification exam.

**Relationship to Programmatic Learning Outcomes**

This course will help students reach several programmatic learning outcomes of the Baccalaureate degree in Radiologic Sciences major. In particular, through this course students will:

* Develop a modest background in anatomy and pathology commonly encountered in CT imaging
* Will be able to connect the learned principles with those in advanced and clinical courses as well as will be able to have adequate discussions and scope of practice during the interactions with patients and physicians.
* Performance in Clinical rotations and in CT licensure examinations will depend on the proficiency achieved in this course.

**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiological Science |
| **Course Prefix** | RAD |
| **Course Number** | 3525 |
| **Course Title** | CT Anatomy, Pathophysiology and Instrumentation |
| **Catalog Description** | Both normal and pathologic computed tomography (CT) specific anatomy are reviewed.  A thorough understanding of both normal and abnormal anatomy as they appear with and without CT contrast is required for the student to perform in clinical rotations, correlate with other CT courses and, to some extent, with other relevant modalities including MR, Ultrasound and Nuclear Medicine. There is also a laboratory/tutorial component based on CT physics and problem solving for learning how to adjust technical parameters, patient positioning, and equipment controls for the major equipment manufacturers without direct physician interaction. |
| **Prerequisite** | Admission to the Baccalaureate Program in Radiological Science (CT Concentration) |
| **Corequisite** |  |
| **Pre- or corequisite** |  |
| **Credits** | 3 |
| **Contact Hours** | 2.0 class hours, 2.0 lab hours, 3 hours total. |
| **Liberal Arts** | **[] Yes  [X  ] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | **Spring 2019** |

**Rationale**:

This course will address the sectional as well as 3D anatomy and pathophysiology associated with CT examinations that are one of the most useful diagnostic procedures available today for chronic and acute conditions. Clinical rotations for students of CT Concentration are most effective when students get both didactic and practice based teachings. An integrated lab component increases the theoretical and applied knowledge for effective equipment operations and the physical principles behind various techniques in today’s CT technology.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | RAD 3728 CT Clinical Education I |
| **Proposal Date** | 9-1-2017 |
| **Proposer’s Name** | Eric Lobel & Subhendra Sarkar |
| **Course Number** | RAD 3728 |
| **Course Credits, Hours** | 8 clinical hours, (4hrs 2x/wk) 1 credits |
| **Course Pre / Co-Requisites** | Admission to Baccalaureate Program, RAD 3525 |
| **Catalog Course Description** | Is an internship designed to integrate and complement the didactic and practical concepts learned in the CT Anatomy with Pathophysiology within CT Technology courses. Emphasis is placed on patient care, radiation protection, contrast administration and parameter setting as per examination protocol(s). Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Computed Tomography for students seeking this option. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | Applies concepts learned didactically into clinical practice. Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | N.A. |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | N/A |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific*

|  |  |
| --- | --- |
| **Learning outcomes** | **Assessment** |
| 1. Identify the appropriateness and utility of CT | Students will undergo on-site observation to satisfy correct protocol choice and related steps before performing each diagnostic CT. |
| 1. Generate high-resolution images of the anatomy / physiology of affected body parts. | Students will be tested individually the pros and cons of each protocol steps and compute risk/benefits for select cases. |
| 1. Calculate the risk/benefits relation of different amounts of radiation and associated quality. | This will be measured by the quality of each CT procedure completed and from the 2 case presentations each semester. |
| 1. Appreciate advantages of 3D images as opposed to 2D from routine X-ray and often multi-task with significant time pressure. | Students will be tested through observation of multi-tasking skills while interacting with scanner and patients. |
| 1. Work with complex image processing steps and transfer large image data files to servers. | This will be measured from observation of image analysis and processing skills for each student for each procedure. |

*General Education*

|  |  |
| --- | --- |
| **Learning outcomes** | **Assessment** |
| 1.Demonstrate the ability to work collaboratively and independently in the supervised clinical setting. | This ability will be tested through observation of efficiency, accuracy and student’s ability to be a team player at clinical sites. |
| 2.Understand and employ both qualitative and quantitative analysis of imaging steps. | Students will be assessed on written summaries of protocols and procedural steps immediately after each clinical case completed. |
| 3.Develop individual patient care knowledge and integrate with the roles of the clinical team. Build consensus. | Students will be evaluated on the skill transfer for performing CT procedures and the ability to integrate learning from senior technologists and physicians during the case presentations. |

**Prerequisite:** Admission to the Baccalaureate Program

**Corequisites:** RAD 3525

**Criteria for student evaluation for each competency:**

A) Correctly understanding physician order for CT

B) Preparation for CT room and contrast, if needed and ensure radiation safety

C) Identifying protocol and plan all steps including any approved deviations from standard steps

D) Identification, communication to and assessment of the correct patient for the correct procedure

E) Documentation of history and prep of patient for CT as per department protocol

F) Patient positioning, CDC precautions, correct scanner protocol / parameters selection

G) Initiate and complete the exam (check for allergy/extravasations, other complications)

H) Check images for quality, accuracy / post-processing and transfer images to correct destination

I) Documentation / recording of exam details in logbook / ensure data archiving

J) Patient discharge with postoperative instructions (ensuring handover)

K) Document key points learned including any deviation of standard procedure needed for future discussion with radiologist/case presentation ARRT procedure log

**Recommended Instructional Materials:**

1. ARRT Clinical Experience Requirements for Post-Primary CT Examination

2. Department/ hospital specific CT procedure / policy manual

3. Appropriate vendor supplied scanner / application manuals.

**Topics/Procedures**

A minimum of 30 successful demonstration of repeats spanning at least 8 of the 10 suggested list of procedures below should be completed by the end of the semester.

*Topics:*

\*Head, Spine, Abdomen, Pelvis, Chest, simple post-processing e.g. MPR (familiarity with contrast).

*Procedures:*

1. Head without contrast
2. Head with contrast
3. Trauma head
4. Face, orbits, sinuses with or without trauma
5. Analysis of head CT density using ROI and geometric measurements
6. Routine non-contrast spine with or without trauma
7. Spinal multi-planar reconstruction
8. Operability of contrast injector
9. Radiation dose documentation and dose comparison for various procedures
10. Routine non-trauma chest, abdomen, pelvis with or without contrast

\*Same procedure may be used to demonstrate competency in more than one anatomical region if applicable, e.g. in Chest/abdomen/pelvis scans.

**Example Weekly Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Topic | Reference | LOs/Assessment Criteria  (Case Evaluations by Site Mentors after every case) |
| 1 | One or more from procedures listed above, preferably from 1-3. | Ref. Materials 1-3 above | 1, 2 / A-D |
| 2 | One or more from procedures listed above, preferably from 1-3. | Ref. Materials 1-3 above | 1, 2 / A-D |
| 3 | One or more from procedures listed above, preferably from 1-3, 6 and 10. | Ref. Materials 1-3 above | 3-5 / C-F |
| 4 | One or more from procedures listed above, preferably from 1-3, 6 and 10. | Ref. Materials 1-3 above | 3-5 / C-F |
| 5 | One or more from procedures listed above, preferably from 1-3, 6, 7 & 10. | Ref. Materials 1-3 above | 3-5 / C-F |
| 6 | One or more from procedures listed above, preferably from 4-8 &10. | Ref. Materials 1-3 above | 1-5 / A-G |
| 7 | One or more from procedures listed above, preferably from 4-8 & 10. | Ref. Materials 1-3 above | 1-5 / A-G |
| 8 | One or more from procedures listed above, preferably from 4-8 & 10. | Ref. Materials 1-3 above | 1-5 / A-G |
| 9 | One or more from procedures listed above, preferably from 4-8 & 10. | Ref. Materials 1-3 above | 2-3 / A-K |
| 10 | One or more from procedures listed above, preferably from 4-8 & 10. | Ref. Materials 1-3 above | 2-3 / A-K |
| 11 | One or more from procedures listed above, preferably from 6-10. | Ref. Materials 1-3 above | 1-5 / E-H |
| 12 | One or more from procedures listed above, preferably from 6-10. | Ref. Materials 1-3 above | 1-5 / E-H |
| 13 | One or more from procedures listed above, preferably from 6-10. | Ref. Materials 1-3 above | 1-7 / E-K |
| 14 | One or more from procedures listed above, preferably from 6-10. | Ref. Materials 1-3 above | 1-7 / E-K |
| 15 | **---Final Exam/Case Presentation-----** |  |  |

**Grading**

Competency Evaluations (30) 40%

Professional Growth and Development Report 30%

Clinical Case Presentation 30%

100%

**Grading Policy and Procedure**

*Method of grading*: Students will be evaluated though demonstration of successful completion of required CT procedures satisfying department standards for quality. These competencies will have to be signed off by site mentor and/or clinical instructor while the competency level will reflect a numerical grade for each procedure. The student will also have to present at least 2 procedure details from his/her list of completed exams by the end of the semester. The final grade will be based on a weighted average of the numerical grades of completed procedures , Professional Growth and Development Report and the case presentation.

**College academic integrity policy**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at NYCCT and is punishable by penalties, including failing grades, suspension, and expulsion.

**Class Participation**

A student must be able to devote sufficient time to complete all clinical practices with accuracy and professionalism. Lateness and absences should be communicated to the respective clinical department as much in advance as possible with emails to follow to clinical instructor.

**Technology statement**:

Before entering the course, and within 2 weeks after starting the introductory BS Radiology courses the students should be able to analyze patient history, diagnostic charts and radiation data and be comfortable with QA/QC.

**Course Need Assessment**

**Target Students and Projected Head Counts:** This course will be a required upper level science course for BSRS CT concentration students. We will offer the course twice per year, ideally in the Fall Semester and again in the Spring, adding Summer sessions when necessary. All students would take either in their first semester or the immediate next semester offered. We anticipate that there will be approximately 8 students taking the course. As the program grows, also the class enrollment will grow.

**Physical Resources:** Students will report to a clinical (hospital) affiliation off-campus and provide immunization/drug test records satisfying site requirements to work in patient service areas.

**Overlap with Other Courses:** No overlaps with existing courses.

**Full Time Faculty:** Adjunct faculty and a full time clinical coordinator will be required to oversee the entire clinical courses in the CT and MR Concentrations.

**Course Design:** RAD 3728 CT Clinical Education I is a common course in many bachelor programs in advanced imaging and stand-alone certificate/continuing education courses in preparation for the advanced ARRT registry in CT. It is a required course for the BSRS (CT concentration). It will consist of eight hours of clinical classes per week and follow hospital affiliation scheduling. Patient examinations and/or Quality Control tests on CT equipment will be logged into the ARRT web portal. Students will be required to provide faculty members access to the database and meet an exam quota. A written progress report and case presentation may additionally be part of the overall grade.

**Relationship to Programmatic Learning Outcomes**

This course will help students reach several programmatic learning outcomes of the Baccalaureate degree in Radiologic Sciences with computed tomography concentration. In particular, through this course students will:

* An appreciation of various steps of how the computed tomography procedures are administered to help detect and diagnose various disorders beyond routine x-ray techniques.
* A concrete foundation and proficiency in the safe application of ionizing radiation to generate high resolution structural and physiological images of patients including the equipment operation and image manipulation under radiologist and lead technologist’s supervision.

**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiological Science |
| **Course Prefix** | RAD |
| **Course Number** | 3728 |
| **Course Title** | **CT Clinical Education I** |
| **Catalog Description** | Is an internship designed to integrate and complement the didactic and practical concepts learned in the CT Anatomy with Pathophysiology within CT Technology courses. Emphasis is placed on patient care, radiation protection, contrast administration and parameter setting as per examination protocol(s). Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Computed Tomography for students seeking this option. |
| **Prerequisite** | Admission to the Baccalaureate Program in CT Concentration |
| **Corequisite** |  |
| **Pre- or corequisite** | RAD 3525 |
| **Credits** | 1 |
| **Contact Hours** | 8 clinical hours/week |
| **Liberal Arts** | **[] Yes  [X  ] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | **Spring 2019** |

**Rationale**:

In the first clinical rotation student learns hospital based policies that are integral for safe operation of CT scanners. He/she applies concepts learned concurrently in the didactic courses and practices some of the simple diagnostic exams as required in the basic categories toward professional ARRT licensure exam.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | RAD 4628 CT Clinical Education II |
| **Proposal Date** | 9-1-2017 |
| **Proposer’s Name** | Eric Lobel & Subhendra Sarkar |
| **Course Number** | RAD 4628 |
| **Course Credits, Hours** | 8 clinical hours, (4 hrs 2x/wk) 1 credits |
| **Course Pre / Co-Requisites** | RAD 3728 |
| **Catalog Course Description** | Further development of techniques acquired in the CT Anatomy with Pathophysiology within CT Technology courses. Continued emphasis are placed on patient care and safety and more advanced procedures. Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Computed Tomography for students seeking this option. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | Continues the application of concepts learned didactically into clinical practice. Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination. Allows for functioning with indirect supervision and to begin more advanced CT studies. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | N.A. |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | N/A |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific*

|  |  |
| --- | --- |
| **Learning outcome** | **Assessment** |
| 1. Will learn about the appropriateness and utility of CT scans for chronic and acute conditions as practiced per site protocols. | Each completed case will be individually evaluated by site mentors from clinical sites and will be graded by the clinical instructor at the middle and at the end of semester. |
| 1. Will assimilate the anatomy and physiology of normal and affected body parts at high resolution. | These will be evaluated for every student, for every completed case by the site mentors throughout the semester. |
| 1. Will understand the risk/benefits relation of different amounts of radiation and associated contrast efficacy to generate CT quality in simple to involved cases. | Students will be assessed on their planned approaches and reduction of radiation dose at the middle and at the end of semester during case presentations. |
| 1. Will be able to appreciate advantages of 3D images as opposed to 2D from routine X-ray and often multi-task with significant time pressure. | These will be evaluated by 3D image processing accuracy for every completed case by site mentors throughout the semester. |
| 1. Will continue to learn complex image processing steps and transfer large image data files to multiple servers. | These will be evaluated by image processing accuracy by both site mentors and clinical instructor. |

*General Education*

|  |  |
| --- | --- |
| **Learning outcomes** | **Assessment** |
| 1.Demonstrate the ability to work collaboratively and independently in the supervised clinical setting. | This ability will be tested through observation of efficiency, accuracy and student’s ability to be a team player at clinical sites. |
| 2.Understand and employ both qualitative and quantitative analysis of imaging steps. | Students will be assessed on written summaries of protocols and procedural steps immediately after each clinical case completed. |
| 3.Develop individual patient care knowledge and integrate with the roles of the clinical team. Build consensus. | Students will be evaluated on the skill transfer for performing CT procedures and the ability to integrate learning from senior technologists and physicians during the case presentations. |

**Prerequisite: RAD 3728**

**Criteria for student evaluation for each competency:**

A) Correctly understanding physician order for CT

B) Preparation for CT room and contrast, if needed and ensure radiation safety

C) Identifying protocol and plan all steps including any approved deviations from standard steps

D) Identification, communication to and assessment of the correct patient for the correct procedure

E) Documentation of history and prep of patient for CT as per department protocol

F) Patient positioning, CDC precautions, correct scanner protocol / parameters selection

G) Initiate and complete the exam (check for allergy/extravasation, other complications)

H) Check images for quality, accuracy / post-processing and transfer images to correct destination

I) Documentation / recording of exam details in logbook / ensure data archiving

J) Patient discharge with postoperative instructions (ensuring handover)

K) Document key points learned including any deviation of standard procedure needed for future discussion with radiologist/case presentation ARRT procedure log

**Recommended Instructional Materials:**

1. ARRT Clinical Experience Requirements for Post-Primary Computed Tomography Examination

2. Department/ hospital specific CT procedure / policy manual

3. Appropriate vendor supplied scanner / application manuals.

**Topics/Procedures**

A minimum of 42 successful demonstration of repeats spanning at least 15 of the 17-suggested list of procedures below should be completed by the end of the semester.

*Topics:*

1. All Clinical Education-I with greater involvement and understanding i.e. Head, Spine, Abdomen, Pelvis, Chest, simple post-processing e.g. MPR (modest familiarity with contrast procedures and, in addition,
2. Musculoskeletal and simple CTA, and minor to moderate trauma, 3D reconstruction and retrospective reconstruction, daily QA procedures.

*Procedures:*

1. Head without contrast
2. Head with contrast
3. Trauma head
4. Face, orbits, sinuses with or without trauma
5. Analysis of head CT density using ROI and geometric measurements plus identifying structures from above
6. Routine non-contrast spine with or without trauma
7. Spinal multiplanar reconstruction, retrospective reconstruction
8. Operability of contrast injector/ contrast dose planning
9. Radiation dose documentation and dose comparison for various procedures
10. Routine non-trauma chest, abdomen, pelvis with or without contrast
11. Soft tissue neck with contrast
12. CTA procedures including vascular chest, vascular head and vascular neck
13. Chest and/or pelvic trauma and MPR
14. Musculoskeletal trauma and MPR
15. Routine extremities with or without contrast
16. Multi-phase abdomen
17. Biopsies and drainage

**Example Weekly Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Topic | Reference | LOs/Assessment Criteria  (Case Evaluations by Site Mentors after every case) |
| 1 | Two or more from procedures listed above, preferably from 1-10. | Ref. Materials 1-3 above | 1, 2 / A-D |
| 2 | Two or more from procedures listed above, preferably from 1-10. | Ref. Materials 1-3 above | 1, 2 / A-D |
| 3 | Two or more from procedures listed above, preferably from 1-10, 12 | Ref. Materials 1-3 above | 3-5 / C-F |
| 4 | One or more from procedures listed above, preferably from 11-17. | Ref. Materials 1-3 above | 3-5 / C-F |
| 5 | Two or more from procedures listed above, preferably from 11-17. | Ref. Materials 1-3 above | 3-5 / C-F |
| 6 | Two or more from procedures listed above, preferably from 11-17. | Ref. Materials 1-3 above | 1-5 / A-G |
| 7 | Two or more from procedures listed above, preferably from 11-17. | Ref. Materials 1-3 above | 1-5 / A-G |
| 8 | Two or more from procedures listed above, preferably from 11-17. | Ref. Materials 1-3 above | 1-5 / A-G |
| 9 | Two or more from procedures listed above, preferably from 11-17. | Ref. Materials 1-3 above | 2-3 / A-K |
| 10 | Two or more from procedures listed above, preferably from 11-17. | Ref. Materials 1-3 above | 2-3 / A-K |
| 11 | Two or more from procedures listed above, preferably from 11-17. | Ref. Materials 1-3 above | 1-5 / E-H |
| 12 | Two or more from procedures listed above, preferably from 11-17. | Ref. Materials 1-3 above | 1-5 / E-H |
| 13 | Two or more from procedures listed above, preferably from 11-17. | Ref. Materials 1-3 above | 1-7 / E-K |
| 14 | Two or more from procedures listed above, preferably from 11-17. | Ref. Materials 1-3 above | 1-7 / E-K |
| 15 | **---Final Exam/Case Presentation-----** |  |  |

**Grading**

Competency Evaluations (42) 40%

Professional Growth and Development Report 30%

Clinical Case Presentation 30%

100%

**Grading Policy and Procedure**

*Method of grading*: Students will be evaluated though demonstration of successful completion of required CT procedures satisfying department standards for quality. These competencies will have to be signed off by site mentor and/or clinical instructor while the competency level will reflect a numerical grade for each procedure. The student will also have to present at least 2 procedure details from his/her list of completed exams by the end of the semester. The final grade will be based on a weighted average of the numerical grades of completed procedures , Professional Growth and Development Report and the case presentation.

**College academic integrity policy**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**Class Participation**

A student must be able to devote sufficient time to complete all clinical practices with accuracy and professionalism. Lateness and absences should be communicated to the respective clinical department as much in advance as possible with emails to follow to clinical instructor.

**Technology statement**:

Before entry students should be able to analyze patient history, diagnostic charts and radiation data and be comfortable with QA/QC.

**Course Need Assessment**

**Target Students and Projected Head Counts:** This course will be a required upper level science course for BSRS CT concentration students. We will offer the course twice per year, ideally in the Fall Semester and again in the spring, adding summer sessions if possible. All students would take this course in the immediate semester offered after completion of RAD 3728 CT Clinical Education I. We anticipate that there will be approximately 8 students taking the course. As the program grows, also the class enrollment will grow.

**Physical Resources:**

Students will report to a clinical (hospital) affiliation off-campus and provide immunization/drug test records satisfying site requirements to work in patient service areas.

**Overlap with Other Courses:** This course does not overlap with any other courses.

**Full Time Faculty:** An adjunct faculty member and a full time clinical coordinator will be required to oversee the entire clinical courses in the CT and MR Concentrations.

**Course Design**

RAD 4628 CT Clinical Education II is a common course in many bachelor programs in advanced imaging and stand-alone certificate/continuing education courses in preparation for the advanced (ARRT) registry in CT. It is a required course for the BSRS (CT concentration). It will consist of eight hours of clinical classes per week and follow hospital affiliation scheduling. Patient examinations and/or Quality Control tests on CT equipment will be logged into the ARRT web portal. Students will be required to give faculty access to the ARRT database to verify they have meet an examination quota. A written progress report and/or case presentation may additionally be part of the weighted overall course grade.

**Relationship to Programmatic Learning Outcomes**

This course will help students reach several programmatic learning outcomes of the Baccalaureate degree in Radiologic Sciences with computed tomography concentration. In particular, through this course students will:

* An appreciation of various steps of how the computed tomography procedures are administered to help detect and diagnose various disorders beyond routine X-ray techniques.
* A concrete foundation and proficiency in safe application of ionizing radiation to generate high resolution structural and physiological images of patients including the equipment operation and image manipulation under radiologist and lead technologist’s supervision.

**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiological Science |
| **Course Prefix** | RAD |
| **Course Number** | 4628 |
| **Course Title** | **CT Clinical Education II** |
| **Catalog Description** | Further development of techniques acquired in the CT Anatomy with Pathophysiology within CT Technology courses. Continued emphasis are placed on patient care and safety and more advanced procedures. Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Computed Tomography for students seeking this option. |
| **Prerequisite** | RAD 3728 |
| **Corequisite** |  |
| **Pre- or corequisite** |  |
| **Credits** | 1 |
| **Contact Hours** | 8 clinical hours/week |
| **Liberal Arts** | **[] Yes  [X  ] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | Spring 2019 |

**Rationale**:

Applies more advanced concepts learned didactically into clinical practice. Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | CT Clinical Education III |
| **Proposal Date** | 9-1-2017 |
| **Proposer’s Name** | Eric Lobel & Subhendra Sarkar |
| **Course Number** | RAD 4728 |
| **Course Credits, Hours** | 8 clinical hours, (4 hrs 2x/wk) 1 credits |
| **Course Pre / Co-Requisites** | RAD 4628 |
| **Catalog Course Description** | Thisinternship is the final clinical course in the three part sequence fully integrate concepts learned in didactic courses to the clinical environment. Emphasis are placed on more difficult and advanced procedures as well as quality control and quality assurance methodologies. Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Computed Tomography for students seeking this option. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | Completes the application of concepts learned didactically into clinical practice. Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination. Focus on advanced procedures and quality control tests. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | N/A |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | N/A |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific*

|  |  |
| --- | --- |
| **Learning outcomes** | **Assessment** |
| 1. Will learn about the appropriateness and utility of CT scans for chronic and acute conditions. | Each complex case will be individually evaluated by site mentors from clinical sites and will be graded by the clinical instructor at the middle and at the end of semester. |
| 1. Will assimilate the anatomy and physiology of normal and affected body parts at high resolution. | These will be evaluated for every student, during the case presentations. |
| 1. Will understand the risk/benefits relation of different amounts of radiation and associated contrast efficacy to generate CT quality in complex and involved cases. | Students will be assessed on their planned approaches to minimize radiation dose and will be part of their report for every case completed. |
| 1. Will be able to multi-task including satisfactory patient handling and related communication. | Clinical satisfaction comments of patients or site mentors for a minimum of 3 cases will be evaluated during the semester for each student by clinical instructor. |
| 1. Will learn to work with complex image processing steps in consultation with radiologists. | These will be evaluated for image processing accuracy by both site mentors and clinical instructor. |

*General Education*

|  |  |
| --- | --- |
| **Learning outcomes** | **Assessment** |
| 1.Demonstrate the ability to work collaboratively and independently in the supervised clinical setting. Build consensus. | This ability will be tested through observation of efficiency, accuracy and student’s ability to be a team player at clinical sites. |
| 2.Understand and employ both qualitative and quantitative analysis of imaging concepts as related to advanced clinical problems. | Students will be assessed on ability to apply advanced science concepts to CT protocols needed to satisfactorily integrate benefits and drawbacks of procedures performed. |
| 3.Develop individual patient care knowledge and integrate with the information flow of the clinical departments. | Students will be evaluated on performing CT procedures and the integrated learning from senior technologists and physicians during their case presentations. |

**Prerequisite: RAD 4628**

**Criteria for student evaluation for each competency:**

A) Correctly understanding physician order for CT

B) Preparation for CT room and contrast, if needed and ensure radiation safety

C) Identifying protocol and plan all steps including any approved deviations from standard steps

D) Identification, communication to and assessment of the correct patient for the correct procedure

E) Documentation of history and prep of patient for CT as per department protocol

F) Patient positioning, CDC precautions, correct scanner protocol / parameters selection

G) Initiate and complete the exam (check for allergy/extravasation, other complications)

H) Check images for quality, accuracy / post-processing and transfer images to correct destination

I) Documentation / recording of exam details in logbook / ensure data archiving

J) Patient discharge with postoperative instructions (ensuring handover)

K) Document key points learned including any deviation of standard procedure needed for future discussion with radiologist/case presentation ARRT procedure log

**Recommended Instructional Materials:**

1. ARRT Clinical Experience Requirements for Post-Primary Computed Tomography Examination

2. Department/ hospital specific CT procedure / policy manual

3. Appropriate vendor supplied scanner / application manuals.

**Topics/Procedures**

A minimum of 53 successful demonstration of repeats spanning at least 20 of the 28 suggested list of procedures below should be completed by the end of the semester.

*Topics:*

1. All of Clinical Education-II with greater involvement and understanding i.e. Head, Spine, Abdomen, Pelvis, Chest, simple post-processing e.g. MPR (modest familiarity with contrast procedures, Musculoskeletal and simple CTA, and minor to moderate trauma, 3D reconstruction and retrospective reconstruction, daily QA procedures and in addition,
2. More complex CTA (full competency with contrast procedures) and complex trauma or complex decision-making situations involving senior technologists or radiologists for example for ICU or pediatric patients.

*Procedures:*

1. Head without contrast
2. Head with contrast, brain perfusion (if available)
3. Trauma head
4. Head CT for Early Stroke Detection (Brain Bleed)
5. Face, orbits, sinuses with or without trauma
6. Analysis of head CT density using ROI and geometric measurements plus identifying structures from above
7. Routine non-contrast spine with or without trauma
8. Spinal multiplanar reconstruction, retrospective reconstruction
9. Operability of contrast injector/ contrast dose planning
10. Radiation dose documentation and dose comparison for various procedures
11. Routine non-trauma chest, abdomen, pelvis with or without contrast
12. Soft Tissue neck with contrast
13. CTA procedures including vascular chest, vascular head and vascular neck
14. Chest and/or pelvic trauma and MPR
15. Musculoskeletal trauma and MPR
16. Routine extremities with or without contrast
17. Multi-phase abdomen
18. Biopsies and Drainage
19. High dose lung nodule study and low-dose lung screening study
20. CT protocol building for adults and dose reduction choices
21. Dose reduction and clinical quality assessments for various cases
22. Calcium scoring/coronary angiography for heart
23. CT enterography and CT colonography
24. Dual energy CT applications
25. Post processing for vascular studies in stand-alone workstations
26. Pediatric protocols and dose reduction
27. Familiarity with ACR accreditation documentation/submissions
28. Familiarity with various dose registry and lung screening registry set-up/documentation

**Example Weekly Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Topic | Reference | LOs/Assessment Criteria  (Case Evaluations by Site Mentors after every case) |
| 1 | Three or more from procedures listed above, preferably from 1-19. | Ref. Materials 1-3 above | 1, 2 / A-D |
| 2 | Three or more from procedures listed above, preferably from 1-19. | Ref. Materials 1-3 above | 1, 2 / A-D |
| 3 | Three or more from procedures listed above, preferably from 1-19. | Ref. Materials 1-3 above | 3-5 / C-F |
| 4 | Three or more from procedures listed above, preferably from 1-19. | Ref. Materials 1-3 above | 3-5 / C-F |
| 5 | Three or more from procedures listed above, preferably from 1-19, plus  One item if possible from 20-28. | Ref. Materials 1-3 above | 3-5 / C-F |
| 6 | Three or more from procedures listed above, preferably from 1-19, plus  One item if possible from 20-28. | Ref. Materials 1-3 above | 1-5 / A-G |
| 7 | Three or more from procedures listed above, preferably from 1-19, plus  One item if possible from 20-28. | Ref. Materials 1-3 above | 1-5 / A-G |
| 8 | Three or more from procedures listed above, preferably from 1-19, plus  One item if possible from 20-28. | Ref. Materials 1-3 above | 1-5 / A-G |
| 9 | Three or more from procedures listed above, preferably from 1-19, plus  One item if possible from 20-28. | Ref. Materials 1-3 above | 2-3 / A-K |
| 10 | Three or more from procedures listed above, preferably from 1-19, plus  One item if possible from 20-28. | Ref. Materials 1-3 above | 2-3 / A-K |
| 11 | Three or more from procedures listed above, preferably from 1-19, plus  One item if possible from 20-28. | Ref. Materials 1-3 above | 1-5 / E-H |
| 12 | Three or more from procedures listed above, preferably from 1-19, plus  One item if possible from 20-28. | Ref. Materials 1-3 above | 1-5 / E-H |
| 13 | Three or more from procedures listed above, preferably from 1-19, plus  One item if possible from 20-28. | Ref. Materials 1-3 above | 1-7 / E-K |
| 14 | Three or more from procedures listed above, preferably from 1-19, plus  One item if possible from 20-28. | Ref. Materials 1-3 above | 1-7 / E-K |
| 15 | **---Final Exam/Case Presentation-----** |  |  |

**Grading**

Competency Evaluations (53) 40%

Professional Growth and Development Report 30%

Clinical Case Presentation 30%

100%

**Grading Policy and Procedure**

*Method of grading*: Students will be evaluated though demonstration of successful completion of required CT procedures satisfying department standards for quality. These competencies will have to be signed off by site mentor and/or clinical instructor while the competency level will reflect a numerical grade for each procedure. The student will also have to present at least 2 procedure details from his/her list of completed exams by the end of the semester. The final grade will be based on a weighted average of the numerical grades of completed procedures, Professional Growth and Development Report and the case presentation.

**College academic integrity policy**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**Class Participation**

A student must be able to devote sufficient time to complete all clinical practices with accuracy and professionalism. Lateness and absences should be communicated to the respective clinical department as much in advance as possible with emails to follow to clinical instructor.

**Technology statement**

Before entry students should be able to analyze patient history, diagnostic charts and radiation data and be comfortable with QA/QC.

**Course Need Assessment**

**Target Students and Projected Head Counts:** This course will be a required upper level science course for BS in Radiologic Sciences (CT Concentration) students. We will offer the course twice per year, ideally in the Fall Semester and again in the spring, adding summer sessions if needed. All students would take this course in the immediate semester offered after completion of RAD 4628 CT Clinical Education II. We anticipate that there will be approximately 8 students taking the course. As the program grows, also the class enrollment will grow.

**Physical Resources**

Before entry students will report to a clinical (hospital) affiliation off-campus and provide immunization/drug test records satisfying site requirements to work in patient service areas.

**Overlap with Other Courses:** There is no overlap with other courses.

**Full Time Faculty:** Adjunct faculty and a clinical coordinator will be required.

**Course Design**

RAD 4728 CT Clinical Education III is a common course in many bachelor programs in advanced imaging and stand-alone certificate/continuing education courses in preparation for the advanced ARRT registry in CT. It is a required course for the BSRS (CT concentration). It will consist of eight hours of clinical classes per week and follow hospital affiliation scheduling. Patient examinations and/or Quality Control tests on CT equipment will be logged into the ARRT web portal. Students will be required to give faculty access to the ARRT database to verify they have meet an examination quota. A written progress report and/or case presentation may additionally be part of the weighted overall course grade.

**Relationship to Programmatic Learning Outcomes**

This course will help students reach several programmatic learning outcomes of the Baccalaureate degree in Radiologic Sciences with computed tomography concentration. In particular, through this course students will:

* An appreciation of various steps of how the computed tomography procedures are administered to help detect and diagnose various disorders beyond routine X-ray techniques.
* A concrete foundation and proficiency in safe application of ionizing radiation to generate high resolution structural and physiological images of patients including the equipment operation and image manipulation under radiologist and lead technologist’s supervision.

**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiological Science |
| **Course Prefix** | RAD |
| **Course Number** | 4728 |
| **Course Title** | **CT Clinical Education III** |
| **Catalog Description** | Thisinternship is the final clinical course in the three part sequence fully integrate concepts learned in didactic courses to the clinical environment. Emphasis will be placed on more difficult and advanced procedures as well as quality control and quality assurance methodologies. Examinations will be entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Computed Tomography for students seeking this option. |
| **Prerequisite** | RAD 4628 |
| **Corequisite** |  |
| **Pre- or corequisite** |  |
| **Credits** | 1 |
| **Contact Hours** | 8 clinical hours/week |
| **Liberal Arts** | **[] Yes  [X  ] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | Summer 2019 |

**Rationale**:

Continues the application of concepts learned didactically into clinical practice. Student is expected to show greater independence and develop protocols and policies that meets expectation of clinical sites. Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | RAD 4827 Advanced CT Theory and Applications |
| **Proposal Date** | 9-1-2017 |
| **Proposer’s Name** | Eric Lobel & Subhendra Sarkar |
| **Course Number** | RAD 4827 |
| **Course Credits, Hours** | 3 class hours, 3 credits |
| **Course Pre / Co-Requisites** | RAD 4628 |
| **Catalog Course Description** | Focuses on the latest technologies, trends and areas of scientific study in the field of Computed Tomography. Topics include but not be limited to 3D Multiplanar Reconstruction Techniques, Coronary Artery Calcium Scoring, Computed Aided Diagnosis and Artificial Intelligence technologies, Molecular Fusion Imaging (PET/CT), Dose Optimization methodologies, Cardiac CT with gating, and dual-energy CT. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | Reviews current scientific discovery and use of CT imaging in order to prepare students for the changing technology in the coming decade. Goes beyond introductory course. Subject matter not covered in other nearby institutions. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | N.A. |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | X |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific*

|  |  |
| --- | --- |
| **Learning outcomes (LOs)** | **Assessment** |
| 1. Apply the structural anatomy of various human body parts with similar language and in greater detail to be compatible with CT researchers and CT radiologists. | These will be assessed by quizzes and class discussions. |
| 1. Utilize the common pathologies not only usually encountered in a hospital CT department but also consistent in detail and utility as practiced by CT researchers and CT radiologists in general. | This will be evaluated from research paper presentation and from performance in final exam. |
| 1. Will compare the CT dose and contrast safety, efficacy and accuracy of various CT protocols in order to take leadership roles in CT suites or in CT team building as a lead technologist with multiple vendors and with a growing number of diagnostic applications. | These will be assessed by mid-term exam and class discussions. |
| 1. Recognize and integrate the extent of pathology with patient symptoms and other complementary modalities like MRI, Nuclear Medicine and Ultrasound. | This will be evaluated from research paper presentations. |
| 1. Will be able to assess CT image quality and incorporate the added quality from advanced CT methods and discuss with radiology managers and colleagues in the professional domain as needed. | These will be assessed by quizzes, research paper presentations and class discussions. (This may not be suitably evaluated by mid-term and final exam formats). |

*General Education*

|  |  |
| --- | --- |
| **Learning outcomes (Gen Los)** | **Assessment** |
| 1. Understand and employ both qualitative and quantitative analysis to describe advanced sciences making progress against diseases. | Students will be tested through several quizzes both qualitative and quantitative importance of screening and management of diseases by advanced CT techniques. |
| 1. Develop an in-depth appreciation of benefits and risks as related to large data and ultrafast medical technology. | On these topics students will be assessed during class discussions on a regular basis as well as during Mid Term and Final exams. |
| 1. Will be able to integrate expression of diseases at various ages, in different cultures, and the role of society in optimal healthcare. | Students will be evaluated during quizzes and other exams the age and culture related differences that need to be accommodated in CT applications |

**Pre or Co-requisite: RAD 4628**

Homework assignments and the final exam are based on the topics presented in class and will involve brief answer to advance CT instrumentation, physics, chemistry and clinical applications. Most topics will have supplemental readings using pre-assigned review papers from Radiology journals. Typically, the homework and class participation will comprise 20% of final grade while midterm and final will cover the rest 80% and will be decided by the course instructor based on student suggestions at the beginning of the course.

**Example Weekly Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Topic | Chapters/Sections | LOs |
| 1 | CT Dose Reduction in Practice, Adult and Pediatric Techniques/Protocols | Ref. 3, 13, 14 | L.O. 1, 2 |
| 2 | Dose Reduction Feasibility Study by IAEA in 2009;  Dose reduction in children | Ref. 15, 4 | L.O. 1, 2 |
| 3 | Dose Reduction Techniques- Several Manufacturer Comparison and protocols at Mass Gen Hosp | Ref. 3, 5 | L.O. 1,2 |
| 4 | Contrast Timing and Complications in CT – Vendor contrast data sheets | Ref. 7 and Contrast Media vendor data sheets | L.O. 1, 2 |
| 5 | 4D CTA and CT Perfusion in stroke | Ref 1, 6 | L.O. 1, 2 |
| 6 | Arterial Input Functions for CT Perfusion | Ref. 2 | L.O. 1, 2 |
| 7 | **----Mid Term or Paper presentation---** | Ref. 8 | L.O. 1-5 |
| 8 | CT Perfusion Instrumentation and Implementation for Stroke | Ref. 9 | L.O. 1-5 |
| 9 | Dual Energy CT in Cardiac Applications: Perfusion and Beyond | Ref. 10 | L.O. 1-5 |
| 10 | Iodine concentration calculation by dual energy CT to evaluate thyroid metabolism | Ref. 16 | L.O. 1-5 |
| 11 | Stress cardiac CT by DECT and comparison with cardiac MR | Ref 11 | L.O. 1-5  GLO 6, 7 |
| 12 | New concepts in abdominal CTA | Ref. 17 | L.O. 1- 5  GLO 6, 7 |
| 13 | Application of CTP and Dual Energy CTA to Chronic Hypertension | Ref. 12 | L.O. 1- 5  GLO 6, 7 |
| 14 | Liver iron imaging by DECT in transfusion patients | Ref. 18, 19 | L.O. 1- 5  GLO 6, 7 |
| 15 | **---Final Exam/Paper Presentation-----** |  |  |

**Grading Policy and Procedure**

*Scope of assignments and other course requirements*: Students will prepare homework assignments regularly. There will be at least 3 exams and a final exam.

*Method of grading*: Students will be evaluated though homework, exams and research paper presentations. The final grade will be based on a weighted average of the grades from the homework and exams as follows:

Final Exam 40%

Midterm 30%

Project/Paper 20%

Quizzes/HW 10%

**Recommended Instructional Materials**

*Recommended textbook and web links:*

1. <https://radiopaedia.org/articles/ct-perfusion-in-ischaemic-stroke> by Frank Gaillard et al.
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3744327/> by Rafael Ferreira et al AJR 2010
3. <http://www.medicalimaging.org/2011/04/19/list-of-dose-reduction-features-for-several-ct-manufacturers/>
4. <https://link.springer.com/article/10.1007/s00330-005-2856-0> by Peter Vock in Eur Rad 2005
5. [https://www.itnonline.com/article/dose-reduction-techniques-ct-and-cta by Mannudeep Kalra 2008](https://www.itnonline.com/article/dose-reduction-techniques-ct-and-cta%20by%20Mannudeep%20Kalra%202008)
6. Dynamic 4-D CTA for Neurovascular Pathologies. Ahmed Alnemari et al. World Neurosurg. (2017) 105:1034.e11-1034.e18. <http://dx.doi.org/10.1016/j.wneu.2017.06.022>
7. Intravenous Contrast Medium Administration and Scan Timing at CT: Considerations and Approaches by Kyongtae Bae, Radiology 2010
8. CTP in Ischemic Stroke, Part-I: Theory, by A. Konstas, AJNR 2009
9. CTP in Ischemic Stroke, Part-II: Technical Implementation, by A. Konstas, AJNR 2009
10. DECT in Cardiac Applications: perfusion and Beyond, by Joseph Schoepf.
11. Diagnostic Performance of Dual-Energy CT Stress Myocardial Perfusion Imaging: Direct Comparison with Cardiovascular MRI, by Sung Min Ko, AJR 2014.
12. DECTA and CTP in Chronic Hypertension, by Gaël Dournes, Eur Radiol 2014.
13. CT Radiation Dose Reduction: How to Implement Change without Sacrificing Diagnostic Quality, by Eric Tamn, Radiographics 2011.
14. CT dose reduction in practice, by Michael J. Callahan, Pediatric Radiol 2011.
15. DOSE REDUCTION IN CT WHILE MAINTAINING DIAGNOSTIC CONFIDENCE: A FEASIBILITY/ DEMONSTRATION STUDY, IAEA, VIENNA, 2009, IAEA-TECDOC-1621, ISBN 978–92–0–108009–7.
16. Iodine concentration calculated by dual energy computed tomography (DECT) as a functional parameter to evaluate thyroid metabolism in patients with Hyperthyroidism, by D. Binh, BMC Med Imaging 2017.
17. New and Evolving Concepts in CT for Abdominal Vascular Imaging, by Jorge M. Fuentes-Orrego, Radiographics 2014.
18. <http://emedicine.medscape.com/article/369012-overview> for liver iron imaging.
19. Evaluation of Liver Iron Deposition in Transfusion-Dependent Patients by Dual-Energy CT, by Hironori Kobayashi in Blood 2016.

**College academic integrity policy**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**College Policy on Participation**

A student must be able to devote sufficient time to fully assimilate the advance concepts and application of complex CT theory that is clearly dominating the potential of reduced radiation and increased efficacy for CT today. The course may not follow a sequence of easy to hard concepts but will switch between various physics, chemistry, mathematics and engineering principles to establish a working understanding that is expected among advance CT technologists today. Hence a sincere effort for continuous participation in this course is expected from students as may be made clear at the beginning of the course.

**Technology statement**

Before entry the students should have a background in radiation physics and chemistry as relevant to CT (equivalent to that of an introductory CT principles course in addition to AAS level X-ray or nuclear medicine radiation physics course). In addition, student should have clinical CT background obtained by completing two clinical semesters of CT rotation and also completed Math 1375 or above.

**Course Need Assessment**

**Target Students and Projected Head Counts**

This course is a required upper level science course for BS in Radiologic Sciences students CT Concentration. We will offer the course once per year, ideally in the spring semester. All students would take this course upon completion of the prerequisites. We anticipate that there will be approximately 20 students taking the course. As the program grows, the class enrollment will grow.

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**Physical Resources:**

No additional physical resources are necessary.

**Overlap with Other Courses:** No overlap exists with other courses.

**Full Time Faculty:** The department does not currently have full-time faculty for teaching this course.

**Course Design**

This course will focus on the latest technologies, trends and areas of scientific study in the field of Computed Tomography. Topics will include but not be limited to 3D Multiplanar Reconstruction Techniques, Coronary Artery Calcium Scoring, Computed Aided Diagnosis and Artificial Intelligence technologies, Molecular Fusion Imaging (PET/CT), Dose Optimization methodologies, Cardiac CT with gating, Radiation Treatment planning, and informatics integration. It is a required course for the BSRS (CT concentration). It will consist of 3 hours of lecture classes, one evening per week, where the topics are introduced, and physical principles and instrumentation are discussed. Homework will be assigned on a regular basis, which will prepare the students for their midterm and final exams.

**Relationship to Programmatic Learning Outcomes**

This course will help students achieve several programmatic learning outcomes of the Baccalaureate degree in Radiologic Sciences major. In particular, through this course students will develop critical and academic maturity as they:

|  |
| --- |
| * Participate in research, education as well as in routine clinical environment and be aware of the risk/benefit aspects of using advanced, somewhat uncommon, CT procedures that have not been optimized and are practiced mostly in academic hospitals as compared to the well-practiced, routine CT procedures in spite of their limited scope. |
| * Understand the comparative utility and scope of CT among several radiologic modalities when differential benefit may come with advanced CT techniques while the radiation safety, diagnostic accuracy and cost burden may be ill understood for choosing or adding CT beyond other tools like MR, Ultrasound and Nuclear Medicine. |

**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiological Science |
| **Course Prefix** | RAD |
| **Course Number** | 4827 |
| **Course Title** | **Advanced CT Theory and Applications** |
| **Catalog Description** | Focuses on the latest technologies, trends and areas of scientific study in the field of Computed Tomography. Topics include but not be limited to 3D Multiplanar Reconstruction Techniques, Coronary Artery Calcium Scoring, Computed Aided Diagnosis and Artificial Intelligence technologies, Molecular Fusion Imaging (PET/CT), Dose Optimization methodologies, Cardiac CT with gating, and dual-energy CT. |
| **Prerequisite** |  |
| **Corequisite** |  |
| **Pre- or corequisite** | RAD 4628 |
| **Credits** | 3 |
| **Contact Hours** | 3 class hours |
| **Liberal Arts** | **[ ] Yes  [X] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | **Spring 2019** |

**Rationale**:

Student assimilates most advanced concepts and learns to compare risk/benefits of high and low dose CT techniques. He/she learns about cutting edge CT applications and relative roles of CT in comparison to other modalities and prepares reports from advanced journal articles as instructed in class.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | RAD 3737 MR Anatomy, Pathophysiology and Instrumentation |
| **Proposal Date** | 9-1-2017 |
| **Proposer’s Name** | Eric Lobel & Subhendra Sarkar |
| **Course Number** | RAD 3737 |
| **Course Credits, Hours** | 2.0 class hours, 2.0 lab hours, 3 credits |
| **Course Pre / Co-Requisites** | Admission to the Baccalaureate Program in Radiological Science (MR Concentration) |
| **Catalog Course Description** | Both normal and pathologic magnetic resonance (MR) specific anatomy are reviewed.  A thorough understanding of both normal and abnormal anatomy as they appear with and without MR contrast is required for the student to perform in clinical rotations, to correlate with other MR courses and, to some extent, with other relevant modalities including CT, Ultrasound and Nuclear Medicine. There is also a laboratory/tutorial component based on MR physics and problem solving for learning how to adjust technical parameters, patient positioning as well as operating and optimizing imaging equipment from major equipment manufacturers without direct physician interaction. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | This course will address the sectional as well as 3D anatomy and pathophysiology associated with MR examinations that are one of the most useful diagnostic procedures available today for chronic and acute conditions. Clinical rotations for students of MR concentration are most effective when students get both didactic and practice based teachings. An integrated lab component increases the theoretical and applied knowledge for effective equipment operations, the physical principles behind as well as medical device safety concerns with various MR techniques today. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. |  |
| **Intent to Submit as An Interdisciplinary Course** | NA |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | X |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific*

|  |  |
| --- | --- |
| **Learning outcomes (LOs)** | **Assessment** |
| 1. Describe the anatomy of various human body parts as needed to position and understand MR images and associated artifacts effectively for satisfactory MR technologist function. | In-class quizzes (frequency determined by instructor) to evaluate students grasp of 3D relationships of normal anatomy |
| 2. Describe the common pathologies usually encountered in a hospital MR department for various human body parts as needed to generate MR images reflecting affected parts. | Analysis of diseases and common appearance of pathology will be tested in home works, midterm and final exams. |
| 3. Apply safety, sensitivity and specificity principles of various MR techniques for specific chronic and acute conditions. | Students will be asked to compare efficacy and diagnostic utility of various diagnostic tests in both midterm and final exams |
| 4. Compute and implement protocol parameters as applicable to MR systems from different manufacturers per workplace standards for all ages, particularly when some patients need low power due to embedded medical devices. | Students will present to the rest of the class the range of workable protocols for various MR scans. |
| 5. Build policies specific to MR protocol variation for safety, patient tolerability and diagnostic efficacy as per regulatory and scientific guidelines. | This will be evaluated during mid-term and final exams. |

*General Education*

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| **Learning outcomes** | **Assessment** |
| 1.Understand and employ both qualitative and quantitative analysis to describe disease screening challenges. | Students will be tested through several quizzes both qualitative and quantitative importance of disease screening by competing techniques. |
| 2.Develop an in-depth appreciation of risks and benefits as related to technology. | Students will be assessed on written summaries of particular lecture/s or other sources comparing risk benefit ratios for various MR procedures. |
| 3.Will be able to integrate expression and effects of diseases at various ages, in different cultures, and the role of society in healthcare. | Students will be tested during the final exam controversial ethical issues with understanding of cultural, genetic, ageing and bias components as part of personalized medicine. |

Homework assignments and the final exam are based on the topics presented in class as well as practice problems and applications in the lab. Typically, the homework and class participation will comprise 20% of final grade while midterm and final will cover the rest 80% and will be decided by the course instructor based on student suggestions at the beginning of the course.

**Example Weekly Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Topic | Chapters/Sections | LOs |
| 1 | -Introduction/Physics of Body MR  -MR Brain: **Congenital Malformations**  **-Laboratory**: brief overview of exam types, equipment, vendor choices, nomenclature, protocol parameters | Ch 1: RO  **Part-I Sec 1. OS**  **Ref 5 for Lab** | L.O. 1, 2 |
| 2 | - MR of Focal & Diffuse Liver Lesions  - **MR of Head Trauma (**primary/secondary effects)  **-Laboratory:** introductory MR physics,  exam types, body and brain MR protocols | Ch 2, 3: RO  **Part-I Sec 2. OS**  **Ref 5 for Lab** | L.O. 1, 2 |
| 3 | - MR Seminar on Spine  - **MR Brain: Subarachnoid Hemorrhage & Aneurysm**  **-Laboratory**: More on MR physics, positioning, RF coilsand head protocols | SP: PDF  **Part-I Sec 3. OS**  **Ref 5 for Lab** | L.O. 1,2 |
| 4 | - MR of the GB and Biliary System  - **MR of Stroke** including Nontraumatic Intracranial Hemorrhage, Atherosclerosis and Carotid Stenosis, Vasculopathy, Cerebral Ischemia and Infarction  **-Laboratory:**  More on MR physics, RF and gradient operations, head protocols | Ch 4: RO  **Part-I Sec 4. OS**  **Ref 5 for Lab** | L.O. 1, 2 |
| 5 | -Basic principles/Tendons in MSK MR  -MR of Stroke continued  **-Laboratory:**  Spine MR protocols | Ch 1, 3: HE  **Part-I Sec 4. OS**  **Ref 5 for Lab** | L.O. 1, 2 |
| 6 | - **MR of Brain Neoplasms:** Astrocytic Tumors, Oligodendroglia Tumors, Ependymal Tumors, Choroid Plexus Tumors, Neuronal and Glial Tumors, Pineal Tumors, Tumors of Cranial/Peripheral Nerves.  **-Laboratory:**  MR contrast physics and chemistry, body MR protocols | Ch 10, 11: HE  **Ref 5 for Lab** | L.O. 1, 2 |
| 7 | -MR of Wrist; MSK of Shoulder, Elbow  **-----------MID-TERM EXAM-----------** | Ch 10-12: HE | L.O. 1-3 |
| 8 | - MR of the Pancreas, Spleen, Kidneys- MR Brain Infectious: Congenital /Neonatal Infections, Acquired Infections**-Laboratory:**  High and low field differences, heating and safety issues, artifacts and in-depth head protocols | Ch 5, 6: RO  **Part-I Sec 8. OS**  **Ref 5 for Lab** | L.O. 1-4 |
| 9 | - MR of Hips and Pelvis  **-MR Brain: Inflammatory, and Demyelinating Disease.**  **-Laboratory:**  MSK protocols | Ch 14: HE  **Part-I Sec 8. OS**  **Ref 5 for Lab** | L.O. 1-4 |
| 10 | -MR of Female Reproductive System  **-Inherited Metabolic /Degenerative Disorders: Mitochondrial, Lysosomal, Peroxisomal, Organic & Amino-acidopathic Disorders**  **-Laboratory:**  Quality, artifacts, MR Angio physics and suitable protocols | Ch 9, 10: RO  **Part-I Sec 10. OS**  **Ref 5 for Lab** | L.O. 1-5 |
| 11 | -MR of Knee  - **MR of Dementias and Degenerative Disorders**  **- Laboratory:**  More on MR Angio physics and suitable protocols | Ch 15: HE  **Part-I Sec 10. OS**  **Ref 5 for Lab** | L.O. 1-5  GLO 6 |
| 12 | -MR of Foot & Ankle  **-Anatomy-based Disorders: Ventricles and Cisterns: Normal Variants, Hydrocephalus**  **- Laboratory:**  MR diffusion physics and suitable protocols | Ch 16: HE  **Part-II Sec 1. OS**  **Ref 5 for Lab** | L.O. 1- 5  GLO 6, 7 |
| 13 | - MR of the Prostate  - **Sella and Pituitary ; CPA-IAC: Bell Palsy, Trigeminal Neuralgia, Vestibular Schwannoma, Meningioma**  **- Laboratory:**  MR spectroscopy physics and suitable protocols | Ch 11: RO  **Part-II Sec 2, 3. OS**  **Ref 5 for Lab** | L.O. 1- 5  GLO 6, 7 |
| 14 | -Tumors in MSK MR  -**Skull, Scalp, and Meninges:** Calvarial Defects, Cephalocele, Leptomeningeal Cyst, Fibrous Dysplasia, Paget Disease, Thick Skull, Sebaceous Cyst, Atypical and Malignant Meningioma, Benign and Malignant Mesenchymal Tumors, Calvarial Hemangioma, Dura/Venous Sinuses Hemangioma, Myeloma.  **-Laboratory: ARRT Exam Review** | Ch 7: HE  **Part-II Sec 4. OS**  **Ref 5 for Lab** | L.O. 1- 5  GLO 6, 7 |
| 15 | **Final exam: two parts**  **(1) MR Anatomy/Pathophysiology**  **(2) Laboratory:**  **Sample test similar to ARRT Exam** |  |  |

**Grading Policy and Procedure**

*Scope of assignments and other course requirements*: Students will prepare homework assignments regularly. There will be at least 3 exams and a final exam.

*Method of grading*: Students will be evaluated though homework and exams. The final grade will be based on a weighted average of the grades from the homework and exams as follows:

Final Exam 50%

Midterm 30%

HW/quizzes 20%

**Required Instructional Materials**

*Recommended textbook*: (abbreviated as RO, OS, SP, HE respectively from 1-4 below.)

1. Fundamentals of Body MRI: Expert Consult- Online and Print, 2nd Ed. (Fundamentals of Radiology) Elsevier Health. 2011. by [Christopher G. Roth MD](https://www.amazon.com/s/ref=dp_byline_sr_book_1?ie=UTF8&text=Christopher+G.+Roth+MD&search-alias=books&field-author=Christopher+G.+Roth+MD&sort=relevancerank)
2. Handbook of MRI Scanning by Geraldine Burghart and Carol Ann Finn
3. OER: [Spine MRI lecture2 - Indiana University Bloomington](http://r.search.yahoo.com/_ylt=A0LEVif9qcJZlR4AezMnnIlQ;_ylu=X3oDMTBydWNmY2MwBGNvbG8DYmYxBHBvcwM0BHZ0aWQDBHNlYwNzcg--/RV=2/RE=1505958526/RO=10/RU=http%3a%2f%2fwww.indiana.edu%2f%7Emri%2fseminars%2fslides%2fFall_2012%2fSpine%2520MRI%2520lecture%2520online%2520version.pdf/RK=1/RS=oOqKRWWNKZTpmXeR2caxGMq2cac-). (PDF) www.indiana.edu/~mri/seminars/slides/Fall\_2012/Spine%20MRI%2...
4. Diagnostic Imaging: Brain, 3rd Ed. Elsevier Health. 2015. by [Anne Osborn](https://www.amazon.com/s/ref=dp_byline_sr_book_1?ie=UTF8&text=Anne+G.+Osborn+MD++FACR&search-alias=books&field-author=Anne+G.+Osborn+MD++FACR&sort=relevancerank), [Karen Salzman](https://www.amazon.com/s/ref=dp_byline_sr_book_2?ie=UTF8&text=Karen+L.+Salzman+MD&search-alias=books&field-author=Karen+L.+Salzman+MD&sort=relevancerank), [Miral Jhaveri](https://www.amazon.com/s/ref=dp_byline_sr_book_3?ie=UTF8&text=Miral+D.+Jhaveri+MD&search-alias=books&field-author=Miral+D.+Jhaveri+MD&sort=relevancerank) and [James Barkovich](https://www.amazon.com/s/ref=dp_byline_sr_book_4?ie=UTF8&text=A.+James+Barkovich+MD&search-alias=books&field-author=A.+James+Barkovich+MD&sort=relevancerank)
5. Musculoskeletal MRI. 2nd Ed. Saunders. Clyde Helms, Nancy Major, Mark Anderson, Phoebe Kaplan and Robert Dussault
6. Materials for laboratory sessions (A-E): OER
7. A review of MR physics: 3T versus 1.5T. by B.J. [Soher et al.](https://www.ncbi.nlm.nih.gov/pubmed/?term=Soher%20BJ%5BAuthor%5D&cauthor=true&cauthor_uid=17893049)  [Magn Reson Imaging Clin N Am.](https://www.ncbi.nlm.nih.gov/pubmed/17893049/) 2007, 15(3):277-90.
8. Runge, Val et al. Clinical 3T MR, Thieme Medical Publishers, 2007
9. ARRT Clinical Experience Requirements for Post-Primary Magnetic Resonance Examination
10. Typical Department/NYC hospital specific MR procedure/policy and device safety manuals
11. Scanner/application vendor manuals/ACR QA and Accreditation details from ACR website

**College academic integrity policy**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**Class Participation**

A student must be able to devote sufficient time to complete assimilation of anatomy and pathophysiology of all body parts. The laboratory component will involve physical science concepts to safely modify existing protocols for greater accuracy or to meet changing departmental policy. Clinical rotations and performance in MR licensure examinations will depend on the proficiency achieved in this course. Deficiency in any particular areas of human anatomy and pathology or MR safety related parameters on a student’s part due to non-participation will significantly affect his/her functioning in all clinical courses since every clinical week involves understanding of hospital policy and safe operability of MR scanners in the whole body. The laboratory component in this course discusses sample hospital policies from NYC hospitals. Students should attend all lectures.

**Technology statement**: N.A.

**Course Need Assessment:** Required for students in the BSRS MR concentration

**Target Students and Projected Head Counts:** This course will be a required upper level science course for BS in Radiologic Sciences (MR Concentration) students. We will offer the course at least once per year, ideally in the Fall Semester and again in the spring if necessary. All students would take this upon their entry point into the program. We anticipate that there will be approximately 20 students taking the course. As the program grows, also the class enrollment will grow.

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**Physical Resources:** No additional physical resources are necessary.

**Overlap with Other Courses:** There exists a small overlap (<10%) for this course with PHYS 2603.

**Full Time Faculty:** An adjunct faculty member will teach this course.

**Course Design**

RAD 3737, MR Anatomy, Pathophysiology and Instrumentation is a common course in many bachelor programs in advanced imaging and a required course for the BSRS MR concentration. It will consist of 2.0 hours of didactic and 2.0 hours of lab practice sessions, one evening per week, where the topics are introduced, and applicable pathology and equipment operations are reviewed in lecture, tutorial format. Homework will be assigned on a regular basis, which will prepare the students for their midterm and final exams as well as for professional MR certification exam.

**Relationship to Programmatic Learning Outcomes**

This course will help students reach several programmatic learning outcomes of the Baccalaureate degree in Radiologic Sciences major. In particular, through this course students will:

* Develop a modest background in anatomy and pathology commonly encountered in MR imaging
* Connect the learned principles with advanced and clinical courses as well as will be able to have adequate discussions and scope of practice in the interactions with patients and physicians.
* Performance in Clinical rotations and in MR licensure examinations will depend on the proficiency achieved in this course.

**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiological Science |
| **Course Prefix** | RAD |
| **Course Number** | 3737 |
| **Course Title** | **MR Anatomy, Pathophysiology and Instrumentation** |
| **Catalog Description** | Both normal and pathologic magnetic resonance (MR) specific anatomy are reviewed.  A thorough understanding of both normal and abnormal anatomy as they appear with and without MR contrast is required for the student to perform in clinical rotations, to correlate with other MR courses and, to some extent, with other relevant modalities including CT, Ultrasound and Nuclear Medicine. There is also a laboratory/tutorial component based on MR physics and problem solving for learning how to adjust technical parameters, patient positioning as well as operating and optimizing imaging equipment from major equipment manufacturers without direct physician interaction. |
| **Prerequisite** | Admission to the Baccalaureate Program in Radiological Science (MR Concentration) |
| **Corequisite** |  |
| **Pre- or corequisite** |  |
| **Credits** | 3 |
| **Contact Hours** | 2.0 class hours, 2 lab hours, 3 credit hours total. |
| **Liberal Arts** | **[] Yes  [X  ] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | **Spring 2019** |

**Rationale**:

This course will address the sectional as well as 3D anatomy and pathophysiology associated with MR examinations that are one of the most useful diagnostic procedures available today for chronic and acute conditions. Clinical rotations for students of MR Concentration are most effective when students get both didactic and practice based teachings. An integrated lab component increases the theoretical and applied knowledge for effective equipment operations, the physical principles behind as well as medical device safety concerns with various MR techniques today.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | RAD 3739 MR Clinical Education I |
| **Proposal Date** | 9-28-2017 |
| **Proposer’s Name** | Eric Lobel & Subhendra Sarkar |
| **Course Number** | RAD 3739 |
| **Course Credits, Hours** | 8 clinical hours, (4 hrs 2x/wk) 1 credits |
| **Course Pre / Co-Requisites** | Admission to the Baccalaureate Program RAD 3737 |
| **Catalog Course Description** | Is aninternship designed to integrate and complement the didactic and practical concepts learned in the MR Anatomy Pathophysiology within MR Technology courses. Emphasis is placed on patient safety and magnetic field patient contraindications, pulse sequence selection, slice selection, contrast administration and parameter setting as per examination protocol(s). Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in MR imaging for students seeking this option. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | N/A |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | N/A |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific*

|  |  |
| --- | --- |
| **Learning outcome** | **Assessment** |
| 1. Will learn about the appropriateness and utility of MR systems, operational safety, clinical site policies and protocols. | This will be evaluated by site mentors from clinical sites throughout the semester. |
| 1. Will assimilate the anatomy and physiology of normal and affected body parts at high resolution. | These will be evaluated for every student, during the case presentations for accuracy standards. |
| 1. Will understand the effect of noise on image quality and tissue contrast depending on time spent in MRI and associated contrast efficacy to generate MR quality in simple to complex cases. | Students will be assessed on their planned approaches to maximize image quality and will be part of their report for every case completed. |
| 1. Will be able to appreciate advantages of gray scale tissue contrast as compared to black and white in radiation modalities like CT. Also appreciate 3D images as opposed to single planar 2D sections from many other modalities. | This will be evaluated during the case presentations. |
| 1. Will learn to work with complex image processing steps and transfer large image data files to multiple servers. | These will be evaluated for image processing accuracy by both site mentors and clinical instructor. |
| 1. Will learn to determine quality standards and system performance before or during the start of work day based on test phantom results. | The quality of each case will be individually evaluated by site mentors from clinical sites and will be graded by the clinical instructor at the middle and at the end of semester. |

*General Education*

|  |  |  |
| --- | --- | --- |
| **Learning outcomes** | **Assessment** | |
| 1.Demonstrate the ability to work collaboratively and independently in the supervised clinical setting. Build consensus. | | This ability will be tested through observation of advanced analytical skills in the complex MR procedures rather than simple ones in prior clinical courses. |
| 2.Understand and employ both qualitative and quantitative analysis of imaging concepts as related to simple clinical problems. | | Students will be assessed on ability to apply advanced science concepts to MR protocols needed to satisfactorily integrate benefits and drawbacks of procedures performed. |
| 3.Develop individual patient care knowledge and integrate with the information flow of the clinical departments. | | Students will be evaluated from case presentations on the general ability to make use of information from patient charts. |

**Pre-requisites (to be completed before or in the first week of clinical rotation):**

* Pre-or-co requisite MR course (RAD 3737) as stated in the catalog
* MR safety training

**Specific clinical MR procedural competency categories:**

1. Head & neck
2. Spine
3. Thorax
4. Abdomen & pelvis
5. Musculoskeletal
6. Special/Advanced Imaging Procedures
7. Quality Control/ACR Accreditation

**Criteria for student evaluation for each competency:**

**A partial competency is allowed in first semester only if student shows sufficient progress per hospital/college mentor**

A) Correctly understanding physician order for MR, noting any contraindications/quality concerns

B) Preparation for MR room and contrast, if needed and ensure device and patient safety

C) Identifying protocol and plan all steps including any approved deviations from standard steps

D) Identification, communication to and assessment of the correct patient for the correct procedure

E) Documentation of history and instruct patient for MR as per department protocol

F) Patient positioning, CDC precautions, correct scanner protocol/parameters selection

G) Initiate and check quality and patient safety during and after sequence, complete the exam

H) Check images for overall quality, consult radiologist as needed for accuracy/post-processing and transfer images to correct destination, if de-identification of patient info is needed must perform that

I) Documentation/recording of exam details in logbook/ensure data archiving/communicate to senior technologist if scanner quality is questionable.

J) Patient discharge with postoperative instructions (ensuring handover)

K) Document key points learned including any deviation of standard procedure needed for future discussion with radiologist/case presentation ARRT procedure log

**Weekly training plan (unless the faculty coordinator/hospital mentor specify different plan):**

A minimum of 16 successful demonstration of repeats (preferably 2 each of 8 procedures chosen from 4 out of 5 categories). If a particular category is not available perform from available ones with permission. **Example:** 2 from Head; 2 from Any spine; 2 from Any abdomen; 2 from Any musculoskeletal; 2 from Any QA)

**This will broadly establish confidence & proficiency needed after first semester in MR concentration.**

May choose at least 4 out of 5 categories below:

Head, Spine, Abdomen & Pelvis, Musculoskeletal and QA areas including simple post-processing e.g. MPR and modest familiarization with MR contrast procedures.

1. **Head (with or without contrast):** complete 2 different or two repeats of the same procedure from 3 below

* **Non-contrast brain**
* **Contrast brain**
* **Limited competency - Head MRA** (may not be proficient in processing in first semester)

1. **Spine (non-contrast):** complete 2 different or two repeats of the same procedure from 3 below

* **C-spine**
* **T-spine**
* **L-spine**

1. **Abdomen & pelvis (with contrast):** complete 2 different or two repeats of the same procedure from 4 below

* **Liver**
* **Kidneys**
* **Female pelvis**
* **Limited competency - Renal MRA** (may not be fully proficient in contrast timing in first semester)

1. **Musculoskeletal (non-contrast):** complete 2 different or two repeats of the same procedure from 3 below

* **Knee joint**
* **Shoulder joint**
* **Hip/non-contrast pelvis**

1. **Quality Control/ACR Accreditation:** complete 2 different or two repeats of the same procedure from 3 below

* **Daily QA** (plotting a monthly trend in Excel for example comprise one competency)
* **ACR weekly QA including basic technologist analysis**
* **Phantom scanning using several RF coils and pre-planned sequences for coil testing**

(2 RF coils tested on same day for acceptable quality or repair needs comprise one competency)

**Example Weekly Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Topic | Reference | LOs/Assessment Criteria  (Case Evaluations by Site Mentors after every case) |
| 1 | One or more from procedures listed in A or B. | Ref. Materials 1-3 above | 1-3 / At least A-G |
| 2 | One or more from procedures listed in A and/or B. | Ref. Materials 1-3 above | 1-3 / At least A-G |
| 3 | One or more from procedures listed in A and/or B. | Ref. Materials 1-3 above | 1-4 / At least A-J |
| 4 | One or more from procedures listed in A and/or B and/or C and/or D. | Ref. Materials 1-3 above | 1-4/ At least A-J |
| 5 | One or more from procedures listed in A and/or B and/or C and/or D. | Ref. Materials 1-3 above | 1-6 / A-K |
| 6 | One or more from procedures listed in A and/or B and/or C and/or D. | Ref. Materials 1-3 above | 1-6 / A-K |
| 7 | One or more from procedures listed in A and/or B and/or C and/or D. | Ref. Materials 1-3 above | 1-6/ A-K |
| 8 | One or more from procedures listed in A to E as suggested by mentors. | Ref. Materials 1-3 above | 1-6 / A-K |
| 9 | One or more from procedures listed in A to E as suggested by mentors. | Ref. Materials 1-3 above | 1-7 / A-K |
| 10 | One or more from procedures listed in A to E as suggested by mentors. | Ref. Materials 1-3 above | 1-8/ A-K |
| 11 | One or more from procedures listed in A to E as suggested by mentors. | Ref. Materials 1-3 above | 1-8/ A-K |
| 12 | One or more from procedures listed in A to E as suggested by mentors. | Ref. Materials 1-3 above | 1-8 / A-K |
| 13 | One or more from procedures listed in A to E as suggested by mentors. | Ref. Materials 1-3 above | 1-8 / A-K |
| 14 | One or more from procedures listed in A to E as suggested by mentors. | Ref. Materials 1-3 above | 1-8 / A-K |
| 15 | **---Final Exam/Case Presentation-----** |  |  |

**Grading**

Competency Evaluations (16) 40%

Professional Growth and Development Report 30%

Clinical Case Presentation 30%

100%

**Grading Policy and Procedure**

*Method of grading*:

Students will be evaluated though demonstration of successful completion of required MR procedures satisfying department standards for quality. These competencies will have to be signed off by site mentor and/or clinical instructor while the competency level will reflect a numerical grade for each procedure. The student will also have to present at least 2 procedure details from his/her list of completed exams by the end of the semester. The final grade will be based on a weighted average of the numerical grades of completed procedures, Professional Growth and Development Report and the case presentation.

**Required Instructional Materials**

1. Handbook of MRI Scanning by Geraldine Burghart MA RT(R)(MR)(M) and Carol Ann Finn RT(R)(MR)

**Recommended Instructional Materials**

1. ARRT Clinical Experience Requirements for Post-Primary Magnetic Resonance Examination

2. Department/hospital specific MR procedure/policy and device safety manuals

3. Appropriate vendor supplied scanner/application manuals/ACR QA and Accreditation details from ACR website

**College academic integrity policy:** Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**Class Participation:** A student must be able to devote sufficient time to complete all clinical practices with accuracy and professionalism. Lateness and absences should be communicated to the respective clinical department as much in advance as possible with emails to follow to clinical instructor.

**Technology statement:**  Students should be graduates from an approved AAS in radiologic technology or equivalent program.

**Course Need Assessment**: Required course in the BSRS for MR concentration students

**Target Students and Projected Head Counts:** This course will be a required upper level science course for BSRS MR concentration students. We will offer the course twice per year, ideally in the Fall Semester and again in the Spring, adding summer sessions when necessary. All students would take this course either in their first semester or the immediate next semester offered. We anticipate that there will be approximately 8 students taking the course. As the program grows, also the class enrollment will grow.

**Physical Resources:** Students will report to a clinical (hospital) affiliation off-campus and provide immunization/drug test records satisfying site requirements to work in patient service areas.

**Overlap with Other Courses:** There is no overlap with any course.

**Full Time Faculty:** An adjunct faculty and a full time clinical coordinator will be required to oversee the entire clinical courses in the CT and MR Concentrations.

**Course Design**

RAD 3739 MR Clinical Education I is a common course in many bachelor programs in advanced imaging and stand-alone certificate/continuing education courses in preparation for the advanced ARRT registry in MR. It is a required course for the BSRS (MR concentration). It will consist of eight hours of clinical classes per week and follow hospital affiliation scheduling. Patient examinations and/or Quality Control tests on MR equipment will be logged into the ARRT web portal. Students will be required to give faculty access to the database and meet an exam quota. A written progress report and case presentation may additionally be part of the weighted course overall grade.

**Relationship to Programmatic Learning Outcomes**

This course will help students reach several programmatic learning outcomes of the Baccalaureate degree in Radiologic Sciences with magnetic resonance imaging concentration. In particular, through this course students will:

* An appreciation of various steps of how the MR procedures are administered to help detect and diagnose various disorders beyond routine X-ray and CT imaging.
* A concrete foundation and proficiency in the physics of MR to appreciate normal and abnormal tissue anatomy as well as introductory physiological images of patients and

The MR equipment operation and image manipulation under radiologist and lead technologist’s supervision.**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiological Science |
| **Course Prefix** | RAD |
| **Course Number** | 3739 |
| **Course Title** | **MRI Clinical Education I** |
| **Catalog Description** | Is aninternship designed to integrate and complement the didactic and practical concepts learned in the MR Anatomy Pathophysiology within MR Technology courses. Emphasis is placed on patient safety and magnetic field patient contraindications, pulse sequence selection, slice selection, contrast administration and parameter setting as per examination protocol(s). Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in MR imaging for students seeking this option. |
| **Prerequisite** | Admission to the Baccalaureate Program in Radiological Science (MR Concentration) |
| **Corequisite** |  |
| **Pre- or corequisite** | RAD 3737 |
| **Credits** | 1 |
| **Contact Hours** | 8 clinical hours/week |
| **Liberal Arts** | **[] Yes  [X  ] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | **Spring 2019** |

**Rationale:**

Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | RAD 4629 MR Clinical Education II |
| **Proposal Date** | 9-28-2017 |
| **Proposer’s Name** | Eric Lobel & Subhendra Sarkar |
| **Course Number** | RAD 4629 |
| **Course Credits, Hours** | 8 clinical hours, 1 credits |
| **Course Pre-Requisites** | RAD 3739 |
| **Catalog Course Description** | An internship and a continuation of RAD 3739. It is designed to further develop techniques acquired in the MR Anatomy with Pathophysiology within MR Technology courses. Continued emphasis are placed on patient care and magnetic field safety and more advanced procedures. Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Magnetic Resonance Imaging for students seeking this option. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | Continues the application of concepts learned didactically into clinical practice. Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination. Allows for functioning with indirect supervision and to begin more advanced MR studies. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | N/A |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | N/A |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific*

|  |  |
| --- | --- |
| **Learning outcome** | **Assessment** |
| 1. Will learn about the appropriateness and utility of MR scans for chronic and acute conditions in consultation with radiologists. | Each case will be individually evaluated by site mentors from clinical sites and will be graded by the clinical instructor at the middle and at the end of semester. |
| 1. Will assimilate the anatomy and physiology of normal and affected body parts at high resolution. | These will be evaluated for every student, during the case presentations for accuracy standards. |
| 1. Will understand the effect of noise on image quality and tissue contrast depending on time spent in MRI and associated contrast efficacy to generate MR quality in simple to complex cases. | Students will be assessed on their planned approaches to maximize image quality and will be part of their report for every case completed. |
| 4. Will continue to learn about the strength and limits of MR systems, operational safety, clinical site policies and protocols | Clinical satisfaction comments of patients or site mentors for a minimum of 3 cases will be evaluated during the semester for each student by clinical instructor. |
| 1. Will learn to work with complex image processing steps and transfer large image data files to multiple servers. | These will be evaluated for image processing accuracy by both site mentors and clinical instructor. |
| 1. Will learn to determine quality standards and system performance before or during the start of work day based on test phantom results. | The quality of each case will be individually evaluated by site mentors from clinical sites and will be graded by the clinical instructor at the middle and at the end of semester. |

*General Education*

|  |  |
| --- | --- |
| **Learning outcomes** | **Assessment** |
| 1.Demonstrate the ability to work collaboratively and independently in the supervised clinical setting. Build consensus. | This ability will be tested through observation of efficiency, accuracy and student’s ability to be listen and analyze. |
| 2.Understand and employ both qualitative and quantitative analysis of imaging concepts as related to advanced clinical problems. | Students will be assessed on written summaries of protocols and procedural steps immediately after each clinical case completed. |
| 3.Develop individual patient care knowledge and integrate with the information flow of the clinical departments. | Students will be evaluated on the information transfer for performing MR procedures and integrated learning from senior technologists. |

**Pre-requisites:**

* Completion of RAD 3739 MR Clinical Education-I.

**Specific clinical MR procedural competency categories:**

1. Head & neck
2. Spine
3. Abdomen & pelvis
4. Musculoskeletal
5. Quality Control/ACR Accreditation
6. Thorax
7. Special/Advanced Imaging Procedures

**Criteria for student evaluation for each competency:**

A) Correctly understanding physician order for MR, noting any contraindications/quality concerns

B) Preparation for MR room and contrast, if needed and ensure device and patient safety

C) Identifying protocol and plan all steps including any approved deviations from standard steps

D) Identification, communication to and assessment of the correct patient for the correct procedure

E) Documentation of history and instruct patient for MR as per department protocol

F) Patient positioning, CDC precautions, correct scanner protocol/parameters selection

G) Initiate and check quality and patient safety during and after sequence, complete the exam

H) Check images for overall quality, consult radiologist as needed for accuracy/post-processing and transfer images to correct destination, if de-identification of patient info is needed perform that correctly

I) Documentation/recording of exam details in logbook/ensure data archiving/communicate to senior technologist if scanner quality is questionable.

J) Patient discharge with postoperative instructions (ensuring handover)

K) Document key points learned including any deviation of standard procedure needed for future discussion with radiologist/case presentation ARRT procedure log

**Weekly training plan (unless the faculty coordinator/hospital mentor specify different plan):**

A minimum of 50 successful demonstration of repeats (see the details below). If a particular category is not available perform from available ones with instructor or hospital mentor permission.

**This will establish the major confidence & proficiency needed after second semester to start planning for ARRT licensure examination along MR concentration.**

May choose at least six out of seven categories below if one category is not available:

Head, Spine, Abdomen & Pelvis, Musculoskeletal, Thorax, QA and advance imaging groups.

1. **Head/Neck (with or without contrast):**

Complete a minimum of 10 entries/repeats from 7 areas in Head/Neck group

* Non-contrast brain
* Contrast brain
* Head MRA
* Head MRV
* Any one from IAC, Orbit, Pituitary, Cranial Nerves, Face
* Soft tissue neck
* Carotid MRA

1. **Spine (non-contrast):**

**Complete a minimum of 12 entries/repeats from 4 procedures below**

* C-spine
* T-spine
* L-spine
* Sacrum/Coccyx

1. **Abdomen & pelvis (with contrast):**

**Complete a minimum of 8 entries/repeats from 5 procedures below**

* Liver
* Kidneys
* MRCP
* Female pelvis
* Renal MRA

1. **Musculoskeletal (non-contrast):**

**Complete a minimum of 10 entries/repeats from 10 procedures below**

* Knee joint
* Shoulder joint
* Hip/non-contrast pelvis
* Elbow
* Hand/wrist/fingers
* MR arthrograms
* Ankle joint
* Foot
* Upper extremity-long bones
* Lower extremity-long bones

1. **Quality Control/ACR Accreditation:**

**Complete a minimum of 3 entries/repeats from 3 QA procedures below**

* Daily QA (plotting a monthly trend in Excel for example comprise one competency)
* ACR weekly QA including basic technologist analysis
* Phantom scanning using several RF coils and pre-planned sequences for coil testing

(2 RF coils tested on same day for acceptable quality or repair needs comprise one competency)

1. **Thorax region:**

**Complete a minimum of 3 entries/repeats from 4 procedures below**

* chest
* breast cancer and/or implants including time series subtraction
* Aortic MRA
* Brachial plexus

1. **Limited advance imaging procedures:**

**Complete a minimum of 4 entries/repeats from 7 procedures below**

* Image post-processing (MIP, MPR, Diffusion image processing, Time series subtraction for breast or prostate etc.)
* DSC and/or DCE perfusion for tumors
* Body diffusion imaging (diffusion brain is already covered in Head)
* DTI, SWI and/or limited functional MRI for brain
* Cine for flow imaging (CSF phase contrast flow or gated cardiac bright blood imaging)
* Spectroscopy
* ACR QA with physicist level of analysis for annual testing

**Example Weekly Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Topic | Reference | LOs/Assessment Criteria  (Case Evaluations by Site Mentors after every case) |
| 1 | Three or more from procedures listed in A or B. | Ref. Materials 1-3 above | 1-3 / At least A-G |
| 2 | Three or more from procedures listed in A and/or B. | Ref. Materials 1-3 above | 1-3 / At least A-G |
| 3 | Four or more from procedures listed in A –E. | Ref. Materials 1-3 above | 1-4 / At least A-J |
| 4 | Four or more from procedures listed in A –E. | Ref. Materials 1-3 above | 1-4/ At least A-J |
| 5 | Three or more from procedures listed in A –F. | Ref. Materials 1-3 above | 1-6 / A-K |
| 6 | Three or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-6 / A-K |
| 7 | Three or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-6/ A-K |
| 8 | Three or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-6 / A-K |
| 9 | Four or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-7 / A-K |
| 10 | Four or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-8/ A-K |
| 11 | Four or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-8/ A-K |
| 12 | Four or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-8 / A-K |
| 13 | Four or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-8 / A-K |
| 14 | Four or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-8 / A-K |
| 15 | **---Final Exam/Case Presentation-----** |  |  |

**Grading**

Competency Evaluations (50) 40%

Professional Growth and Development Report 30%

Clinical Case Presentation 30%

100%

**Grading Policy and Procedure**

*Method of grading*:

Students will be evaluated though demonstration of successful completion of required MR procedures satisfying department standards for quality. These competencies will have to be signed off by site mentor and/or clinical instructor while the competency level will reflect a numerical grade for each procedure. The student will also have to present at least 2 procedure details from his/her list of completed exams by the end of the semester. The final grade will be based on a weighted average of the numerical grades of completed procedures, Professional Growth and Development Report and the case presentation.

**Required Instructional Materials**

1. Handbook of MRI Scanning by Geraldine Burghart MA RT(R)(MR)(M) and Carol Ann Finn RT(R)(MR)

**Recommended Instructional Materials**

1. ARRT Clinical Experience Requirements for Post-Primary Magnetic Resonance Examination

2. Department/hospital specific MR procedure/policy and device safety manuals

3. Appropriate vendor supplied scanner/application manuals/ACR QA and Accreditation details from ACR website

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**Class Participation:** A student must be able to devote sufficient time to complete all clinical practices with accuracy and professionalism. Lateness and absences should be communicated to the respective clinical department as much in advance as possible with emails to follow to clinical instructor.

**Technology statement:** Students should be graduates from an approved AAS in radiologic technology or equivalent program.

**Course Need Assessment:** Required course for BSRS MR concentration students

**Target Students and Projected Head Counts:** This course will be a required upper level science course for students in the MR Concentration of the BSRS program. We will offer the course twice per year, ideally in the Fall Semester and again in the spring, adding summer sessions if possible. All students would take this course in the immediate semester offered after completion of RAD 3828 MR Clinical Education I. We anticipate that there will be approximately 8 students taking the course. As the program grows, also the class enrollment will grow.

**Physical Resources:** Students will report to a clinical (hospital) affiliation, off-campus and provide immunization/drug test records satisfying site requirements to work in patient service areas.

**Overlap with Other Courses:** There is no overlap with any other course.

**Full Time Faculty:** An adjunct faculty and a full time clinical coordinator will be required to oversee the entire clinical courses in the CT and MR Concentrations.

**Course Design:** RAD 4629 MR Clinical Education II is a common course in many bachelor programs in advanced imaging and stand-alone certificate/continuing education courses in preparation for the advanced (ARRT) registry in MR. It is a required course for the BS in RS (MR concentration). It will consist of eight hours of clinical classes per week and follow hospital affiliation scheduling. Patient examinations and/or Quality Control tests on MRI equipment will be logged into the ARRT web portal. Students will be required to give faculty access to the ARRT database to verify they have meet an examination quota. A written progress report and/or case presentation may additionally be part of the weighted overall course grade.

**Relationship to Programmatic Learning Outcomes**

This course will help students reach several programmatic learning outcomes of the Baccalaureate degree in Radiologic Sciences with magnetic resonance imaging concentration. In particular, through this course students will obtain:

* An appreciation of various steps of how the MR procedures are administered to help detect and diagnose various disorders beyond what was learned in MR Clinical-I.
* A greater foundation and proficiency than obtainable in MR Clinical-I in the physics of MR imaging to appreciate normal and abnormal tissue anatomy as well as introductory physiological images of patients and
* Further proficiency in the MR equipment operation and image manipulation under radiologist and lead technologist’s supervision.

**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiological Science |
| **Course Prefix** | RAD |
| **Course Number** | 4629 |
| **Course Title** | **MR Clinical Education II** |
| **Catalog Description** | An internship and a continuation of RAD 3739. It is designed to further develop techniques acquired in the MR Anatomy with Pathophysiology within MR Technology courses. Continued emphasis are placed on patient care and magnetic field safety and more advanced procedures. Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Magnetic Resonance Imaging for students seeking this option. |
| **Prerequisite** | RAD 3739 |
| **Corequisite** |  |
| **Pre- or corequisite** |  |
| **Credits** | 1 |
| **Contact Hours** | 8 clinical hours/week |
| **Liberal Arts** | **[] Yes  [X  ] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | Spring 2019 |

**Rationale**:

Continues the application of concepts learned didactically into clinical practice. Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination. Allows for functioning with indirect supervision and to begin more advanced MR studies.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | RAD 4729 MR Clinical Education III |
| **Proposal Date** | 9-28-2017 |
| **Proposer’s Name** | Eric Lobel & Subhendra Sarkar |
| **Course Number** | RAD 4729 |
| **Course Credits, Hours** | 8 clinical hours, 1 credits |
| **Course Pre / Co-Requisites** | RAD 4629 |
| **Catalog Course Description** | Is aninternship and the final MRI clinical course. The student having taken the majority of the didactic courses is fully able to integrate materials learned in class into the MR procedures. Emphasis is on more difficult and advanced procedures as well as quality control and quality assurance methodologies. In this course, patient care and magnetic field safety and advanced procedures are the primary goals of learning. Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Magnetic Resonance Imaging for students seeking this option. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | Completes the application of concepts learned didactically into clinical practice. Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination. Focus on advanced procedures and quality control tests. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | N/A |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | N/A |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific*

|  |  |
| --- | --- |
| **Learning outcome** | **Assessment** |
| 1. Will learn about the appropriateness and utility of MR scans for chronic and acute conditions in consultation with radiologists. | Each case will be individually evaluated by site mentors from clinical sites and complex cases will be graded by the clinical instructor at the middle and at the end of semester. |
| 1. Will assimilate the anatomy and physiology of normal and affected body parts at high resolution as well as using dynamic methods. | These will be evaluated for every student, during the case presentations for accuracy standards. |
| 3. Will continue to learn about the strength and limits of MR systems, operational safety, clinical site policies and protocols. | Students will be assessed on their planned approaches to maximize image quality and will be used to compute the final grade. |
| 1. Will be able to appreciate advantages of gray scale tissue contrast as compared to black and white as in radiation modalities. Also will appreciate physiologic or metabolic imaging (molecular imaging) in Clinical MR courses. | These will be evaluated for complex cases by the site mentor or by the radiologist and will be used by clinical instructor for determination of final grade. |
| 1. Will learn to work with complex image processing steps involving contrast and transfer large image data files to servers. | These will be evaluated for image processing accuracy throughout the semester. |

*General Education*

|  |  |  |
| --- | --- | --- |
| **Learning outcomes** | **Assessment** | |
| 1.Demonstrate the ability to work collaboratively and independently in the supervised clinical setting. Build consensus. | | This ability will be tested through observation of advanced analytical skills in the complex MRI procedures rather than simple ones in prior clinical courses. |
| 2.Understand and employ both qualitative and quantitative analysis of imaging concepts as related to advanced clinical problems. | | Students will be assessed on ability to apply advanced science concepts to MRI protocols needed to satisfactorily integrate benefits and drawbacks of procedures performed. |
| 3.Develop individual patient care knowledge and integrate with the information flow of the clinical departments. | | Students will be evaluated from case presentations on the general ability to take directions from radiologists and other physicians from the clinical site and integrate information flow with procedures. |

**Pre-requisites:**

* Completion of MR Clinical Education-II (RAD 4629).

**Specific clinical MR procedural competency categories:**

1. Head & neck
2. Spine
3. Abdomen & pelvis
4. Musculoskeletal
5. Quality Control/ACR Accreditation
6. Thorax
7. Special/Advanced Imaging Procedures

**Criteria for student evaluation for each competency:**

A) Correctly understanding physician order for MR, noting any contraindications/quality concerns

B) Preparation for MR room and contrast, if needed and ensure device and patient safety

C) Identifying protocol and plan all steps including any approved deviations from standard steps

D) Identification, communication to and assessment of the correct patient for the correct procedure

E) Documentation of history and instruct patient for MR as per department protocol

F) Patient positioning, CDC precautions, correct scanner protocol/parameters selection

G) Initiate and check quality and patient safety during and after sequence, complete the exam

H) Check images for overall quality, consult radiologist as needed for accuracy/post-processing and transfer images to correct destination, if de-identification of patient info is needed.

I) Documentation/recording of exam details in logbook/ensure data archiving/communicate to senior technologist if scanner quality is questionable.

J) Patient discharge with postoperative instructions (ensuring handover)

K) Document key points learned including any deviation of standard procedure needed for future discussion with radiologist/case presentation ARRT procedure log

**Weekly training plan (unless the faculty coordinator/hospital mentor specify a different plan):**

A minimum of 65 successful demonstration of repeats (see the details below). If a particular category is not available perform from available ones with instructor or hospital mentor permission.

This will establish the confidence & proficiency needed after third semester to take the ARRT licensure examination as well as work in outpatient imaging centers or in tertiary care hospitals.

May choose at least 6 out of 7 categories below if one category is not available:

Head, Spine, Abdomen & Pelvis, Musculoskeletal, Thorax, QA and advance imaging groups.

1. **Head/Neck (with or without contrast):**

**Complete a minimum of 5 entries/repeats from 7 areas in Head/Neck group**

* Non-contrast brain
* Contrast brain
* Head MRA
* Head MRV
* Any one from IAC, Orbit, Pituitary, Cranial Nerves, Face
* Soft tissue neck
* Carotid MRA

1. **Spine (non-contrast):**

**Complete a minimum of 5 entries/repeats from 4 procedures below**

* C-spine
* T-spine
* L-spine
* Sacrum/Coccyx

1. **Abdomen & pelvis (with contrast):**

**Complete a minimum of 15 entries/repeats from 5 procedures below**

* Liver
* Kidneys
* MRCP
* Female pelvis
* Renal MRA

1. **Musculoskeletal (non-contrast):**

**Complete a minimum of 20 entries/repeats from 10 procedures below**

* Knee joint
* Shoulder joint
* Hip/non-contrast pelvis
* Elbow
* Hand/wrist/fingers
* MR arthrograms
* Ankle joint
* Foot
* Upper extremity-long bones
* Lower extremity-long bones

1. **Quality Control/ACR Accreditation:**

**Complete a minimum of 5 entries/repeats from 3 QA procedures below**

* ACR weekly QA including basic technologist analysis
* Phantom scanning using several RF coils and pre-planned sequences for coil testing

(2 RF coils tested on same day for acceptable quality or repair needs comprise one competency)

1. **Thorax region:**

**Complete a minimum of 5 entries/repeats from 4 procedures below**

* chest
* breast cancer and/or implants including time series subtraction
* Aortic MRA
* Brachial plexus

1. **Limited advance imaging procedures:**

**Complete a minimum of 10 entries/repeats from 7 procedures below**

* Image post-processing (MIP, MPR, Diffusion image processing, Time series subtraction for breast or prostate etc.)
* DSC and/or DCE perfusion for tumors
* Body diffusion imaging (diffusion brain is already covered in Head)
* DTI, SWI and/or limited functional MRI for brain
* Cine for flow imaging (CSF phase contrast flow or gated cardiac bright blood imaging)
* Spectroscopy
* ACR QA with physicist level of analysis for annual testing

**Example Weekly Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Topic | Reference | LOs/Assessment Criteria  (Case Evaluations by Site Mentors after every case) |
| 1 | Three or more from procedures listed in A-B. | Ref. Materials 1-3 above | 1-3 / At least A-G |
| 2 | Three or more from procedures listed in A-B. | Ref. Materials 1-3 above | 1-3 / At least A-G |
| 3 | Four or more from procedures listed in A –E. | Ref. Materials 1-3 above | 1-4 / At least A-J |
| 4 | Five or more from procedures listed in A –E. | Ref. Materials 1-3 above | 1-4/ At least A-J |
| 5 | Five or more from procedures listed in A –F. | Ref. Materials 1-3 above | 1-6 / A-K |
| 6 | Five or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-6 / A-K |
| 7 | Five or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-6/ A-K |
| 8 | Five or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-6 / A-K |
| 9 | Five or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-7 / A-K |
| 10 | Five or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-8/ A-K |
| 11 | Five or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-8/ A-K |
| 12 | Five or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-8 / A-K |
| 13 | Five or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-8 / A-K |
| 14 | Five or more from procedures listed in A –G. | Ref. Materials 1-3 above | 1-8 / A-K |
| 15 | **---Final Exam/Case Presentation-----** |  |  |

**Grading**

Competency Evaluations (65) 40%

Professional Growth and Development Report 30%

Clinical Case Presentation 30%

100%

**Grading Policy and Procedure**

*Method of grading*:

Students will be evaluated through demonstration of successful completion of required MR procedures satisfying department standards for quality. These competencies will have to be signed off by site mentor and/or clinical instructor while the competency level will reflect a numerical grade for each procedure. The student will also have to present at least 2 procedure details from his/her list of completed exams by the end of the semester. The final grade will be based on a weighted average of the numerical grades of completed procedures, Professional Growth and Development Report and the case presentation.

**Required Instructional Materials**

1. Handbook of MRI Scanning by Geraldine Burghart MA RT(R)(MR)(M) and Carol Ann Finn RT(R)(MR)

**Recommended Instructional Materials**

1. ARRT Clinical Experience Requirements for Post-Primary Magnetic Resonance Examination

2. Department/hospital specific MR procedure/policy and device safety manuals

3. Appropriate vendor supplied scanner/application manuals/ACR QA and Accreditation details from ACR website

**College academic integrity policy:** Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**Class Participation:** A student must be able to devote sufficient time to complete all clinical practices with accuracy and professionalism. Lateness and absences should be communicated to the respective clinical department as much in advance as possible with emails to follow to clinical instructor.

**Technology statement** Students should be graduates from an approved AAS in radiologic technology or equivalent program.

**Course Need Assessment**

**Target Students and Projected Head Counts:** This course will be a required upper level science course for BS in Radiologic Sciences (MR Concentration) students. We will offer the course twice per year, ideally in the Fall Semester and again in the spring, adding summer sessions if necessary. All students would take this course in the immediate semester offered after completion of RAD 4629 MR Clinical Education II. We anticipate that there will be approximately 8 students taking the course. As the program grows, also the class enrollment will grow.

**Physical Resources:** Students will report to a clinical (hospital) affiliation off-campus and provide immunization/drug test records satisfying site requirements to work in patient service areas.

**Overlap with Other Courses:** There is no overlap with any other course.

**Full Time Faculty:** An adjunct faculty and a full time clinical coordinator will be required to oversee the entire clinical courses in the CT and MR Concentrations.

**Course Design:** RAD 4729 MR Clinical Education III is a common course in many bachelor programs in advanced imaging and stand-alone certificate/continuing education courses in preparation for the advanced (ARRT) registry in MR. It is a required course for the BSRS (MR concentration). It will consist of eight hours of clinical classes per week and follow hospital affiliation scheduling. Patient examinations and/or Quality Control tests on MR equipment will be logged into the ARRT web portal. Students will be required to give faculty access to the ARRT database to verify they have meet an examination quota. A written progress report and/or case presentation may additionally be part of the weighted overall course grade.

**Relationship to Programmatic Learning Outcomes**

This course will help students reach several programmatic learning outcomes of the Baccalaureate degree in Radiologic Sciences with magnetic resonance imaging concentration. In particular, through this course students will obtain:

* An appreciation of various steps of how the MR procedures are administered to help detect and diagnose various disorders beyond what was learned in MR Clinical-I.
* A greater foundation and proficiency than obtainable in MR Clinical-I in the physics of MRI to appreciate normal and abnormal tissue anatomy as well as introductory physiological images of patients and
* Further proficiency in the MR equipment operation and image manipulation under radiologist and lead technologist’s supervision.

**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiological Science |
| **Course Prefix** | RAD |
| **Course Number** | 4729 |
| **Course Title** | **MR Clinical Education III** |
| **Catalog Description** | Is aninternship and the final MRI clinical course. The student having taken the majority of the didactic courses is fully able to integrate materials learned in class into the MR procedures. Emphasis is on more difficult and advanced procedures as well as quality control and quality assurance methodologies. In this course, patient care and magnetic field safety and advanced procedures are the primary goals of learning. Examinations are entered into the American Registry of Radiologic Technologists (ARRT) portal to document clinical procedures; a requirement to pursue the examination for the post-primary credential in Magnetic Resonance Imaging for students seeking this option. |
| **Prerequisite** | RAD 4629 |
| **Corequisite** |  |
| **Pre- or corequisite** |  |
| **Credits** | 1 |
| **Contact Hours** | 8 clinical hours/week |
| **Liberal Arts** | **[] Yes  [X  ] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | Summer 2019 |

**Rationale**:

Completes the application of concepts learned didactically into clinical practice. Provides accountable examinations toward the fulfillment of ARRT clinical requirements for post certification examination. Focus on advanced procedures and quality control tests.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | RAD 4829 Advanced MR Theory and Applications |
| **Proposal Date** | 9-1-2017 |
| **Proposer’s Name** | Eric Lobel & Subhendra Sarkar |
| **Course Number** | RAD 4829 |
| **Course Credits, Hours** | 3 class hours, 3 credits |
| **Course Pre / Co-Requisites** | RAD 4629 |
| **Catalog Course Description** | Focuses on the latest technologies, trends and areas of scientific study in the field of MR imaging. Topics include but not be limited to Functional Magnetic Resonance Imaging (FMRI), Spectroscopy, Perfusion & Diffusion Weighted Imaging, Molecular Fusion Imaging (PET/MR), Computed Aided Diagnosis and Artificial Intelligence technologies, Special Reconstruction & 3D techniques, Advanced Pulse Sequences (MRA), Cardiac MR with gating, and informatics integration. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | Reviews current scientific discovery and use of MR imaging in order to prepare students for the changing technology in the coming decade. Goes beyond introductory course.  Subject matter not covered in other nearby institutions. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received- * Will all sections be offered as ID? Y/N | N/A |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | X |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific*

|  |  |
| --- | --- |
| **Learning outcomes (LOs)** | **Assessment** |
| 1. Describe the structural anatomy of various human body parts with similar language and in greater detail to be compatible with MR researchers and MR radiologists. | These will be assessed by quizzes and class discussions. |
| 1. Describe the common pathologies not only usually encountered in a hospital MR division but also in detail to MR researchers. | This will be evaluated from research paper presentation and from performance in final exam. |
| 1. Have knowledge of the MR safety, efficacy and accuracy of various MR protocols in order to take lead steps in MR suite at all field strengths and with growing number of medical devices. | These will be assessed by mid-term exam and class discussions. |
| 1. Describe the extent of pathology to physicians and co-workers in the radiology department. | This will be evaluated from research paper presentations. |
| 1. Ability to assess MR image quality and incorporate the added quality from advanced MR methods and discuss with radiology managers and colleagues in the professional domain as needed. | These will be assessed by quizzes, research paper presentations and class discussions. (This may not be suitably evaluated by mid-term and final exam formats). |

*General Education*

|  |  |
| --- | --- |
| **Learning outcomes (Gen Los)** | **Assessment** |
| 1. Understand and employ both qualitative and quantitative analysis to describe advanced sciences making progress against diseases. | Students will be tested through several quizzes both qualitative and quantitative importance of screening and management of diseases by advanced MR techniques. |
| 2.Develop an in-depth appreciation of risks as related to new technology. | On these topics students will be assessed during class discussions on a regular basis as well as during Mid Term and Final exams. |
| 3.Will be able to integrate expression of diseases at various ages, in different cultures, and the role of society in medical research. | Students will be evaluated during quizzes and other exams the age and culture related differences that need to be accommodated in MR applications |

**Pre/Corequisite: RAD 4629**

Homework assignments and the final exam are based on the topics presented in class and will involve brief answer to advance MR instrumentation, physics, chemistry and clinical applications. Most topics will have supplemental readings using pre-assigned clinical review papers from Radiology journals. Typically, the homework and class participation will comprise 20% of final grade while midterm and final will cover the rest 80% and will be decided by the course instructor based on student suggestions at the beginning of the course.

**Example Weekly Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Topic | Chapters/Sections | LOs |
| 1 | Classical approach to MR signal and rotating frame of reference, Bloch Equation and magnet design | **Brown: Ch 2-4, 27**  **And Appendix A.** | L.O. 1, 2 |
| 2 | Signal acquisition methods and k-space | **Brown: Ch 8, 9**  **Stroman: Ch 5** | L.O. 1, 2 |
| 3 | Signal acquisition …, noise & filters | **Brown: Ch 10-13** | L.O. 1,2 |
| 4 | SNR, CNR, RF pulses, water/fat saturation techniques including fat/water resonances in a spectrum. | **Brown: Ch 15-17** | L.O. 1, 2 |
| 5 | Fast imaging, EPI and susceptibility  Cardiac MR pulse sequences | **Brown: Ch 18, 19, 25**  **Roth: TBD** | L.O. 1, 2 |
| 6 | Random walks, diffusion/perfusion, T1 & T2 estimations;  Motion artifacts, angiography and flow | **Brown: Ch 21, 22**  **Brown: Ch 23, 24** | L.O. 1, 2 |
| 7 | **----Mid Term or Paper presentation---** |  |  |
| 8 | Introductory sequence design and parallel imaging in brain and body (cardiac MR) | **Brown: Ch 26, 28**  **Roth: TBD** | L.O. 1-5 |
| 9 | Principles of fMRI and diffusion/perfusion | **Stroman: Ch 6** | L.O. 1-5 |
| 10 | fMRI study design | **Stroman: Ch 7** | L.O. 1-5 |
| 11 | fMRI data analysis | **Stroman: Ch 8** | L.O. 1-5 |
| 12 | Clinical applications of fMRI | **Stroman: Ch 9** | L.O. 1- 5 |
| 13 | MRS: technical details and clinical applications (Epilepsy, metabolic disorders, psychiatry) | **Horska: functional neuroradiology 2011** | L.O. 1- 5  GLO 6, 7 |
| 14 | MRS continued. (application to cancer) | **Horska:functional neuroradiology 2011** | L.O. 1- 5  GLO 6, 7 |
| 15 | **---Final Exam/Paper Presentation-----** |  |  |

**Grading**

Competency Evaluations (9 minimum) 40%

Professional Growth and Development Report 30%

Clinical Case Presentation 30%

100%

**Grading Policy and Procedure**

*Scope of assignments and other course requirements*: Students will prepare homework assignments regularly. There will be at least 3 exams and a final exam.

*Method of grading*: Students will be evaluated though homework, exams and research paper presentations. The final grade will be based on a weighted average of the grades from the homework and exams as follows:

Final Exam 40%

Midterm 30%

Project/Paper 20%

Quizzes/HW 10%

**Required Instructional Materials**

1. Essentials of Functional MRI, CRC Press 2011 by Patrick Stroman
2. Magnetic Resonance Imaging: Physical Principles and Sequence Design, 2nd Ed. Wiley-Blackwell 2014 by [Robert Brown](http://www.wiley.com/WileyCDA/Section/id-302475.html?query=Robert+W.+Brown), [Y.-C. Norman Cheng](http://www.wiley.com/WileyCDA/Section/id-302475.html?query=Y.-C.+Norman+Cheng), [E. Mark Haacke](http://www.wiley.com/WileyCDA/Section/id-302475.html?query=E.+Mark+Haacke), [Michael Thompson](http://www.wiley.com/WileyCDA/Section/id-302475.html?query=Michael+R.+Thompson), [Ramesh Venkatesan](http://www.wiley.com/WileyCDA/Section/id-302475.html?query=Ramesh+Venkatesan)
3. Magnetic Resonance Spectroscopy: Clinical Applications (2011 article in Functional neuroradiology by Alena Horska and Ivan Tkac.

<https://link.springer.com/chapter/10.1007%2F978-1-4419-0345-7_9>

*Recommended reference books*:

1. Fundamentals of Body MRI: Expert Consult- Online and Print, 2nd Ed. (Fundamentals of Radiology) Elsevier Health. 2011. by [Christopher G. Roth MD](https://www.amazon.com/s/ref=dp_byline_sr_book_1?ie=UTF8&text=Christopher+G.+Roth+MD&search-alias=books&field-author=Christopher+G.+Roth+MD&sort=relevancerank) .
2. Diagnostic Imaging: Brain, 3rd Ed. Elsevier Health. 2015. by [Anne Osborn](https://www.amazon.com/s/ref=dp_byline_sr_book_1?ie=UTF8&text=Anne+G.+Osborn+MD++FACR&search-alias=books&field-author=Anne+G.+Osborn+MD++FACR&sort=relevancerank), [Karen Salzman](https://www.amazon.com/s/ref=dp_byline_sr_book_2?ie=UTF8&text=Karen+L.+Salzman+MD&search-alias=books&field-author=Karen+L.+Salzman+MD&sort=relevancerank), [Miral Jhaveri](https://www.amazon.com/s/ref=dp_byline_sr_book_3?ie=UTF8&text=Miral+D.+Jhaveri+MD&search-alias=books&field-author=Miral+D.+Jhaveri+MD&sort=relevancerank) and [James Barkovich](https://www.amazon.com/s/ref=dp_byline_sr_book_4?ie=UTF8&text=A.+James+Barkovich+MD&search-alias=books&field-author=A.+James+Barkovich+MD&sort=relevancerank)

**College academic integrity policy:** Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**Class Participation:** A student must be able to devote sufficient time to complete assimilation of advance concepts and application of complex MR theory to the frontiers that is clearly dominating the potential of MR today. The course may not follow a sequence of easy to hard concepts but will switch between various physics, chemistry, mathematics and engineering principles to establish a working understanding that is expected among advance MR technologists today. Students should attend all lectures.

**Technology statement** : The students should have a background in college physics as relevant to MR (equivalent to that an introductory MR physics course), completed two clinical semesters of MR rotation and completed Math 1375 or above.

**Course Need Assessment**

**Target Students and Projected Head Counts:** This course will be a required upper level science course for BS in Radiologic Sciences students (MR Concentration). We will offer the course once per year, ideally in the Fall Semester. All students would take this after completion of prerequisites. We anticipate that there will be approximately 20 students taking the course. As the program grows, also the class enrollment will grow.

**Physical Resources:** No additional physical resources are necessary.

**Overlap with Other Courses:** There is no overlap with any other course.

**Full Time Faculty:** This course will be taught by an adjunct faculty member.

**Course Design:** This course will focus on the latest technologies, trends and areas of scientific study in the field of Magnetic Resonance Imaging. Topics will include but not be limited to specialized techniques such as spectroscopy, functional imaging, perfusion/diffusion imaging, cardiac, PET/MR imaging and informatics integration. It is a required course for the BS in RS (MR concentration). It will consist of 3 hours of lecture classes, one evening per week. Homework will be assigned on a regular basis, which will prepare the students for their midterm and final exams.

**Relationship to Programmatic Learning Outcomes**

This course will help students reach several programmatic learning outcomes of the bachelor’s degree in Radiological Science major. In particular, through this course students will:

|  |
| --- |
| * Participate in research, education as well as in routine clinical environment and be aware of the risk/benefit aspects of using advanced, less established MR procedures as compared to the well understood, routine MR approaches in spite of their limitations. |
| * Understand the comparative utility and scope of MR among several radiologic modalities when differential added value may come with advanced techniques while the safety, accuracy and cost burden also increase for choosing or adding MR beyond other tools like CT, Ultrasound and Nuclear Medicine. |

**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiological Science |
| **Course Prefix** | RAD |
| **Course Number** | 4829 |
| **Course Title** | **Advanced MR Theory and Applications** |
| **Catalog Description** | Focuses on the latest technologies, trends and areas of scientific study in the field of MR imaging. Topics include but not be limited to Functional Magnetic Resonance Imaging (FMRI), Spectroscopy, Perfusion & Diffusion Weighted Imaging, Molecular Fusion Imaging (PET/MR), Computed Aided Diagnosis and Artificial Intelligence technologies, Special Reconstruction & 3D techniques, Advanced Pulse Sequences (MRA), Cardiac MR with gating, and informatics integration. |
| **Prerequisite** |  |
| **Corequisite** |  |
| **Pre- or corequisite** | RAD 4629 |
| **Credits** | 3 |
| **Contact Hours** | 3 class hours |
| **Liberal Arts** | **[ ] Yes  [X] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** |  |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | Fall 2019 |

**Rationale**:

This course,will focus on the latest technologies, trends and areas of scientific study in the field of Magnetic Resonance Imaging. Topics will include but not be limited to Functional Magnetic Resonance Imaging (fMRI), Spectroscopy, Perfusion & Diffusion Weighted Imaging, Molecular Fusion Imaging (PET/MR), Computed Aided Diagnosis and Artificial Intelligence technologies, Special Reconstruction & 3D techniques, Advanced Pulse Sequences (MRA), Cardiac MRI with gating, and informatics integration.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | RAD 3100 Principles of Mammography |
| **Proposal Date** | 9-1-2017 |
| **Proposer’s Name** | Evans Lespinasse |
| **Course Number** | RAD 3100 |
| **Course Credits, Hours** | 3 class hours, 3 credits |
| **Course Pre / Co-Requisites** | Admission to the Baccalaureate Program and department permission. |
| **Catalog Course Description** | This elective course builds on prior knowledge in radiologic technology and provides the Mammography Quality Standards Act (MQSA) required cognitive skills underlying the intelligent performance of mammographers. Emphasis on routine breast imaging procedures and advanced techniques in Digital Breast Tomosynthesis, breast anatomy, physiology and pathology, patient interactions and management, positioning, equipment operation, quality management, and new technologies. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | The Mammography course is part of the BS General Concentration and a great option for the CT and MR Concentrations. This course is in high demand from both current and former Radiologic Technology students. In 2017, this course was offered to the BS in RS students in January and in March to graduates of the program in collaboration with Continuing Studies. Both sections were successful. As the only medical imaging procedure using ionizing radiation that is under FDA regulations (MQSA), we anticipate offering the course in spring semesters. |
| **CUNY – Course Equivalencies**  Provide information about equivalent courses within CUNY, if any. | There are no CUNY equivalent courses |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | No. |
| **For Interdisciplinary Courses:**   * Date submitted to ID Committee for review * Date ID recommendation received   - Will all sections be offered as ID? Y/N | N/A |
|  |
|  |
| **Intent to Submit as a Writing Intensive Course** | No |

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** | **X** |
| * Title, Number, Credits, Hours, Catalog course description | X |
| * Brief Rationale | X |
| * CUNY – Course Equivalencies | x |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X |
| Prerequisites/Co- requisites | X |
| Detailed Course Description | X |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X |
| Example Weekly Course outline | X |
| Grade Policy and Procedure | X |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | X |
| Library resources and bibliography | X |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. | X |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A |
| Where does this course overlap with other courses, both within and outside of the department? | X |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) | X |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X |
| How does this course support Programmatic Learning Outcomes? | X |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No |
| **Additional Forms for Specific Course Categories** | N/A |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Learning Outcomes and Assessments**

*Discipline specific*

|  |  |
| --- | --- |
| **Instructional Objectives***: For the successful completion of this course, students should:* | ***Assessment:*** *Instructional Activity, Evaluation Methods and Criteria* |
| 1. Provide historical perspectives of mammography | Reading, discussions evaluated by in-class exercises |
| 1. Breast anatomy and mammographic correlation | Students will be assessed by quizzes and during mid term. |
| 1. Identify and correlate breast pathology in mammographic images | Students will be assessed on differentiating pathology in various quizzes and during mid term. |
| 1. Discuss mammographic positioning for routine procedures and special views | These will be evaluated in quizzes and via home works. . |
| 1. Identify and label all components of the mammography equipment and its accessories | These will be evaluated in quizzes. |
| 1. Discuss department organization and MQSA regulations | These will be evaluated in mid-term and final. |
| 1. Provide information related to mammography quality management | These will be evaluated in class presentations and discussions. |
| 1. Articulate the various techniques employed in breast imaging | Students will be assessed on applicability of various techniques to differentiate pathology in various quizzes and during mid term. |
| 1. Provide proper patient care in mammography | Students will be evaluated on methods for providing optimal patient care in both mid- term and Final. . |
| 1. Discuss advanced imaging procedures including FNA and localization, stereotactic, ultrasound, tomosynthesis, and breast MRI | Students will be assessed on critically comparing multiple modalities like MRI, ultrasound and Mammography mid term. |

*General Education*

|  |  |
| --- | --- |
| **Learning outcomes** | **Assessment** |
| 1. Understand and employ both qualitative and quantitative analysis to describe progress against diseases. | Students will be tested through quizzes both qualitative and quantitative importance of screening and management of breast cancer by existing and futuristic tools.. |
| 2. Develop an in-depth appreciation of risks and benefits as related to cancer screening. | On these topics students will be assessed during class discussions on a regular basis as well as during Mid Term and Final exams. |
| 3. Integrate expression of diseases at various ages, in different cultures, and some of the issues related to women’s health. | Students will be evaluated during quizzes and other exams on the age and culture related differences that need to be accommodated. |

Homework assignments and the final exam are based on the topics presented in class and will involve questions and answers to image anatomy, physiology, patient care, equipment and pathology based questions. Final exam will be comprehensive and cumulative.

**Example Weekly Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Topic** | **Chapters** | **Quizzes and Exams** |
| 1 | Historical Perspectives and Fundamentals of Mammography | Related chapters |  |
| 2 | Departmental Structure and Regulatory Guidelines | Related chapters | Title of Term Paper |
| 3 | Breast Anatomy, Physiology and Mammographic Correlation | Related chapters | Outline of Term Paper |
| 4 | Pathology of the Breast | Related chapters | Quiz 1 |
| 5 | Correlative Physical Breast Assessment | Related chapters |  |
| 6 | Equipment and Safety | Related chapters | Abstract of Term Paper |
| 7 | Midterm Exam | Related chapters | Midterm Exam |
| 8 | Interventional Procedures | Related chapters |  |
| 9 | Mammography Quality Management | Related chapters | Oral Presentation |
| 10 | New Technologies (Computer Assisted Detection, Digital Breast Tomosynthesis, Breast Imaging Biomarkers, Dual Energy Contrast-enhanced Mammography, Breast Elastography Ultrasound Imaging, Scintimammography, and PET) | Related chapters | Oral Presentation |
| 11 | Mammographic Positioning, Special Needs and Imaging Procedures | Related chapters | Oral Presentation |
| 12 | Sonomammography and Breast MRI | Related chapters | Quiz 2 |
| 13 | Image Evaluation | Related chapters | Term Paper Due Oral Presentation |
| 14 | ARRT Exam Content Specifications and Application Procedure | Related chapters | Oral Presentation |
| 15 | Final exam | Related chapters |  |

**Grading Policy and Procedure**

*Scope of assignments and other course requirements*: Students will prepare homework assignments regularly, participate in all in-class exercises, and present their case-study results. There will be 2 quizzes, 2 exams including the final exam, and a term paper.

*Method of grading*: The final grade will be based on a weighted average of the grades from the following:

Quizzes 15%

Class Participation 15%

Term Paper 20%

Midterm 20%

Final Exam 30%

**Required and Recommended Instructional Materials**

*Required textbooks*:

1. Mammography & Breast Imaging Prep, 2nd Edition, ISBN: 9780071749329

2. Lange Q & A Mammography Examination (3rd Edition) SBN 970071833929

**College academic integrity policy**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**Class Participation**

A student must be able to devote sufficient time to complete all lecture, classroom exercises, homework, research and other course work. The course will follow a sequence that includes all ASRT and ARRT specifications. This course may be taken before, during or after the BS in RS program. Deficiency in any particular areas of the anatomy and physiology, patient care, pathology, equipment and quality management on a student’s part due to non-participation will significantly affect his/her preparedness to commence the clinical requirement for the ARRT exam. Students are expected to attend all lectures.

**Technology statement**

Before entering the course, as expected from AAS radiologic technology graduates, students should be comfortable with Blackboard.

**Course Need Assessment**

**Target Students and Projected Head Counts:** This course will be an elective upper level science course for BS in Radiologic Science (General, CT and MR Concentrations) students or non-matriculated radiographers who are looking to satisfy the MQSA required forty (40) educational contact hours of the mammography discipline. We will offer the course at least once per year, ideally in the Spring Semester. Students may take this course to fulfill the credit requirements of the BS in RS program. We anticipate that there will be approximately 15 students taking the course.

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**Physical Resources:** A new Mammography Unit has been purchased and will be installed in the New Academic Building for this course. We also have in place other accessory equipment for quality management including, breast phantoms and the latest educational software for faculty and students.

At this time, no other physical resources are necessary.

**Overlap with Other Courses:** This course does not overlap with any other course in the program or other courses in the college.

**Full Time Faculty:** The department currently has two full-time faculty capable of teaching this course and one adjunct faculty who has taught the course recently in the department.

**Course Design**

RAD 3100 Principles of Mammography will consist of 3 hours of lecture classes, once per week (evening and/or Saturday morning). Topics will be introduced, and applicable techniques will be demonstrated on the equipment in the laboratory suite. Classroom and homework activities will be assigned on a regular basis, which will prepare the students for their midterm and final exams.

**Relationship to Programmatic Learning Outcomes**

Consistent with the department's mission, this course will help students acquire the necessary knowledge in this advanced imaging modality course in preparation for the certification exam.

**Chancellor’s University Report**

**New courses to be offered in the Radiologic Technology & Medical Imaging Department**

|  |  |
| --- | --- |
| **Department(s)** | **Radiologic Technology & Medical Imaging** |
| **Academic Level** | **[X] Regular  [   ] Compensatory  [   ] Developmental  [   ] Remedial** |
| **Subject Area** | Radiological Science |
| **Course Prefix** | RAD |
| **Course Number** | 3100 |
| **Course Title** | Principles of Mammography |
| **Catalog Description** | This elective course builds on prior knowledge in radiologic technology and provides the Mammography Quality Standards Act (MQSA) required cognitive skills underlying the intelligent performance of mammographers. Emphasis on routine breast imaging procedures and advanced techniques in Digital Breast Tomosynthesis, breast anatomy, physiology and pathology, patient interactions and management, positioning, equipment operation, quality management, and new technologies.  . |
| **Prerequisite** | Admission to the Baccalaureate Program departmental permission. |
| **Corequisite** | N/A |
| **Pre- or corequisite** |  |
| **Credits** | 3 |
| **Contact Hours** | 3 class hours |
| **Liberal Arts** | **[ ] Yes  [X ] No** |
| **Course Attribute (e.g. Writing Intensive, etc.)** | N/a |
| **Course Applicability** | |  |  |  | | --- | --- | --- | | **[X] Major** |  | | | **[ ] Gen Ed Required** | **[ ] Gen Ed - Flexible** | **[ ] Gen Ed - College Option** | | **[ ] English Composition** | **[ ] World Cultures** | **[ ] Speech** | | **[ ] Mathematics** | **[ ] US Experience in its Diversity** | **[ ] Interdisciplinary** | | **[ ] Science** | **[ ] Creative Expression** | **[ ] Advanced Liberal Arts** | |  | **[ ] Individual and Society** |  | |  | **[ ] Scientific World** |  | |
| **Effective Term** | Spring 2019 |

**Rationale**:

The Mammography course is part of the BS General Concentration and a great option for the CT and MR Concentrations. This course is in high demand from both current and former Radiologic Technology students. In 2017, this course was offered to the BS in RS students in January and in March, to graduates of the program in collaboration with Continuing Studies. Both sections were successful. As the only medical imaging procedure using ionizing radiation that is under FDA regulations (MQSA), we anticipate offering the course in spring semesters.

## Minor AAS Modification Chancellor's Reports

Changes to be offered in the AAS Program in Radiologic Technology & Medical Imaging

|  |  |  |  |
| --- | --- | --- | --- |
| **CUNYFirst Course ID** | 040524 |  |  |
| **FROM** |  | **TO** |  |
| **Department(s)** |  | Department(s) |  |
| **Course** | RAD 1125 | Course | RAD 1125 |
| **Corequisite** |  | Corequisite |  |
| **Prerequisite** | ~~CUNY proficiency in reading, writing and mathematics~~ | Prerequisite | ENG 1101, BIO 1101, BIO 2311, MAT 1275 or higher, RAD 1124 |
| **Corequisite** | ~~RAD 1124~~, RAD 1126, RAD 1127, ~~RAD 1128,~~ ~~BIO 2311~~ | Corequisite | RAD 1126, RAD 1127, RAD 1129, BIO 2312 |
| **Pre- or corequisite** |  |  |  |
| **Hours** |  | Hours |  |
| **Credits** |  | Credits |  |
| **Description** |  | Description |  |
| **Requirement Designation** |  | Requirement Designation |  |
| **Liberal Arts** | [ ] Yes [x ] No | Liberal Arts | [ ] Yes [ x] No |
| **Course Attribute (e.g. Writing Intensive, Honors, etc.** |  | Course Attribute (e.g. Writing Intensive, Honors, etc. |  |
| **Course Applicability** | |  | | --- | | [ ] Major | | [ ] Gen Ed Required | | | [ ] English Composition | | | [ ] Mathematics | | | [ ] Science | | | [ ] Gen Ed - Flexible | | | [ ] World Cultures  Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.   |  |  | | --- | --- | | **Completed NEW COURSE PROPOSAL FORM** | **X** | | * Title, Number, Credits, Hours, Catalog course description | X | | * Brief Rationale | X | | * CUNY – Course Equivalencies | x | | Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X | | **Course Outline**  Include within the outline the following. |  | | Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X | | Prerequisites/Co- requisites | X | | Detailed Course Description | X | | Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X | | Example Weekly Course outline | X | | Grade Policy and Procedure | X | | Recommended Instructional Materials (Textbooks, lab supplies, etc) | X | | Library resources and bibliography | X | | **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  | | Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X | | Projected headcounts (fall/spring and day/evening) for each new or modified course. | X | | If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A | | Where does this course overlap with other courses, both within and outside of the department? | X | | Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X | | If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A | | **Course Design**  Describe how this course is designed. |  | | Course Context (e.g. required, elective, capstone) | X | | Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X | | Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X | | How does this course support Programmatic Learning Outcomes? | X | | Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No | | **Additional Forms for Specific Course Categories** | N/A | | [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  | | Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  | | [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  | | Writing Intensive Form if course is intended to be a WIC (under development) |  | | If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  | | **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A | | Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  | | Established Timeline for Curricular Experiment |  | | | | [ ] US Experience in its Diversity | | | [ ] Creative Expression | | | [ ] Individual and Society | | | [ ] Scientific World | | | [ ] Gen Ed - College Option | | | [ ] Speech | | | [ ] Interdisciplinary | | | [ ] Advanced Liberal Arts | | | Course Applicability | |  |  | | --- | --- | | [ ] Major |  | | [ ] Gen Ed Required | | | [ ] English Composition | | | [ ] Mathematics | | | [ ] Science | | | [ ] Gen Ed - Flexible | | | [ ] World Cultures  Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.   |  |  | | --- | --- | | **Completed NEW COURSE PROPOSAL FORM** | **X** | | * Title, Number, Credits, Hours, Catalog course description | X | | * Brief Rationale | X | | * CUNY – Course Equivalencies | x | | Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X | | **Course Outline**  Include within the outline the following. |  | | Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X | | Prerequisites/Co- requisites | X | | Detailed Course Description | X | | Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X | | Example Weekly Course outline | X | | Grade Policy and Procedure | X | | Recommended Instructional Materials (Textbooks, lab supplies, etc) | X | | Library resources and bibliography | X | | **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  | | Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X | | Projected headcounts (fall/spring and day/evening) for each new or modified course. | X | | If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A | | Where does this course overlap with other courses, both within and outside of the department? | X | | Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X | | If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A | | **Course Design**  Describe how this course is designed. |  | | Course Context (e.g. required, elective, capstone) | X | | Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X | | Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X | | How does this course support Programmatic Learning Outcomes? | X | | Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No | | **Additional Forms for Specific Course Categories** | N/A | | [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  | | Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  | | [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  | | Writing Intensive Form if course is intended to be a WIC (under development) |  | | If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  | | **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A | | Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  | | Established Timeline for Curricular Experiment |  | | | | [ ] US Experience in its Diversity | | | [ ] Creative Expression | | | [ ] Individual and Society | | | [ ] Scientific World | | | [ ] Gen Ed - College Option | | | [ ] Speech | | | [ ] Interdisciplinary | | | [ ] Advanced Liberal Arts | | |
| **Effective Term** |  |  | Fall 2019 |

**Rationale:**

The current prerequisites for this course do not support student's success in the clinical phase of the associate program. With ENG 1101, MAT 1275, BIO 2311 and RAD 1124, students' foundational knowledge will be strengthened and progress toward their degree completion.

## Minor AAS Modification Chancellor's Report

Changes to be offered in the AAS Program in Radiologic Technology & Medical Imaging

|  |  |  |  |
| --- | --- | --- | --- |
| **CUNYFirst Course ID** | 040526 |  |  |
| **FROM** |  | **TO** |  |
| **Department(s)** |  | Department(s) |  |
| **Course** | RAD 1126 | Course | RAD 1126 |
| **Corequisite** |  | Corequisite |  |
| **Prerequisite** | ~~CUNY proficiency in reading, writing and mathematics~~ | Prerequisite | ENG 1101, BIO 1101, BIO 2311, MAT 1275 or higher, RAD 1124 |
| **Corequisite** | ~~RAD 1124, RAD 1125, RAD 1127~~ ~~RAD 1128,~~ ~~BIO 2311, MAT 1275 or higher~~ | Corequisite | RAD 1125, RAD 1127, RAD 1129, BIO 2312 |
| **Pre- or corequisite** |  |  |  |
| **Hours** |  | Hours |  |
| **Credits** |  | Credits |  |
| **Description** |  | Description |  |
| **Requirement Designation** |  | Requirement Designation |  |
| **Liberal Arts** | [ ] Yes [x ] No | Liberal Arts | [ ] Yes [ x] No |
| **Course Attribute (e.g. Writing Intensive, Honors, etc.** |  | Course Attribute (e.g. Writing Intensive, Honors, etc. |  |
| **Course Applicability** | |  | | --- | | [ ] Major | | [ ] Gen Ed Required | | | [ ] English Composition | | | [ ] Mathematics | | | [ ] Science | | | [ ] Gen Ed - Flexible | | | [ ] World Cultures  Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.   |  |  | | --- | --- | | **Completed NEW COURSE PROPOSAL FORM** | **X** | | * Title, Number, Credits, Hours, Catalog course description | X | | * Brief Rationale | X | | * CUNY – Course Equivalencies | x | | Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X | | **Course Outline**  Include within the outline the following. |  | | Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X | | Prerequisites/Co- requisites | X | | Detailed Course Description | X | | Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X | | Example Weekly Course outline | X | | Grade Policy and Procedure | X | | Recommended Instructional Materials (Textbooks, lab supplies, etc) | X | | Library resources and bibliography | X | | **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  | | Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X | | Projected headcounts (fall/spring and day/evening) for each new or modified course. | X | | If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A | | Where does this course overlap with other courses, both within and outside of the department? | X | | Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X | | If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A | | **Course Design**  Describe how this course is designed. |  | | Course Context (e.g. required, elective, capstone) | X | | Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X | | Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X | | How does this course support Programmatic Learning Outcomes? | X | | Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No | | **Additional Forms for Specific Course Categories** | N/A | | [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  | | Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  | | [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  | | Writing Intensive Form if course is intended to be a WIC (under development) |  | | If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  | | **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A | | Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  | | Established Timeline for Curricular Experiment |  | | | | [ ] US Experience in its Diversity | | | [ ] Creative Expression | | | [ ] Individual and Society | | | [ ] Scientific World | | | [ ] Gen Ed - College Option | | | [ ] Speech | | | [ ] Interdisciplinary | | | [ ] Advanced Liberal Arts | | | Course Applicability | |  |  | | --- | --- | | [ ] Major |  | | [ ] Gen Ed Required | | | [ ] English Composition | | | [ ] Mathematics | | | [ ] Science | | | [ ] Gen Ed - Flexible | | | [ ] World Cultures  Use this checklist to ensure that all required documentation has been included. 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Include in your statement the following information. |  | | Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X | | Projected headcounts (fall/spring and day/evening) for each new or modified course. | X | | If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A | | Where does this course overlap with other courses, both within and outside of the department? | X | | Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X | | If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A | | **Course Design**  Describe how this course is designed. |  | | Course Context (e.g. required, elective, capstone) | X | | Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X | | Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X | | How does this course support Programmatic Learning Outcomes? | X | | Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No | | **Additional Forms for Specific Course Categories** | N/A | | [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  | | Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  | | [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  | | Writing Intensive Form if course is intended to be a WIC (under development) |  | | If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  | | **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A | | Plan and process for evaluation developed in consultation with the director of assessment. 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| **Effective Term** |  |  | Fall 2019 |

**Rationale:**

The current prerequisites for this course do not support student's success in the clinical phase of the associate program. With ENG 1101, MAT 1275, BIO 2311 and RAD 1124, students' foundational knowledge will be strengthened and progress toward their degree completion.

## Minor AAS Modification Chancellor's Report

Changes to be offered in the AAS Program in Radiologic Technology & Medical Imaging

|  |  |  |  |
| --- | --- | --- | --- |
| **CUNYFirst Course ID** | 040528 |  |  |
| **FROM** |  | **TO** |  |
| **Department(s)** |  | Department(s) |  |
| **Course** | RAD 1127 | Course | RAD 1127 |
| **Corequisite** |  | Corequisite |  |
| **Prerequisite** | ~~CUNY proficiency in reading, writing and mathematics~~ | Prerequisite | ENG 1101, BIO 1101, BIO 2311, MAT 1275 or higher, RAD 1124 |
| **Corequisite** | ~~RAD 1124,~~ RAD 1125, RAD 1126, ~~RAD 1128,~~ ~~BIO 2311~~ | Corequisite | RAD 1125, RAD 1126, RAD 1129, BIO 2312 |
| **Pre- or corequisite** |  |  |  |
| **Hours** |  | Hours |  |
| **Credits** |  | Credits |  |
| **Description** |  | Description |  |
| **Requirement Designation** |  | Requirement Designation |  |
| **Liberal Arts** | [ ] Yes [x ] No | Liberal Arts | [ ] Yes [ x] No |
| **Course Attribute (e.g. Writing Intensive, Honors, etc.** |  | Course Attribute (e.g. Writing Intensive, Honors, etc. |  |
| **Course Applicability** | |  | | --- | | [ ] Major | | [ ] Gen Ed Required | | | [ ] English Composition | | | [ ] Mathematics | | | [ ] Science | | | [ ] Gen Ed - Flexible | | | [ ] World Cultures  Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.   |  |  | | --- | --- | | **Completed NEW COURSE PROPOSAL FORM** | **X** | | * Title, Number, Credits, Hours, Catalog course description | X | | * Brief Rationale | X | | * CUNY – Course Equivalencies | x | | Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X | | **Course Outline**  Include within the outline the following. |  | | Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X | | Prerequisites/Co- requisites | X | | Detailed Course Description | X | | Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X | | Example Weekly Course outline | X | | Grade Policy and Procedure | X | | Recommended Instructional Materials (Textbooks, lab supplies, etc) | X | | Library resources and bibliography | X | | **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  | | Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X | | Projected headcounts (fall/spring and day/evening) for each new or modified course. | X | | If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A | | Where does this course overlap with other courses, both within and outside of the department? | X | | Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X | | If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A | | **Course Design**  Describe how this course is designed. |  | | Course Context (e.g. required, elective, capstone) | X | | Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X | | Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X | | How does this course support Programmatic Learning Outcomes? | X | | Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No | | **Additional Forms for Specific Course Categories** | N/A | | [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  | | Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  | | [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  | | Writing Intensive Form if course is intended to be a WIC (under development) |  | | If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  | | **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A | | Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  | | Established Timeline for Curricular Experiment |  | | | | [ ] US Experience in its Diversity | | | [ ] Creative Expression | | | [ ] Individual and Society | | | [ ] Scientific World | | | [ ] Gen Ed - College Option | | | [ ] Speech | | | [ ] Interdisciplinary | | | [ ] Advanced Liberal Arts | | | Course Applicability | |  |  | | --- | --- | | [ ] Major |  | | [ ] Gen Ed Required | | | [ ] English Composition | | | [ ] Mathematics | | | [ ] Science | | | [ ] Gen Ed - Flexible | | | [ ] World Cultures  Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.   |  |  | | --- | --- | | **Completed NEW COURSE PROPOSAL FORM** | **X** | | * Title, Number, Credits, Hours, Catalog course description | X | | * Brief Rationale | X | | * CUNY – Course Equivalencies | x | | Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X | | **Course Outline**  Include within the outline the following. |  | | Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X | | Prerequisites/Co- requisites | X | | Detailed Course Description | X | | Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X | | Example Weekly Course outline | X | | Grade Policy and Procedure | X | | Recommended Instructional Materials (Textbooks, lab supplies, etc) | X | | Library resources and bibliography | X | | **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  | | Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X | | Projected headcounts (fall/spring and day/evening) for each new or modified course. | X | | If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A | | Where does this course overlap with other courses, both within and outside of the department? | X | | Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X | | If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A | | **Course Design**  Describe how this course is designed. |  | | Course Context (e.g. required, elective, capstone) | X | | Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X | | Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X | | How does this course support Programmatic Learning Outcomes? | X | | Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No | | **Additional Forms for Specific Course Categories** | N/A | | [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  | | Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  | | [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  | | Writing Intensive Form if course is intended to be a WIC (under development) |  | | If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  | | **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A | | Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  | | Established Timeline for Curricular Experiment |  | | | | [ ] US Experience in its Diversity | | | [ ] Creative Expression | | | [ ] Individual and Society | | | [ ] Scientific World | | | [ ] Gen Ed - College Option | | | [ ] Speech | | | [ ] Interdisciplinary | | | [ ] Advanced Liberal Arts | | |
| **Effective Term** |  |  | Fall 2019 |

**Rationale:**

The current prerequisites for this course do not support student's success in the clinical phase of the associate program. With ENG 1101, MAT 1275, BIO 2311 and RAD 1124, students' foundational knowledge will be strengthened and progress toward their degree completion.

## Minor BS Modification Chancellor's Report

Changes to be offered in the BS Program in Radiologic Technology & Medical Imaging

|  |  |  |  |
| --- | --- | --- | --- |
| **CUNYFirst Course ID** | 116568 |  |  |
| **FROM** |  | **TO** |  |
| **Department(s)** |  | Department(s) |  |
| **Course** | ~~RAD 4726~~ | Course | RAD 3726 |
| **Corequisite** |  | Corequisite |  |
| **Prerequisite** | ~~PHYS 2603~~ | Prerequisite | Admission to the bachelor's program |
| **Hours** |  | Hours |  |
| **Credits** |  | Credits |  |
| **Description** |  | Description |  |
| **Requirement Designation** |  | Requirement Designation |  |
| **Liberal Arts** | [ ] Yes [ ] No | Liberal Arts | [ ] Yes [ ] No |
| **Course Attribute (e.g. Writing Intensive, Honors, etc.** |  | Course Attribute (e.g. Writing Intensive, Honors, etc. |  |
| **Course Applicability** | |  | | --- | | [ ] Major | | [ ] Gen Ed Required | | | [ ] English Composition | | | [ ] Mathematics | | | [ ] Science | | | [ ] Gen Ed - Flexible | | | [ ] World Cultures  Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.   |  |  | | --- | --- | | **Completed NEW COURSE PROPOSAL FORM** | **X** | | * Title, Number, Credits, Hours, Catalog course description | X | | * Brief Rationale | X | | * CUNY – Course Equivalencies | x | | Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X | | **Course Outline**  Include within the outline the following. |  | | Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X | | Prerequisites/Co- requisites | X | | Detailed Course Description | X | | Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X | | Example Weekly Course outline | X | | Grade Policy and Procedure | X | | Recommended Instructional Materials (Textbooks, lab supplies, etc) | X | | Library resources and bibliography | X | | **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  | | Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X | | Projected headcounts (fall/spring and day/evening) for each new or modified course. | X | | If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A | | Where does this course overlap with other courses, both within and outside of the department? | X | | Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X | | If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A | | **Course Design**  Describe how this course is designed. |  | | Course Context (e.g. required, elective, capstone) | X | | Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X | | Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X | | How does this course support Programmatic Learning Outcomes? | X | | Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No | | **Additional Forms for Specific Course Categories** | N/A | | [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  | | Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  | | [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  | | Writing Intensive Form if course is intended to be a WIC (under development) |  | | If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  | | **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A | | Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  | | Established Timeline for Curricular Experiment |  | | | | [ ] US Experience in its Diversity | | | [ ] Creative Expression | | | [ ] Individual and Society | | | [ ] Scientific World | | | [ ] Gen Ed - College Option | | | [ ] Speech | | | [ ] Interdisciplinary | | | [ ] Advanced Liberal Arts | | | Course Applicability | |  |  | | --- | --- | | [ ] Major |  | | [ ] Gen Ed Required | | | [ ] English Composition | | | [ ] Mathematics | | | [ ] Science | | | [ ] Gen Ed - Flexible | | | [ ] World Cultures  Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.   |  |  | | --- | --- | | **Completed NEW COURSE PROPOSAL FORM** | **X** | | * Title, Number, Credits, Hours, Catalog course description | X | | * Brief Rationale | X | | * CUNY – Course Equivalencies | x | | Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X | | **Course Outline**  Include within the outline the following. |  | | Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X | | Prerequisites/Co- requisites | X | | Detailed Course Description | X | | Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X | | Example Weekly Course outline | X | | Grade Policy and Procedure | X | | Recommended Instructional Materials (Textbooks, lab supplies, etc) | X | | Library resources and bibliography | X | | **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  | | Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X | | Projected headcounts (fall/spring and day/evening) for each new or modified course. | X | | If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A | | Where does this course overlap with other courses, both within and outside of the department? | X | | Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X | | If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A | | **Course Design**  Describe how this course is designed. |  | | Course Context (e.g. required, elective, capstone) | X | | Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X | | Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X | | How does this course support Programmatic Learning Outcomes? | X | | Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No | | **Additional Forms for Specific Course Categories** | N/A | | [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  | | Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  | | [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  | | Writing Intensive Form if course is intended to be a WIC (under development) |  | | If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  | | **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A | | Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  | | Established Timeline for Curricular Experiment |  | | | | [ ] US Experience in its Diversity | | | [ ] Creative Expression | | | [ ] Individual and Society | | | [ ] Scientific World | | | [ ] Gen Ed - College Option | | | [ ] Speech | | | [ ] Interdisciplinary | | | [ ] Advanced Liberal Arts | | |
| **Effective Term** |  |  | **Spring 2019** |

**Rationale:**

The proposed change best fits at the 3000 level, based on the population of various imaging backgrounds (Ultrasound, Nuclear Medicine Technology, Radiography, and Radiation Therapy) in the general concentration of the BSRS program. This will provide students with application based knowledge compared to advanced concepts within any specialized modality. Also, the course does not depend on prior knowledge from PHYS 2603, Physical Principles of Medical Imaging**.**

## Minor BS Modification Chancellor's Report

Changes to be offered in the BS Program in Radiologic Technology & Medical Imaging

|  |  |  |  |
| --- | --- | --- | --- |
| **CUNYFirst Course ID** | 116571 |  |  |
| **FROM** |  | **TO** |  |
| **Department(s)** |  | Department(s) |  |
| **Course** | RAD 4830 | Course | RAD 4830 |
| **Corequisite** |  | Corequisite | RAD 4828 |
| **Prerequisite** | LIB 1201, ~~RAD 3527, RAD 3627, RAD 3628, RAD 4726,~~ RAD 4828 | Prerequisite | LIB 1201 |
| **Hours** |  | Hours |  |
| **Credits** |  | Credits |  |
| **Description** | ~~Focus on substantive medical imaging ethical and legal aspects, accreditation compliance and non-compliance issues. Additional topics include political context of health care organization and delivery, mechanisms for policy formulation and implementation, reporting, and risk management techniques. Students will examine various methods of health delivery and explore complex issues and themes that affect medical imaging, radiation therapy, and allied health education in a substantial writing assignment~~. | Description | Focus on substantive medical imaging ethical and legal aspects, accreditation compliance and non-compliance issues. Additional topics include political context of health care organization and delivery, mechanisms for policy formulation and implementation, reporting, and risk management techniques. Students will examine various methods of health delivery and explore complex issues and themes that affect the role of the medical imaging leader in a substantive writing assignment*.* |
| **Requirement Designation** |  | Requirement Designation |  |
| **Liberal Arts** | [ ] Yes [ ] No | Liberal Arts | [ ] Yes [ ] No |
| **Course Attribute (e.g. Writing Intensive, Honors, etc.** |  | Course Attribute (e.g. Writing Intensive, Honors, etc. |  |
| **Course Applicability** | |  |  | | --- | --- | | [ ] Major |  | | [ ] Gen Ed Required | | | [ ] English Composition | | | [ ] Mathematics | | | [ ] Science | | | [ ] Gen Ed - Flexible | | | [ ] World Cultures  Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.   |  |  | | --- | --- | | **Completed NEW COURSE PROPOSAL FORM** | **X** | | * Title, Number, Credits, Hours, Catalog course description | X | | * Brief Rationale | X | | * CUNY – Course Equivalencies | x | | Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) | X | | **Course Outline**  Include within the outline the following. |  | | Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this | X | | Prerequisites/Co- requisites | X | | Detailed Course Description | X | | Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables | X | | Example Weekly Course outline | X | | Grade Policy and Procedure | X | | Recommended Instructional Materials (Textbooks, lab supplies, etc) | X | | Library resources and bibliography | X | | **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  | | Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). | X | | Projected headcounts (fall/spring and day/evening) for each new or modified course. | X | | If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | N/A | | Where does this course overlap with other courses, both within and outside of the department? | X | | Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? | X | | If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | N/A | | **Course Design**  Describe how this course is designed. |  | | Course Context (e.g. required, elective, capstone) | X | | Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | X | | Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | X | | How does this course support Programmatic Learning Outcomes? | X | | Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | No | | **Additional Forms for Specific Course Categories** | N/A | | [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  | | Interdisciplinary Committee Recommendation (if applicable and if received)\*  \*Recommendation must be received before consideration by full Curriculum Committee |  | | [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  | | Writing Intensive Form if course is intended to be a WIC (under development) |  | | If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  | | **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** | N/A | | Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  | | Established Timeline for Curricular Experiment |  | | | | [ ] US Experience in its Diversity | | | [ ] Creative Expression | | | [ ] Individual and Society | | | [ ] Scientific World | | | [ ] Gen Ed - College Option | | | [ ] Speech | | | [ ] Interdisciplinary | | | [ ] Advanced Liberal Arts | | | Course Applicability | |  |  | | --- | --- | | [ ] Major |  | | [ ] Gen Ed Required | | | [ ] English Composition | | | [ ] Mathematics | | | [ ] Science | | | [ ] Gen Ed - Flexible | | | [ ] World Cultures | | | [ ] US Experience in its Diversity | | | [ ] Creative Expression | | | [ ] Individual and Society | | | [ ] Scientific World | | | [ ] Gen Ed - College Option | | | [ ] Speech | | | [ ] Interdisciplinary | | | [ ] Advanced Liberal Arts | | |
| **Effective Term** |  |  | **Spring 2019** |

**Rationale:**

This modification in course description and prerequisites are necessary. The changes realign the prerequisite sequencing to reflect the newly proposed courses in the CT and MR Concentrations. The minor change in course description is more consistent with the course title.

# Minutes from Department of Radiologic Technology & Medical Imaging Meetings

**NEW YORK CITY COLLEGE OF TECHNOLOGY**

**CITY UNIVERSITY OF NEW YORK**

**DEPARTMENT OF RADIOLOGIC TECHNOLOGY AND MEDICAL IMAGING**

**FACULTY MEETING**

**June 14, 2017**

**Meeting Minutes**

**Present:**

Prof. E. Lespinasse, Prof. A. DeVito, Prof. E. Lobel, Prof. S. Sarkar and Ms. Jodi-Ann Douglas (CLT)

**Purpose**:

The primary purpose of this meeting was to discuss the addition of a Computed Tomography (CT) and Magnetic Resonance (MR) imaging concentration in the BS in RS program.

**Discussion**:

Our discussion focused on a number of items not limited to those highlighted below.

* Three concentrations would be offered with the same number of credit hours, leading to the same terminal BS in RS degree. Additionally, an elective course in Mammography will be made part of the proposal.
* Approximately 10 new courses would be offered between the CT and MR concentrations including three clinical internship courses.
* The currently offered program would be modified and become the general concentration.
* The addition of new tenure concentration faculty and the role a clinical coordinator was discussed.

**Result**:

The faculty and staff unanimously supported the idea of a major curriculum modification that would result in three concentrations. A general, CT, or MRI concentration would be offered to new BS in RS students.

**Follow up**:

The following action items were discussed:

* A meeting with Provost and School Dean will be scheduled
* Required curriculum forms and other documents will be reviewed

Respectively Submitted,



Prof. E. Lobel

**Minutes from Meeting with Division Dean, Provost and Department of Radiologic Technology & Medical Imaging Team**

**NEW YORK CITY COLLEGE OF TECHNOLOGY**

**CITY UNIVERSITY OF NEW YORK**

**Tuesday, June 27 from 1pm – 2:15pm in Namm 320.**

**Meeting Minutes**

**Present:**

Dr. Bonne August, Provost, Dr. David Smith, Dean School of Professional Studies, Prof. Evans Lespinasse, Chair, Prof. Eric Lobel, Faculty, and Dr. Subhendra Sarkar, Program Director.

**Purpose**:

The primary purpose of this meeting was to discuss the addition of a Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) concentration in the BS in RS program.

**Results**:

* Both the provost and dean were generally supportive of the proposed CT and MR Concentrations.
* They specifically supported the idea of a clinical component and the need for additional faculty.
* If a timeline of Fall 2018 to be met, the proposal needs to be submitted by end of September, 2017
* The requested additional faculty lines were 2 for the BSRS program.
* A general concentration with modification of two courses will replace the existing BS in RS program.

**Discussion**:

Our discussion focused on several items not limited to those highlighted below.

* Prof Lobel summarized the practical need and general requirements for BS in RS graduates to qualify for national licensure examinations if the specialized MRI and CT concentrations were to be offered including approximately 250 hrs of clinical training needed for each concentration. He clarified the roles of academic professional departments like RTMI, clinical hospital affiliates and the professional licensing registry bodies.
* Profs. Lespinasse and Sarkar asked if the course didactic requirement could be increased from 120 to 124. The Provost and Dean felt that increasing didactic numbers by several credits would require extra justification to Middle States although exceeding by 1 credit may be plausible. The team decided to try to stay within 120-121 credit hours for all BS in RS concentrations.
* The Provost asked if the program would be able to attract clinical affiliates to support the clinical training thus needed for clinical licensure role of those clinical sites.
* Profs. Sarkar and Lespinasse mentioned prior interests and supports that seem to exist from their discussions with some of the major healthcare chains in NYC.
* Prof. Sarkar mentioned the possibility of collaborating with the advanced science research center (ASRC) high field Research MR facility to get a large number of MR concentration students trained quickly at the early and advanced stage while by a lesser extent at the hospitals for the acute, intermediate level for additional clinical training.
* Approximately 10 new courses would be offered between the CT and MR concentrations including three clinical internships.
* The currently offered program would be modified and become the general concentration.
* The addition of new tenure concentration faculty for the specialized courses and the role a clinical coordinator was discussed.

**Follow up**:

The following action items were discussed:

* RTMI team will try to meet the September 26 deadline for the first draft of the proposal.

Respectively Submitted,



Prof. E. Lobel

# Consultation with Affected Departments

**Mathematics:**

In the spring of 2017, preliminary discussion took place between Prof. Lespinasse, Dr. Sarkar and Dr. Han, Chair of the Math Department. The discussion focused on an analysis of the content in MAT 1272 Statistics and that of MAT 1375 Pre-calculus. Following a side by side comparison, we concluded that there is a significant emphasis now on applied sciences with a stronger appreciation of applied mathematics that is not being addressed with MAT 1272. Our BS radiology students do not base their professional practice on introductory statistics as much today but rather must analyze data and situations based on various functions including logarithmic and exponential behavior of health science variables, trigonometry and graphical analysis of inequalities. In a nutshell, they need more topics in MAT 1375 Pre-calculus today.

Based on that discussion, we came to an agreement that MAT 1375 would better serve our students than MAT 1272. Therefore, MAT 1375 will be the required math for all three concentrations, (general, CT and MR).

Spring 2018, we address the correct reference to the math sequence from the Math Department. Below is an excerpt from Dr. Han's email:

" I think it’s safe to say MAT 1275 or higher would be fine if you are requiring only one STEM-track course.  Since all courses that are higher than MAT 1275 have either MAT 1275 as prerequisite or MAT 1375 as pre or corequisite.  However, if you are requiring a sequence of courses such as MAT 1275 and 1375, you should list the courses, and not simply say MAT 1275 or higher."

**Biology:**

In the Fall of 2017, two discussions took place between Prof. Lespinasse, Dr. Sarkar, both LAS and SPS Deans and Dr. Karthikeyan, Chair of the Biology Department. The discussion focused on our request to drop BIO 1101 as a prerequisite for BIO 2311. The Biology Department faculty subsequently met in a special meeting and concluded that an introductory Biology (BIO 1101, 4 cr) should remain a hard prerequisite for enrolling in Anatomy and Physiology-I course (BIO 2311) for students with weakness in Biology as explained in the College Catalog.

Based on the recommendation from provost office, this “hidden” prerequisite for the AAS entry point in Radiologic Technology program must be explicitly accounted for. Consequently, we have accommodated the preference of the Biology department with further advice from Dean David Smith and have included BIO 1101 as an explicit and required course to enroll toward the needed Anatomy and Physiology courses in the 2+2 associate and BS structure. This has increased the credit total for the full BS modification proposal by 1 credit, with the removal of ECON 1101.

# Provost’s Office:

# On March 6, 2018, we met with Provost August, AP Brown, and Kim Cardascia. We proposed the addition of one extra credit to both the AAS (65 to 66 credits) and BS (120 to 121 credits). We were advised that an increase of one credit is feasible and will be pursued by the office of the Provost. This explicitly accounts for the hidden prerequisite issue regarding BIO 1101, as mentioned above.

# We also discussed the best way to present the changes in RAD 1128 without increasing the number of credits. It was decided that the course will best serve the students with 1 hour lecture and 2 hour lab. Lastly, as advised by Prof. Hannum, we changed the number sequence and modify the language in the catalog footnotes to improve clarity.Library Resources & Information Literacy

|  |  |  |
| --- | --- | --- |
| **1** | **Title of proposal**  RAD MAJOR CURRICULUM MODIFICATION  FOR AAS AND BS PROGRAMS | **Department/Program**  Radiologic Technology & Medical Imaging |
|  | **Proposed by** (include email & phone)  Eric Lobel – [elobel@citytech.cuny.edu](mailto:elobel@citytech.cuny.edu)  718-260-5360 | **Expected date course(s) will be offered**  **# of students 16 -25** |

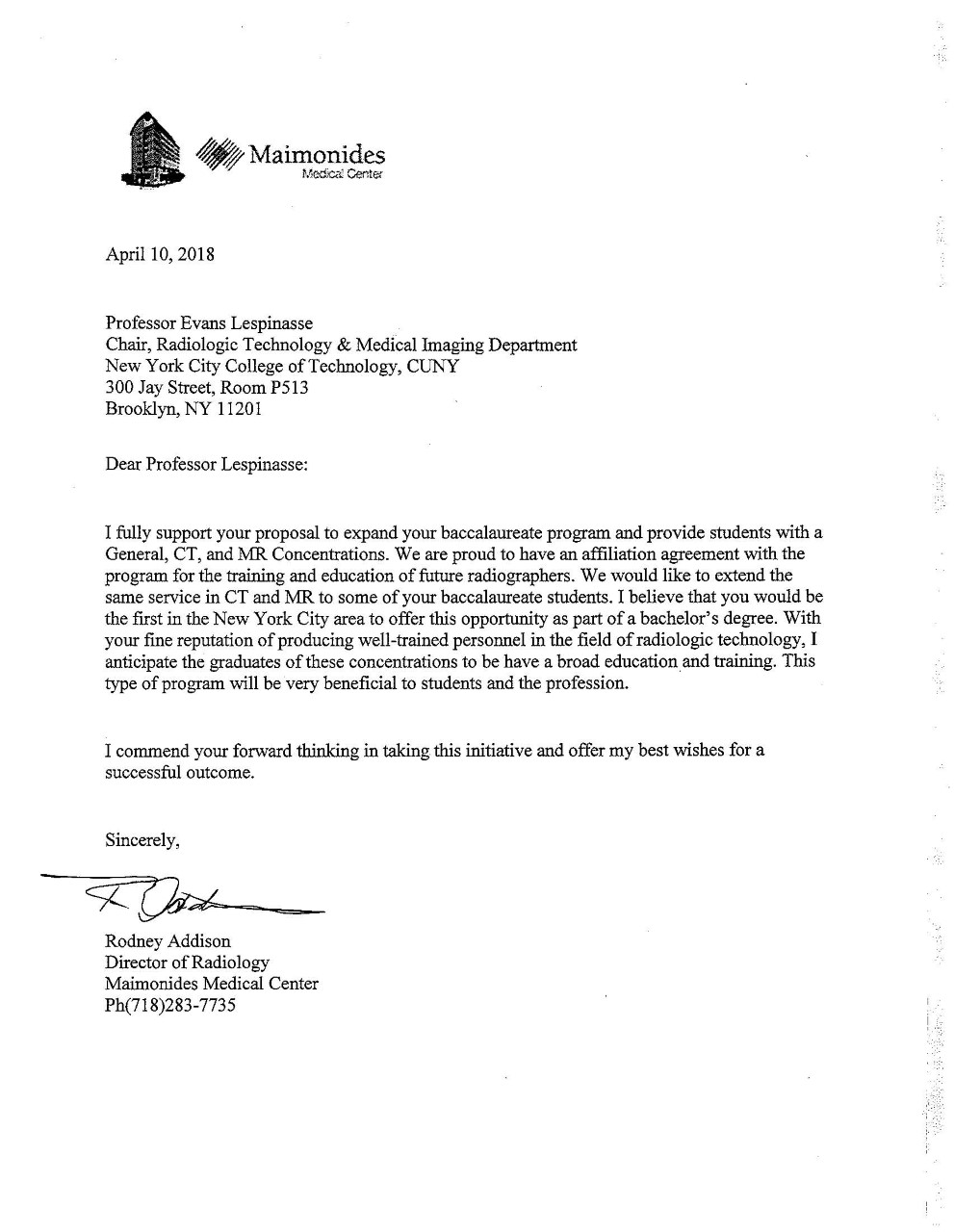
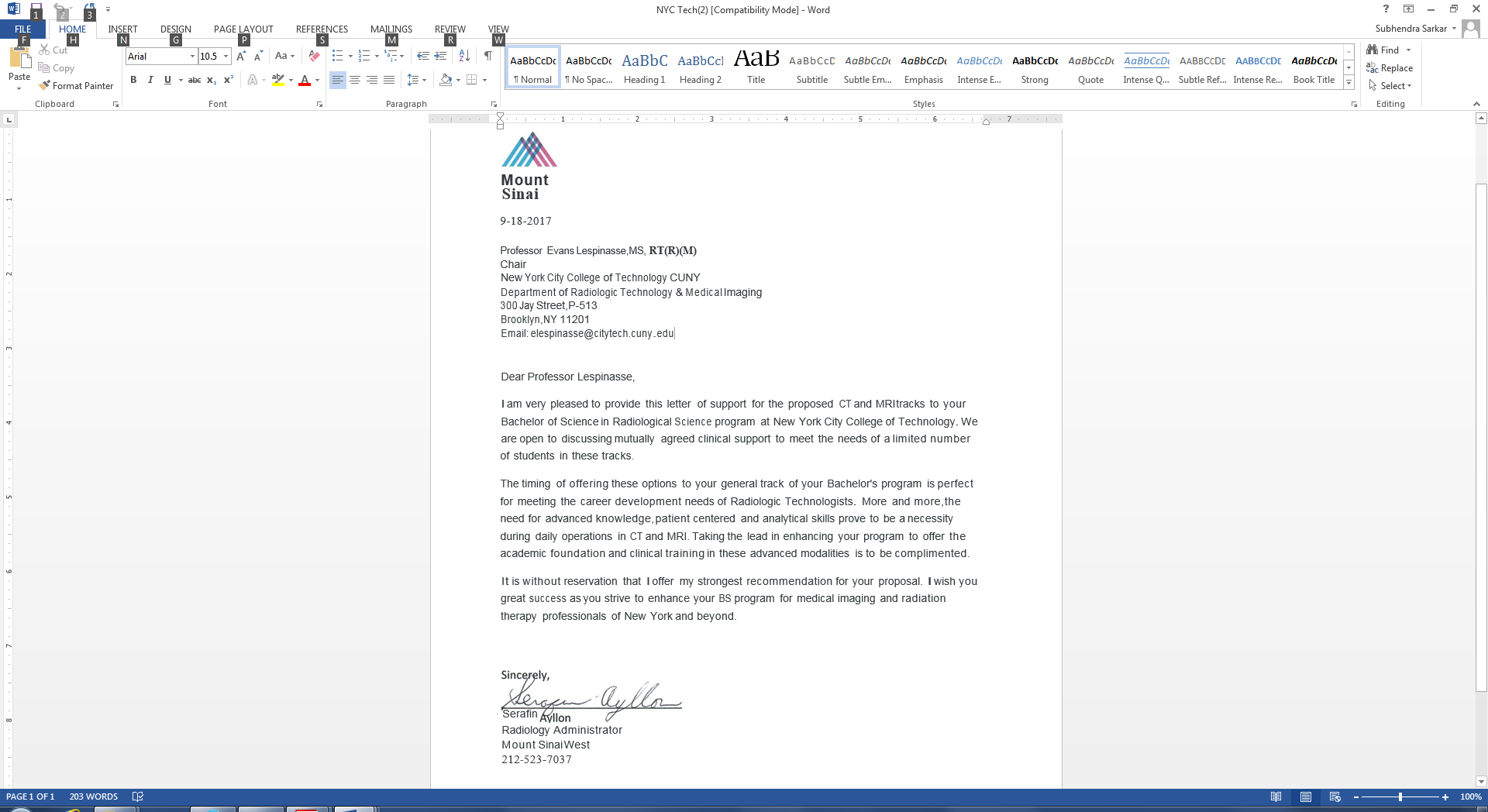
|  |  |
| --- | --- |
| **2** | **The library cannot purchase reserve textbooks for every course at the college, nor copies for all students. Consult our website (**[**http://cityte.ch/curriculum**](http://cityte.ch/curriculum)**) for articles and e-books for your courses, or our open educational resources (OER) guide (**[**http://cityte.ch/oer**](http://cityte.ch/oer)**). Have you considered using a freely-available OER or an open textbook in this course?**  At this time, we have not considered the use of OER or open textbooks for the courses in the MR, CT, or general concentrations outlined in the overall proposal.  Students will not be required to buy text books because subject matter changes rapidly and imaging books get outdated quickly. Budget permitting, we would like to have the library purchase several reference books to complement some of the courses.  Most course work however will require access to medical journals and databases currently available through the library and its partners and existing programs such as MaRLI, ALB, and interlibrary loan.  ***Examples of useful periodicals are: Radiographics, Science and JAMA.***  ***Some useful websites that will be utilized are referenced below:***  <https://www.medphysics.wisc.edu/research/ct/> and  <http://www.radiology.northwestern.edu/research/areas-of-research/advanced-ct.html>  as well as from  <http://www.radiologyeducation.com/> |

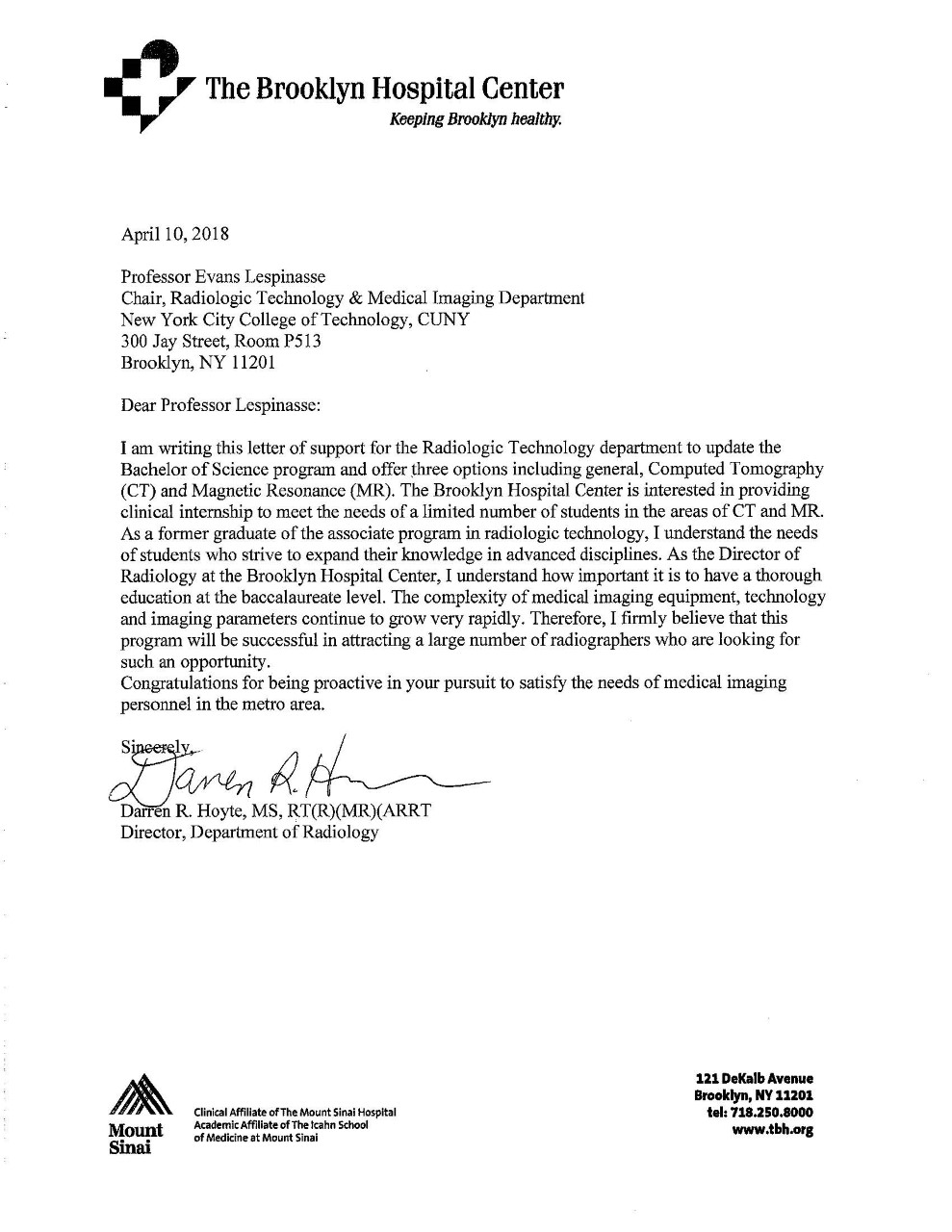
|  |  |
| --- | --- |
| **3** | **Beyond the required course materials, are City Tech library resources sufficient for course assignments? If additional resources are needed, please provide format details (e.g. e-book, journal, DVD, etc.), full citation (author, title, publisher, edition, date), price, and product link.**  No additional resources are needed at this time. Much of what will be required of students can be found for free as outlined below.  ***There will be specific review articles and course handouts that will be obtained from advanced MRI and CT research groups that offer biomedical engineering courses and Radiology review courses for graduate students and physicians. Most of the teaching materials are available free by contacting those academic research laboratories. For Advanced CT, see the labs outlined above.***  ***For Advanced MRI see below:***  <https://radiology.ucsf.edu/research/labs/mri-mrs-srg>  <http://www.med-ed.virginia.edu/courses/rad/>  <http://www.radiologyeducation.com/> |

|  |  |
| --- | --- |
| **4** | **Library faculty focus on strengthening students' information literacy skills in finding, critically evaluating, and ethically using information. We collaborate on developing assignments and customized instruction and research guides. When this course is offered, how do you plan to consult with the library faculty subject specialist for your area? Please elaborate.**  ***Yes -*** RAD 4830 Leadership Roles in Medical Imaging *is a designated writing intensive course and the major research course in the BSRS program.*  *Students for Advanced CT and Advanced MR courses would be required to consult the Library faculty to acquire review articles by interlibrary loan to complete projects as well as to study for specific advanced topics as reading assignments.* |

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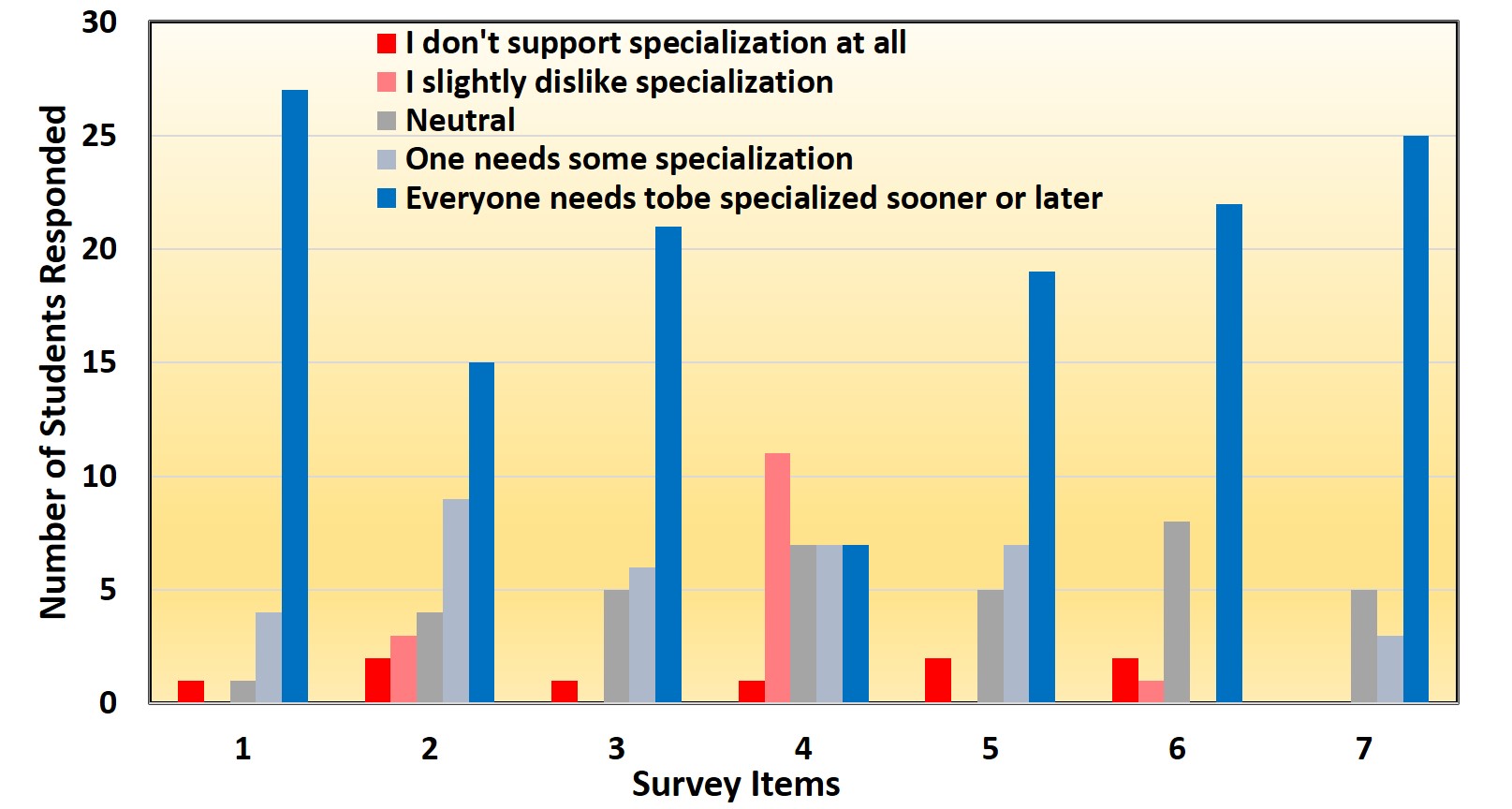
**Community of Interest - Support From NYC Health Care Systems**

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# Current BSRS student survey outcomes

**Majority (out of 33 respondents) favor advanced specialized concentrations for BSRS and a certificate plan for MR or CT or both for those who already graduated or will graduate in general concentration.**

****

***Item 1: Need for multiple, advance specializations for RT job success today.***

***Item 2: College needs to offer these specializations in BSRS in or after 1st semester.***

***Item 3: Should City Tech arrange hospital training to complete MR/CT licensures.***

***Item 4: Should a hiring manager promote licensed workers from outside if comparable workforce is not available within the organization?***

***Item 5: Demand for specialized concentrations compared to general BSRS.***

***Item 6: Preference for specialized concentrations compared to BS management.***

***Item 7: For general BSRS graduates should City Tech offer fast-concentration certificates of competency in MR or CT or in both specialized concentrations.***

**New York City College of Technology**

**City University of New York**

Department of Radiologic Technology & Medical Imaging

**Advisory Board Meeting Minutes**

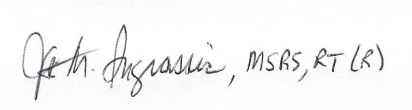
Wednesday November 3, 2016 - President’s Conference Room N-319

Prof. Evans Lespinasse, presiding.

|  |  |
| --- | --- |
| **Administration, Board Members & Faculty Present** | **Students Present** |
| Lillian Amann Adjunct Instructor  Denise Aris Clinical Instructor  Mary Alice Browne Adjunct Associate Professor  Billie Coleman Assistant to the Dean, SPS  Anthony DeVito Assistant Professor  Joycelyn Dillon Professor, DH Chair, Board Member  Jodi-Ann Douglas College Lab Technician (CLT)  Ardian Golemi Adjunct CLT  Sergeo Guilbaud Board Member  Jennett Ingrassia Assistant Professor  Simeon Joseph Clinical Instructor  Judith Keyes Board Member  Marc Kramer Clinical Instructor  Evans Lespinasse Assistant Professor, Chair  Eric Lobel Assistant Professor  Christian Pascarella Clinical Instructor  John Polcari Board Member  Robert Raymond Board Member  Subhendra Sarkar Associate Professor, BS Program Director  David Smith Dean, School of Professional Studies  Jeffrey Smith Clinical Instructor  Liana Tsenova Associate Professor, Board Member  Zoya Vinokur Assistant Professor | Ropwattie Arnasalam AAS Student  John Echavarria AAS Student, REM RAD President  Malessa Henry AAS Student  Brian Hurtado AAS Student  Shyaam Nunes Alum  Nivia Prescod AAS Student  Cindy Samaroo BS Student  Jerry Strklja AAS Student, REM RAD Vice President  Michelle Tronilo AAS Student |

|  |  |  |
| --- | --- | --- |
| **ITEM** | **DISCUSSION** | **ACTION** |
| Call to order | The meeting was called to order at 4:30 pm.  Professor Lespinasse welcomed faculty, staff and students, giving special recognition to Dean David Smith and his assistant, Ms. Billie Coleman. She introduced and welcomed the new members. |  |
| I. Approval of Minutes of November 11, 2015 Meeting | Minutes read and minor typographical errors discussed. Motion made to approve the Minutes and seconded. | Minutes approved unanimously as amended. |
| II. Chair’s Report | Professor Lespinasse reported the following:   1. Mission & Goals:  * The revised Mission and Goals of the program were presented and discussed. The revision was in response to the advisement of the JRCERT.  1. Department Personnel:  * Presently, there are five (5) full time faculty in the AAS program, including the chair, and two (2) adjunct lecturers. The addition of the adjunct lecturers is a change resulting from vacancies currently in the program. * There are seventeen (17) clinical adjuncts. * 1 F/T CLT, 1 adjunct CLT * 1 F/T CUNY Office Assistant (Secretary) * 10 hospital affiliations * 124 AAS (66 1st-yr, 58 2nd-yr) and 55 BS for a total of **179** students   ***Discussion:*** *Professor Lespinasse noted that there is a challenge with program personnel as it now stands. She stated that the program has grown with more students than ever before and the vacancies are hurting the program. Faculty workloads are very difficult to schedule. Filling the vacancies is now a pressing need. Dean Smith was hopeful that this situation would soon be rectified.*   1. Student Population:  * The class of 2016 included **73**: 61AAS and 12 baccalaureate. All AAS students and most BSRS students participated in the program's Pinning Ceremony.   4. ARRT Certification/Licensing Exam Update:   * Our credentialing exam pass rate on first attempt so far is 100%. Sixty (60) out of sixty one (61) graduates have taken the exam. We are hopeful that the last graduate will also be successful on first attempt. This is an increase from the 94% from 2015. Professor Lespinasse profusely expressed her gratitude to the faculty stating that is was a testimony to their hard work and dedication in working to improve the pass rates.  1. Program Effectiveness Data:   Program Effectiveness Data for the AAS program was presented and discussed. All data demonstrates that the program is operating well above its benchmarks.  ***Discussion:*** *Obtaining data (return of surveys) from students has been extremely difficult, especially in past years. However, this year, surveys were sent electronically and there has been a slight improvement in the number of returns. This practice will continue with the hope of continued improvement.*  6. **College Statistics on Department Enrollment:** A report with data from 2011 to 2016 was discussed.The data showed that both the AAS and BSRS programs continue to grow with each passing year.   * **AAS**: Enrollment in this program showed a steady growth. The implication of this is that it shows the continued interest of students in the program. * **BSRS:** Enrollment in this program shows the most dramatic increase. For the first time, multiple sections have been offered for various classes. At this time, 55 students have declared BSRS as their major and there are many others progressing toward the major while completing some prerequisites.   7. **Hospital Affiliations:** Currently, the program still has ten clinical affiliates. Professor Lespinasse stressed that although this sounds like a large number of affiliated, two hospitals are for second year students, only, and one is only for first year students.  ***Discussion:*** *This leaves eight (8) affiliates available for first year students and nine for students in their second year. It would be better if it were the opposite as then additional students could be admitted into the program. As a result, this keeps a cap on enrollment.*  8. **Bureau of Labor Statistics:** The median salary for radiographers in NY is now $58,120 for entry level ($24.97/hour).  Motion made and seconded to approve Chair's report. | Professor Lespinasse will provide an update on the graduate surveys at the next meeting.  Chair's report approved unanimously. |
| III. Curriculum Update | Professor Lobel reported that since the 2015 meeting, the curriculum has been updated using the ASRT Curriculum Guide and the recently revised ARRT Content Specifications. The faculty reviewed both documents carefully and revised all courses to reflect technologies that have emerged and current radiologic technology data. The most extensive updates will be effective January, 2017. The class of 2017 will be subject to these changes. Some changes and updates are as follows:  1. Film-based technology has been eliminated from the Exam. Continued use of this old system will result in a reduction to Medicare reimbursement. Medical Imaging organizations are experiencing a push to acquire Digital Radiography (DR) systems. Even though there is a change in the curriculum, the department's lab will maintain all modes of image processing because both film-base and DR are still widely used throughout the industry.  2. The Content Specifications for clinical education have been revised. There are several changes to the Clinical Competency Requirements. They are as follows:  - Three new geriatric competencies are required. Students must be evaluated on an exam on a geriatric patient (65+) who is physically/cognitively deficient - Elective pediatric competencies (six y/o or under) have been added for abdomen.  - An additional C-Arm procedure competency is now required. In addition to a C-Arm procedure requiring manipulation to acquire more than one projection. Students must now perform a procedure requiring manipulation around the sterile field. Both are mandatory procedures.  - The following changes have been made in terms of mandatory or elective competency:  A) TMJs - Elective  B) Hysterosalpingogram - Elective  C) Clavicle - Mandatory  D) Cross Table Lateral Spine (any) - Mandatory  E) CPR certification is now a mandatory ARRT General Patient Care Competency as per the ARRT along with vital signs, sterile and medical aseptic technique, venipuncture and patient transfer, and care of patient medical equipment.  - Overall, students must now demonstrate clinical competence in 37 procedures identified by the ARRT as mandatory, with eight permitted to be simulated if demonstration on patients is not possible. In addition, students must demonstrate competence in 15 of 34 elective procedures. These should be performed on patients whenever possible but all may be simulated.    4. ARRT Certification Examination: The Registry examination remains at 200 questions; however, the category design has gone from five to four.  5.Political Perspective:There seems to be some encroachment in New York where PhysicianAssistants want to perform fluoroscopy procedures. This is still an ongoing issue that remains unresolved.  6.There was some discussion of when to begin simulations as well as how to obtain the OR competencies. It was stated that it is possible for the OR technologist to be present for the competency procedure and then complete the evaluation along with the clinical instructor. | Report approved unanimously |
| IV. Clinical & Affiliation Update | Professor Anthony DeVito presented the following:   1. At this time, the program has ten (10) clinical affiliates with each having a minimum of six (6) students and a maximum of eight (8) in Brooklyn and Manhattan. 2. There are 124 students this current fall semester consisting of sixty six (66) first year students and fifty eight (58) second year students. 3. There are eight (8) hospitals available for first-year students and nine available for second-year students. This is because two (2) clinical affiliates will only accept second-year students and one (1) clinical affiliate will only accept first-year students.   Some issues and concerns include the following:  A) There is not always a sufficient number or variety of cases, but this varies from semester to semester.  *Discussion: Are there sufficient levels and an ample variety of cases available to students?*  B) We are experiencing extensive delays in getting students cleared by the affiliates. This is becoming a major concern. More and more programs have outsourced the work involved with clearing the students for their internship.  C) Affiliate hospitals are hiring our graduates  D) Shared sites: This is becoming an issue with other schools wanting to share sites with us. All were reminded to be as professional as possible so that the affiliates continue to want our program’s students in their radiology departments, i.e. continue to cultivate our relationships with the clinical affiliates. It is possible that mammography course offered to staff technologists for continuing education might help to cultivate these relationships.  *Discussions followed. Motion made to approve report and seconded.* | Report approved unanimously |
| V. Program Assessment | Professor Jennett Ingrassia discussed that following consultation with the JRCERT, the Assessment Plan was revised to reflect a more clinical centered process. Some changes to the plan include, but are not limited to, the following:   * 1. Laboratory quizzes in RAD 1125, 1127, 1225 and 2427   2. Professional Development Assessment in RAD 2328, and RAD 2428 | Report approved unanimously |
| VI. JRCERT Accreditation Update: | Professor Lespinasse reported that the JRCERT Accreditation site visit went extremely well. The program received only one citation, which was resolved immediately during the visit. We also received two suggestions in the official site visit report as follows:  1. Diversify the members of the Advisory Board to include individuals from other professional disciplines. We have addressed this by adding three (3) new members that are not associated with medical imaging.  2. Faculty attendance at a JRCERT Outcomes Assessment Workshop was advised. There was no need to address this since it was determined that some faculty members did, in fact, attend this workshop at the annual conference of the AERT.  3. Lastly, The JRCERT asked for the removal of identification numbers on Radiation Safety Reports. The CLT contacted the company and this has already been rectified.  The JRCERT’s concerns have been addressed. A formal letter has been submitted to the organization. We are awaiting their response for the final accreditation award.  *Discussions followed. Motion made to approve report and seconded.* | Report approved unanimously |
| VII. BSRS Program Update: | Dr. Subhendra Sarkar presented the following:  1. The BSRS program is considered to have a 2 + 2 program format.  2. There are currently 55 students enrolled in the program; some being experienced technologists as well as recent graduates. This is viewed as a favorable situation since both groups can learn from each other.  3. Students have the option of being full or part time.  4. The program is rigorous and we need to keep the quality high.  5. Employment outlook for all radiologic technologists for the next decade is projected 16% total or 1.6% annually (BLS).  6. A suggestion was made for us to consider adding CT and MR concentrations to the program. These concentrations should be designed with a clinical component.  Dean Smith stated that having a concentration in radiologic technology education would be very doable as there are already many courses in place that could be used. | Report approved unanimously |
| VIII. Student Forum | 1. Jewish Foundation for Education of Women (JFEW): This scholarship is available for both Radiologic Technology and Dental Hygiene students. The benefits of this scholarship include one-half of tuition, paid summer internship, additional laboratory time, and course review sessions. Students are selected for this scholarship based on GPA, submission of an essay, and financial need. Currently, there are 17 recipients. In the past, these students were all at one clinical site, however, since the number has increased, they are now at more than one site.  2. Service-Learning: Professor Lillian Amann has a project in her RAD 2426 Imaging Modalities course that requires the students to disseminate information to underserved population on mammography guidelines. The students also participate in the Making Strides Against Breast Cancer Fundraising Walk. The students collectively raised $5,800 in 2016 and $4,500 in 2015.  3. Lambda Nu: This is a National Honor Society for Radiologic Technology and Medical Imaging students to foster academic scholarship promote research and recognize exemplary students. The program is currently looking into participating in this Honor Society.  4. Student comments:  *Second Year Students*  a) REM RAD Club was very successful and won first place in the City Tech Club Pride event for raising the most amount of funds.  b) Clinical sites are more than adequately preparing them to be radiographer.  c) Receiving a variety of practice opportunities from Brookdale opportunities for trauma cases at NYP  d) Would like additional opportunities to improve critical thinking skills  e) Learning to grow as a professional  *First Year Students*  f) The first-year student representative questioned why the program does not offer part time or evening options to the students.  Professor Lespinasse responded to the question, referencing NYS legislation mandates (Article 35 - Part 39) in terms of educational program hours and protocol for the use of ionizing radiation by students.  *BS Students*  g) The program is intense but students are enjoying it |  |
| IX. Old Business | Professor Zoya Vinokur presented the following:  1. There are still two lines open for additional faculty. It is becoming a challenge to fill them.  2. Graduate Surveys: We have been experiencing difficulties in getting survey responses returned. We are currently using Survey Monkey to see if this method works better. Fifty-one individuals have been contacted and so far, we have received 16. Most graduates have changed their contact information, making this system somewhat challenging. | Professor Lespinasse will provide an update at the next meeting. |
| X. New Business | 1. We are now using an online system called Trajecys to keep concentration of all clinical paperwork, which can work through any internet device such as a smart phone or tablet.  2. We are currently looking into a system that would keep concentration of student’s medical records and criminal background checks.  3. Clinical Instructor questions included whether or not they had the ability to delete or change entries or submissions as well as to be able to have access to student progress from prior semesters. | Professor Lobel will look into these concerns and report to the clinical instructors. |
| XI. Good and Welfare | 1. We are in the process of purchasing a new mammography unit.  2. Continuing education and the department collaborated on a WDI Grant to offer a course in mammography at no cost to the BS students and technologists from our hospital affiliates.  3. Professors Lobel and DeVito will be presenting to the 1199 concerning issues of the State of New York  4. Professor Ingrassia published in the ASRT Radiologic Technology journal titled Successful Admission Criteria to Predict Academic and Clinical Success in the September 2015 issue.  5. Professor Vinokur presented a lecture at the 2016 annual conference of the AERT.  6. Professor Sarkar planned to present a total of six posters with BSRS students coauthoring and presenting four of those at the 14th Annual City Tech Poster Event on Nov 16, 2016 as part of the undergraduate research activities in BS-RS level. |  |
| Closing Remarks | Prof. Lespinasse thanked all for their support and contributions to the program. She extended an invitation to dinner in the Janet Lefler Dining Room, upon adjournment. |  |
| Adjournment | Motion to adjourn made and seconded. | Meeting adjourned at 6:18 pm |

Respectfully Submitted,



Professor Jennett M. Ingrassia, MSRS, RT(R)

**DEPARTMENT OF RADIOLOGIC TECHNOLOGY AND MEDICAL IMAGING**

**DEGREE CHECKLIST FOR ASSOCIATE IN APPLIED SCIENCE IN RADIOLOGIC TECHNOLOGY AND**

**BACHELOR OF SCIENCE IN RADIOLOGICAL SCIENCE**

For students entering the program spring 2019.

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| **ASSOCIATE DEGREE** | **COURSE** | **COURSE TITLE** | **PRE/CO REQUISITES** | **CREDITS** |
| **GENERAL EDUCATION REQUIRED AND FLEXIBLE COMMON CORE (22 CREDITS)**  At least 1 course designed WI is required from the College Option or Gen Ed Flexible Common Core. | ENG 1101 | English Composition I (EC) | Prereq: CUNY Read, Write Proficiency | 3 Credits |
| MAT 1275 | College Algebra and Trigonometry or higher (MQR) | Prereq: CUNY Placement | 4 Credits |
| BIO 1101 | Biology I | Prereq: CUNY Read, Write Proficiency | 4 Credits |
| BIO 2311 | Human Anatomy and Physiology (LPS) | Prereq: BIO 1101 | 4 Credits |
| PHIL 2203 | Health Care Ethics (ID) | Prereq: CUNY Proficiency | 3 Credits |
| PSY 1101 | Introduction to Psychology (IS) | Prereq: CUNY Read, Write Proficiency | 3 Credits |
| RAD 1124 | Introduction to Radiologic Technology and Med. Imaging (F, S) | Prereq: CUNY Reading Proficiency | 1 Credits |
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| **PROGRAM SPECIFIC DEGREE REQUIREMENTS (45 CREDITS)**  Course only offered in fall (F)  Course only offered in spring (S)  Course only offered in summer (SU)  **RAD Courses that must be taken as co-requisites**  i.e: RAD 1100 series, RAD 1200, RAD 2300, RAD 2400  **Double Duty** Specific courses indicate double duty courses, i.e., program degree requirements that also meet general education requirements in that category | BIO 2312 | Human Anatomy and Physiology II | Prereq: BIO 2311 | 4 Credits |
| RAD 1125 | Radiographic Procedures I (F) | Prereq: CUNY Proficiency; BIO 2311 | 2 Credits |
| RAD 1126 | Image Production and Evaluation I (F) | CUNY Proficiency; BIO 2311, MAT 1275 or higher | 2 Credits |
| RAD 1127 | Patient Care and Management (F) | Prereq: CUNY Proficiency; BIO 2311 | 2 Credits |
| RAD 1129 | Radiation Protection and Applied Radiobiology (F) | Prereq: CUNY Proficiency; BIO 2311 | 2 Credits |
| RAD 1225 | Radiographic Procedures II (S) | Prereq: RAD 1100 series; BIO 2311; BIO 2312 | 2 Credits |
| RAD 1226 | Image Production and Evaluation II (S) | Prereq: RAD 1100 series, BIO 2311, BIO 2312, MAT 1275 | 2 Credits |
| RAD 1227 | Radiographic Pathology (S) | Prereq: RAD 1100 series BIO 2311; BIO 2312 | 3 Credits |
| RAD 1228 | Clinical Education I (S) | Prereq: RAD 1100 series, BIO 2311, ENG 1101; BIO 2312 | 2 Credits |
| RAD 1229 | Clinical Education II (SU) | Prereq: RAD 1100 series, RAD 1228, BIO 2312 | 3 Credits |
| RAD 2325 | Radiographic Procedures III (F) | Prereq: RAD 1200 series | 2 Credits |
| RAD 2326 | Radiographic Physics (F) | Prereq:RAD 1200 series | 2 Credits |
| RAD 2327 | Cross-Sectional Anatomy (F) | Prereq: RAD 1200 series | 2 Credits |
| RAD 2328 | Clinical Education III (F) | Prereq: RAD 1200 series, RAD 1229 | 3 Credits |
| RAD 2425 | Advanced Radiographic Procedures (S) | Prereq: RAD 2300 series | 2 Credits |
| RAD 2426 | Imaging Modalities (S) (WI) | Prereq: RAD 2300 series | 2 Credits |
| RAD 2427 | Seminar: Image Critique (S) | Prereq: RAD 2300 series | 2 Credits |
| RAD 2428 | Clinical Education IV (S) | Prereq: RAD 2300 series | 3 Credits |
| RAD 2429 | Clinical Education V (SU) | Prereq: RAD 2300 series, RAD 2428 | 2 Credits |
|  | ASSOCIATE IN APPLIED SCIENCE IN RADIOLOGIC TECHNOLOGY: 65 CREDITS.  MINIMUM REQUIRED LIBERAL ARTS AND SCIENCES CREDITS: 20 CREDITS.  **General Concentration** | | | |
| **BACHELOR'S DEGREE** | **COURSE** | **COURSE TITLE** | **PRE/CO REQUISITES** | **CREDITS** |
| **GENERAL EDUCATION FLEXIBLE COMMON CORE AND COLLEGE OPTION REQUIREMENTS (----------)**  Students must take at least one advanced liberal arts course or choose two sequential courses in a foreign language.  At least 1 course designated WI is required from the College Option or Gen Ed Flexible Common Core. | COM 1330 | Public Speaking or higher | Prereq: CUNY Read, Write Proficiency | 3 Credits |
| ENG 1121 | English Composition II (EC) | Prereq: ENG 1101 | 3 Credits |
| ECON 1101 | Macroeconomics (USED) | Prereq: CUNY Read, Write Proficiency | 3 Credits |
| MAT 1375 | Pre-Calculus | Prereq: MAT 1275 or higher STEM-Track | 4 Credits |
| PHYS 2603 | Physical Principles of Medical Imaging | Prereq: PHYS 1443/1441/RAD 2326 | 3 Credits |
| LIB 1201 | Research and Documentation in the Information Age | Prereq: ENG 1101 | 3 Credits |
|  | World Culture and Global Issues1 (WCGI) |  | 3 Credits |
|  | Creative Expression1 (EC) |  | 3 Credits |
|  | Interdisciplinary Course (ID) |  | 3 Credits |
|  | Lib Art Elective or Foreign Lang. Sequence (FL) |  | 3 Credits |
|  | Lib Art Elective or Foreign Lang. Sequence (FL) |  | 3 Credits |
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| **PROGRAM SPECIFIC DEGREE REQUIREMENTS (19 CREDITS)** | **Concentration Specific** | |  |  |
| RAD 3629 | Advanced Anatomy with Pathophysiology | Prereq: Admission to the BS Program | 3 Credits |
| RAD 3726 | Advanced Medical Imaging I | Prereq: Admission to the BS Program | 3 Credits |
| RAD 4826 or RAD 3100 | Advanced Medical Imaging II or Principles of Mammography 6 | Prereq: Admission to the BS Program, RAD 3726 and department permission. | 3 Credits |
| **All Concentrations** | |  |  |
| RAD 3527 | Advanced Patient Assessment – Pharmacology | Prereq: Admission to the BS Program | 3 Credits |
| RAD 4828 | Medical Informatics/QM HIS | Prereq: Admission to the BS Program | 3 Credits |
| RAD 4830 | Capstone Leadership Roles in Med Imaging (WI) | Prereq: LIB 1201; Corequisite RAD 4828 | 3 Credits |
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|  | **Computed Tomography (CT) Concentration** | | | |
|  | COM 1330 | Public Speaking or higher | Prereq: CUNY Read, Write Proficiency | 3 Credits |
|  | ENG 1121 | English Composition II (EC) | Prereq: ENG 1101 | 3 Credits |
|  | ECON 1101 | Macroeconomics (USED) | Prereq: CUNY Read, Write Proficiency | 3 Credits |
|  | MAT 1375 | Pre-Calculus | Prereq: MAT 1275 or higher STEM-Track | 4 Credits |
|  | PHYS 2603 | Physical Principles of Medical Imaging | Prereq: PHYS 1443/1441/RAD 2326 | 3 Credits |
|  | LIB 1201 | Research and Documentation in the Information Age | Prereq: ENG 1101 | 3 Credits |
|  |  | World Culture and Global Issues1 (WCGI) |  | 3 Credits |
|  |  | Creative Expression1 (EC) |  | 3 Credits |
|  |  | Interdisciplinary Course (ID) |  | 3 Credits |
|  |  | Lib Art Elective or Foreign Lang. Sequence (FL) |  | 3 Credits |
|  |  | Lib Art Elective or Foreign Lang. Sequence (FL) |  | 3 Credits |
|  | **Concentration Specific** | |  |  |
|  | RAD 3525 | CT Anatomy, Pathophysiology & Instrumentation | Prereq: Admission to the BS Program | 3 Credits |
|  | RAD 3728 | CT Clinical Education I | Prereq: Admission to the BS Program,  CO-Req: RAD 3525 | 1 Credit - 8 clinical hrs/wk |
|  | RAD 4628 | CT Clinical Education II | Prereq: RAD 3525, RAD 3728 | 1 Credit - 8 clinical hrs/wk |
|  | RAD 4728 | CT Clinical Education III | Prereq: RAD 3525, RAD 4628 | 1 Credit - 8 clinical hrs/wk |
|  | RAD 4827 | Advanced CT Theory and Applications | Prereq: RAD 4628 | 3 Credits |
|  | **All Concentrations** | |  |  |
|  | RAD 3527 | Advanced Patient Assessment – Pharmacology | Prereq: Admission to the Baccalaureate Program | 3 Credits |
|  | RAD 4828 | Medical Informatics/QM HIS | Prereq: Admission to the Baccalaureate Program | 3 Credits |
|  | RAD 4830 | Capstone Leadership Roles in Medical Imaging (WI) | Prereq: LIB 1201; Corequisite RAD 4828 | 3 Credits |
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|  | **Magnetic Resonance Imaging (MRI) Concentration** | | | |
|  | **COURSE** | **COURSE TITLE** | **PRE/CO REQUISITES** | **CREDITS** |
|  | COM 1330 | Public Speaking or higher | Prereq: CUNY Read, Write Proficiency | 3 Credits |
|  | ENG 1121 | English Composition II (EC) | Prereq: ENG 1101 | 3 Credits |
|  | ECON 1101 | Macroeconomics (USED) | Prereq: CUNY Read, Write Proficiency | 3 Credits |
|  | MAT 1375 | Pre-Calculus | Prereq: MAT 1275 or higher STEM-Track | 4 Credits |
|  | PHYS 2603 | Physical Principles of Medical Imaging | Prereq: PHYS 1443/1441/RAD 2326 | 3 Credits |
|  | LIB 1201 | Research and Documentation in the Information Age | Prereq: ENG 1101 | 3 Credits |
|  |  | World Culture and Global Issues1 (WCGI) |  | 3 Credits |
|  |  | Creative Expression1 (EC) |  | 3 Credits |
|  |  | Interdisciplinary Course (ID) |  | 3 Credits |
|  |  | Liberal Arts Elective (LibArt) or Foreign Language Sequence (FL) |  | 3 Credits |
|  |  | Liberal Arts Elective (LibArt) or Foreign Language Sequence (FL)1 |  | 3 Credits |
|  | **Concentration Specific** | |  |  |
|  | RAD 3737 | MR Anatomy, Pathophysiology and Instrumentation | Prereq: Admission to the Baccalaureate Program | 3 Credits |
|  | RAD 3739 | MR Clinical Education I | Prereq: Admission to the Baccalaureate Program, CO-Req: RAD 3737 | 1 Credits |
|  | RAD 4629 | MR Clinical Education II | Prereq: RAD 3739 | 1 Credits |
|  | RAD 4729 | MR Clinical Education III | Prereq: RAD 4629 | 1 Credits |
|  | RAD 4829 | Advanced MR Theory and Applications | Prereq: RAD 4629 | 3 Credits |
|  | **All Concentrations** | |  |  |
|  | RAD 3527 | Advanced Patient Assessment – Pharmacology | Prereq: Admission to the Baccalaureate Program | 3 Credits |
|  | RAD 4828 | Medical Informatics/QM HIS | Prereq: Admission to the Baccalaureate Program | 3 Credits |
|  | RAD 4830 | Capstone Leadership Roles in Med. Imaging (WI) | Prereq: LIB 1201; Corequisite RAD 4828 | 3 Credits |
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**DEPARTMENT OF RADIOLOGIC TECHNOLOGY AND MEDICAL IMAGING**

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| **ADMISSION CRITERIA**  **AAS in Radiologic Technology & Medical Imaging**  *Candidates for admission must have:*  • Have a high school diploma or its equivalent (GED)  • CUNY proficiency in reading, writing mathematics  Applicants for the clinical phase of the associate in applied science degree in Radiologic Technology and Medical Imaging must be enrolled at City Tech and complete all program pre-requisites with a minimum GPA of 2.7.  Because of great demand for this program, the lowest GPA of entering students has historically been approximately 3.2.  **BS in Radiological Science**  Applicants for a bachelor of science degree with a major in Radiological Science must be graduates of an accredited degree-granting college or certificate-granting medical imaging programs that prepare students for certification and licensure.  *Candidates for admission to the baccalaureate program with an associate degree must:*  • Meet the admission requirements for the college.  • Have an Associate Degree in medical imaging (radiography, nuclear medicine, radiation therapy and sonography) accredited by the Joint Review Committee on Education in Radiologic Technology (JRCERT).  • Have a current state license.  • Have the American Registry of Radiologic Technologist (ARRT) certification and currently registered.  • A 2.5 cumulative grade point average (GPA) on a 4-point scale.  Preference will be given to applicants with a 3.0 cumulative index (GPA) or above.  Students applying to the program will be admitted based on space availability.  *Candidates for admission to the baccalaureate program who hold a certificate in medicalimaging must:*  • Meet the admission requirements for the college and CUNY requirements in reading, writing and mathematics.  • Have graduated from an approved JRCERT program in medical imaging (radiography, nuclear medicine, radiation therapy and sonography).  • A current state license.  • Have a current American Registry of Radiologic Technologist (ARRT) certification.  • A 2.5 cumulative grade point average (GPA). Preference will be given to applicants with a 3.0 cumulative index (GPA) or above.  • Successful completion of all pre-major course requirements. | | | SEMESTER2 | Total Credits 12 |  |  |
| RAD 1225 | Radiographic Procedures II | 2 Credits |  |
| RAD 1226 | Image Production and Evaluation II | 2 Credits |  |
| RAD 1227 | Radiographic Pathology | 3 Credits |  |
| RAD 1228 | Clinical Education I | 2 Credits |  |
| PHIL 2203 | Health Care Ethics | 3 Credits |  |
| SUMMER | Total Credits 3 |  |  |
| RAD 1229 | Clinical Education II | 3 Credits |  |
| SEMESTER 3 | Total Credits 12 |  |  |
| RAD 2325 | Radiographic Procedures III | 2 Credits |  |
| RAD 2326 | Radiographic Physics | 2 Credits |  |
| RAD 2327 | Cross-Sectional Anatomy | 2 Credits |  |
| RAD 2328 | Clinical Education III | 3 Credits |  |
| SEMESTER 4 | Total Credits 9 |  |  |
| RAD 2425 | Advanced Radiographic Procedures | 2 Credits |  |
| RAD 2426 | Imaging Modalities | 2 Credits |  |
| RAD 2427 | Seminar: Image Critique | 2 Credits |  |
| RAD 2428 | Clinical Education IV | 3 Credits |  |
| SUMMER | Total Credits 3 |  |  |
| RAD 2429 | Clinical Education V | 2 Credits |  |
| SEMESTER 5 GEN/ALL | Total Credits General 12 | Total Credits CT 12 | Total Credits MR 12 |
| COM 1330 (3CR) | Public Speaking or higher |  |  |
| PHYS 2603 (3CR) | Physical Principles of Medical Imaging |  |  |
| RAD 3629 (3CR) | Advanced Anatomy with Pathophysiology | RAD 3525 - CT Anatomy, Pathophysiology & Instrumentation (3CR) | RAD 3737 - MR Anatomy, Pathophysiology and Instrumentation (3CR) |
| WCGI (3CR) |  |  |  |
| SEMESTER 6 GEN/ALL | Total Credits General 16 | Total Credits CT 14 | Total Credits MR 14 |
| ENG 1121 (3CR) | English Composition II (EC) |  |  |
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| MAT 1375 (4CR) | Pre-Calculus |  |  |
| LIB 1201 (3CR) | Research and Documentation in the Information Age |  |  |
| RAD 3726 (3CR) | Advanced Medical Imaging I | RAD 3728 - CT Clinical Education I (1CR) | RAD 3739 - MR Clinical Education I (1CR) |
| SEMESTER 7 GEN/ALL | Total Credits General 15 | Total Credits CT 13 | Total Credits MR 13 |
| RAD 3527 (3CR) | Advanced Patient Assessment – Pharmacology |  |  |
|  |  | RAD 4628 - CT Clinial Education II (1CR) | RAD 4629 - MR Clinical Education II (1CR) |
| **ADMISSION SAMPLE COURSE OF STUDY**  For Associate in Applied Science in Radiologic Technology and Bachelor of Science in Radiologic Science. | | | ID (3CR) |  |  |  |
| LIB ART #`1 (3CR) |  |  |  |
| PRECLINICAL | Total Credits 7 |  | RAD 4826 (3CR) or RAD 3100 (3CR) | Advanced Med Imaging or Principles of Mammography |  |  |
| BIO 2311 | Biology 1 |  | RAD 4830 (3CR) | Capstone Leadership Roles in Med Img |  |  |
| ENG 1101 | English Composition 1 | 3 Credits | LIB ART #2 (3CR) |  |  |  |
| PRECLINICAL | Total Credits 9 |  |  | RAD 4729 - MR Clinical Education III (1CR) | RAD 4728 CT Clinical Education III (1CR) |  |
| BIO 2311 | Human Anatomy and Physiology I | 4 Credits |  | RAD 4829 -Advanced MR Theory and Apps (3CR) | RAD 4827 Advanced CT Theory and Apps (3CR) |  |
| MAT 1275 | College Algebra and Trigonometry | 4 Credits |  |  |  |  |
| RAD 1224 | Introduction to Radiologic Technology and Med Imaging | 1 Credits | **Footnotes** 1 Examples of advanced liberal arts courses include SOC 3301 (prerequisite: ECON 1101); SOC 2403 (prerequisite: PSY 1101). In meeting their general education requirements overall, students must take at least one advanced liberal arts course **or** choose two sequential courses in one of the foreign language (FL) course offerings, such as Arabic (ARB), Spanish (SPA), Chinese (CHN), or French (FREN). 2 Specific courses listed indicate double duty courses, i.e., program degree requirements that also meet general education requirements. Choosing to take advantage of double duty can speed up progress toward graduation and increase elective credits. Consult with an advisor about your options. 3 Prerequisites for BIO 2311: BIO 1101/L with a minimum grade of C, a college-level general biology course with lab, or a score of 85 or above on the biology Regents exam (with lab). CUNY Proficiency in reading and writing. | | | |
| SEMESTER 1 | Total Credits 12 |  |
| RAD 1125 | Radiographic Procedures I | 2 Credits |
| RAD 1126 | Image Production and Evaluation I | 2 Credits |
| RAD 1127 | Patient Care and Management | 2 Credits |
| RAD 1129 | Rad Protection and Applied Radiobiology | 2 Credits |
| BIO 2312 | Human Anatomy and Physiology II | 4 Credits |