THE NEW YORK CITY COLLEGE OF TECHNOLOGY

Medical Informatics & Quality Management/Hospital Information Systems
RAD 4828 - Online
SPRING 2016

Instructor  Eric Lobel  Course  4828
Section

E-mail
## Course Objectives

<table>
<thead>
<tr>
<th>Objective</th>
<th>Assessment Methods</th>
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<tbody>
<tr>
<td>Demonstrate an acquired knowledge of medical informatics key players both governmental and private sector.</td>
<td>Reading, audiovisual assigned work, in-class exercises, group discussions and online blog posts.</td>
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<tr>
<td>Discuss the latest acts and laws related to health information technology, their impact on physicians and the general public</td>
<td>Reading, audiovisual assigned work, in-class exercises, group discussions and article summary presentations.</td>
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<tr>
<td>Evaluate some of the barriers to health information technology adoption and compare and contrast a paper based system to the electronic health record.</td>
<td>Reading, audiovisual assigned work, in-class exercises, group discussions and article summary presentations and online blog posts.</td>
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<tr>
<td>Describe the main components of a quality management program and how it influences diagnostic medical imaging.</td>
<td>Reading, audiovisual assigned work, in-class exercises, group discussions and article summary presentations within wiki.</td>
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<tr>
<td>Explain the methods utilized on a daily, weekly, or quarterly basis towards the monitoring of quality control activities for both digital and conventional imaging.</td>
<td>Assigned reading material from the textbooks and handouts, team-based project, research, documentation and presentation of research writing.</td>
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<tr>
<td>Demonstrate Quality Assurance testing to determine equipment malfunction or accuracy status</td>
<td>Instructor directed use of Quality Assurance test's in the energized laboratory and/or discussion of potential experiments that one may perform</td>
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Grading

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>93 – 100</td>
<td>A</td>
</tr>
<tr>
<td>90 – 92.9</td>
<td>A -</td>
</tr>
<tr>
<td>87 – 89.9</td>
<td>B+</td>
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<tr>
<td>83 – 86.9</td>
<td>B</td>
</tr>
<tr>
<td>80 – 82.9</td>
<td>B -</td>
</tr>
<tr>
<td>77 – 79.9</td>
<td>C+</td>
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<tr>
<td>70 – 76.9</td>
<td>C</td>
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<tr>
<td>60 – 69</td>
<td>D</td>
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<td>0 – 59</td>
<td>F</td>
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Course Grading

Blog/Discussion group assignments 30%
Subject-related article analysis and opinion assignments 30%
Group Research Paper 25%
Final Exam 15%

Attendance Policy

As mostly online course, attendance will be based on Blackboard assignments (discussion board, class wikis, and written assignments). Students will be expected to post a minimum of 3 times and no more than 5 posts per week and meet all other class requirements. Late posts are counted as late arrivals and absent posts are counted as class absences. See rubric below for detail on how online assignments will be scored. I will check Blackboard at least every 48 hours. A final examination, and initial class. A 20 point reduction per day will be given for work submitted late. In emergency situations work may be submitted via email with explanation, otherwise all work should be submitted thru the Blackboard system.

Students’ Responsibilities

A CUNY Portal ID and CityTech Email are required to gain access to Blackboard for assignments and to communicate in this course. Student training and assistance can be found in the General Building room G600, additionally WebSupport1 has a beginners guide to Blackboard. See Blackboard help sections online.

Students who enroll in this class must:

1. Actively participate in all online blog/Discussion group assignments (posts)
Posts

i. A post must express a new idea or add new content to an existing post.
ii. The following examples would count as one post entry:
   1. An original post that stands alone
   2. A response to another student’s post
   3. A response to the professor

*Note: it is not required to respond to each student’s comments about your post.

2. Complete all required readings and assigned media presentations
3. Submit 4 opinion/analysis assignments - see Subject-related article analysis and opinion below
4. Submit and present a research paper on a legal case or healthcare informatics issue
   ○ To be done live on a Wednesday night utilizing Blackboard Collaborate
5. Review quality management testing on radiographic equipment (wiki)
6. Participate in examinations

Assignment/Discussion group assignments: (See Rubric below for grading details)

Each student will participate in an online discussion and/or assignments.

Based on the weekly topic. Subsequent to each session a summary document in response to a question or position statement must be submitted in the discussion groups. Written responses must be limited to one single page using a standard font size and are due Tuesday morning by 11:59 AM.

Subject-related article analysis and opinion:

Each student will submit a subject-related analysis and opinion paper of no more than 3 pages in content. Paper must include cover page, abstract, body, and references. Submissions are due Tuesday morning by 11:59 AM.

Group Research Paper:

This 15-20 page group research paper will be submitted prior to the live Wednesday night Blackboard Collaborate session. Each member of the group will submit/contribute a portion of the paper that must be identified by name in the contents. Grading will be based partially on individual work, the work as a whole, and on the live presentation. The title of the paper, group number and participants must appear on the front cover. Works cited should appear as end notes followed by an bibliography of all outside sources utilized at the end of the paper. After the title page a brief abstract should outline what the paper will be about.
Final Examination

To be given to each student on campus on the last session of classes.

Textbooks. (both are offered digitally)


The New York City College of Technology Policy on Academic Integrity:

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. The complete text of the College policy on Academic Integrity may be found in the catalog.

Suggested Reading/Resources

Life as a healthcare CIO  http://geekdoctor.blogspot.com/
Google health  https://www.google.com/health
MicroSoft Health Vault  www.healthvault.com/
HIMSS  http://www.himss.org/ASP/index.asp
HITECH Answers  http://hitechanswers.net/
Certification Commission for Health Information Technology  http://www.cchit.org/
Office of National Coordinator  healthit.hhs.gov
WikiRadiography  http://www.wikiradiography.com/
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Activity</th>
<th>Assignments</th>
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</table>
| 1    | 2/3  | Class Introduction | Syllabus Review  
Medical Informatics overview  
Lecture and Discussion on the history of Medical informatics in the United States. An overview of recent legislation such as the American Recovery and Reinvestment Act 2009 stimulus package. Review of the multitude of private and governmental agencies related to Health Information Technology (HIT)  
Review class structure and requirements. Meet on Campus P501  
Form groups  
Read Hoyt Chapter 1  
Assignment postings - After Reviewing Lecture 1, what interests you most about the field of Health Informatics?  
Review Newsletters and eJournals:  
http://www.informaticseducation.org/Chapter1.htm |
| 2    | 2/10 | Electronic Medical/Health Records | Lecture and Discussion on the current state of electronic medical records. EMR will be defined by the ONC, office of the national coordinator for health information technology. Which agencies will be charged with certifying EHR systems.  
http://ehrdecisions.com/  
Read Hoyt Chapter 4  
Read - Crossing the Quality Chasm  
Please discuss the pros/cons of electronic medical records, the major components and their current state. You may also post on the current state of |
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<tr>
<td>3</td>
<td>2/17</td>
<td>Health Information Technology (HIT). Nationwide Health Information Networks (NHIN) and Health Information Organizations</td>
<td>Blackboard slide presentation on the origin of Regional Health Information Networks. What are the issues regarding interoperability of systems. Which states are ahead of the game and can we learn a lesson from the United Kingdom. Blackboard blog posting &amp; group discussion.</td>
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<td>4</td>
<td>2/24</td>
<td>Computerized Physician Order Entry (CPOE), Decision support systems, and e-prescribing</td>
<td>Blackboard slide presentation advantages of CPOE and decision support systems. <strong>Reading / Assignment:</strong> Review the white paper <a href="http://assets1.csc.com/health_services/downloads/CS_C_E_Prescribing_and_Its_Expanding_Role_in_Healthcare.pdf">http://assets1.csc.com/health_services/downloads/CS_C_E_Prescribing_and_Its_Expanding_Role_in_Healthcare.pdf</a>. What is e-prescribing and will it save any money? Are there harmful effects, or is it all a good thing.. Please give examples. To get an “A” please tell me how Meaningful use fits into</td>
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<tr>
<td>Week</td>
<td>Date</td>
<td>Title</td>
<td>Lecture and Discussion</td>
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<td>5</td>
<td>3/2</td>
<td>Consumer Health Informatics, Personal Health Records (PHR’s) and legal issues</td>
<td>Lecture and Discussion on the current state of personal health records. What do they consist of and how do you start one. Is this valuable and should you be worried about privacy.</td>
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<td>6</td>
<td>3/9</td>
<td>Architectures of Information systems</td>
<td>Lecture and Discussion on basic computer architecture and networks/networking</td>
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<td>Week 7</td>
<td>Date 3/16</td>
<td>Assignment</td>
<td>Read Hoyt 19 Blog postings</td>
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<td><strong>PACS &amp; DICOM HL7 protocols</strong></td>
<td>Lecture and Discussion on the state of Picture Archiving and Communications Systems and the DICOM standard</td>
<td>Assignment: What is the company that your last or current facility is utilizing for PACS. Describe and summarize 2 – 3 of the most important DICOM standards from the current 16 standards.</td>
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<tr>
<th>Week 8</th>
<th>Date 3/30</th>
<th>Assignment</th>
<th>Read Papp chapters 1 and 2</th>
</tr>
</thead>
</table>
| **Quality Management – RIS-HIS Section** | Blackboard slide presentation the differences between the terms quality management, quality assurance, and quality control. Discussion on the collection and analysis of QA data. | | A. Development of indicators  
B. Data collection methods  
C. Assessment of outcomes  
D. Standards for quality |

7 | 3/16 | To Be Assigned | Blackboard Collaborate |

8 | 3/30 | Definitions, Concepts, and Principles of Quality Management | |
<table>
<thead>
<tr>
<th>9</th>
<th>4/6</th>
<th>Collection and analysis of QC data in diagnostic radiography</th>
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<tr>
<td></td>
<td></td>
<td>Blackboard slide discussion on the below outline of different QC tests</td>
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<tr>
<td></td>
<td></td>
<td>A. Generator Performance</td>
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<tr>
<td></td>
<td></td>
<td>1. timer accuracy and reproducibility</td>
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<td></td>
<td></td>
<td>2. kVp accuracy and reproducibility</td>
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<td>3. mA or mAs linearity</td>
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<td></td>
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<td>4. AEC response and density control</td>
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<td></td>
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<td>5. exposure reproducibility</td>
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<td></td>
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<td>6. x-ray tube heat sensors</td>
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<td></td>
<td></td>
<td>7. mobile x-ray generators</td>
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<td></td>
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<td>B. Beam Characteristics</td>
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<tr>
<td></td>
<td></td>
<td>1. half-value layer</td>
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<td></td>
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<td>2. mR / mAs</td>
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<td></td>
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<td>3. light field-radiation field congruence</td>
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<td></td>
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<td>4. image receptor - radiation field alignment</td>
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<tr>
<td></td>
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<td>5. focal spot size</td>
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<td>C. Ancillary Equipment Evaluation</td>
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<td></td>
<td></td>
<td>1. grid performance</td>
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<td></td>
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<td>2. monitors</td>
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<tr>
<td></td>
<td></td>
<td>a. luminance</td>
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<td>b. ambient light</td>
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<td>c. spatial resolution</td>
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<td></td>
<td></td>
<td>d. contrast</td>
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Read Papp Chapter 7

Review the video on sensitometry [http://www.youtube.com/watch?v=PI6OE-9a30c](http://www.youtube.com/watch?v=PI6OE-9a30c)

List the steps in this process and why it is important for patient’s safety.
### Radiographic Processing

#### a. Sensitometry

- Laboratory experiments related to the above topics.

**Completion lab questions**

- Based on Papp chapter 7
- Refer to Powerpoint: [Link](#)

### Quality Control of Fluoroscopic and Digital Equipment

- Blackboard slide discussion on the below outline of different QC tests related to fluoroscopic and digital equipment.

**A. Fluoroscopic Systems**

1. automatic brightness control (ABC)
2. beam quality
3. collimation limits
4. low and high contrast resolution
5. tabletop exposure rate

**B. Evaluation of Digital Systems**

1. computed radiography (CR)
   - a. imaging plate
   - b. phantom tests
   - c. system malfunctions (ghost image, banding, erasure, dead pixels, printer)

**Read Papp chapter 8 and 9**
2. digital radiography (DR)
   a. phantom tests
   b. system malfunctions (ghost image, banding, dead pixels, printer distortion)

C. System reader preventive maintenance (PM)
D. Plate maintenance
E. Uniformity of processing codes
F. System detectors
G. Image quality
H. Image output
I. Repeat/reject analysis

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<tr>
<th>Date</th>
<th>Activity</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/5/4</td>
<td>LAB session 2</td>
<td>Organized Laboratory session with experiments related to the above topics. Lab analysis sheets for groups should be submitted on the your groups Wiki.</td>
</tr>
<tr>
<td>13/5/11</td>
<td>LIVE ON-Line Class</td>
<td>Presentations</td>
</tr>
<tr>
<td></td>
<td>Quality Management</td>
<td>Blackboard slide discussion on the various tools utilized to illustrate management outcomes</td>
</tr>
</tbody>
</table>
## Tools for Problem Identification and Analysis

### 1. Group Dynamics
- Focus groups, brainstorming

### 2. Problem Solving Tools
- Flow charts, fishbone diagrams, decision matrices, affinity charts, nine block grids

### 3. Information Analysis
- Histograms, Pareto charts, control charts, Shewhart charts

## Data Collection Methods

### 1. Surveys and Questionnaires
### 2. Facility Database
### 3. Focus Groups
### 4. Log Entries

## Data Analysis

### 1. Measures of Frequency
- Counts, percents, rates, and ratios

### 2. Measures of Central Tendency
- Mean, median, mode

### 3. Measures of Variation
- Range, standard deviation, variance
D. Assessment of Outcomes

1. Identification of reference standards
   a. Internal (baseline performance, local customer expectations)
   b. External (government regulations, national norms, practice standards)

2. Comparison of outcomes to reference standards

3. Utilization of findings
   a. Update QC/QI manual
   b. Prepare incident reports
   c. Equipment evaluation/purchase recommendations
   d. Staffing recommendations
   e. Update technique charts

| 14 | 5/18  | **Final Exam** | Comprehensive examination of the work done throughout the semester | **On Campus** |
Class Rubric For Online Discussion/WIKI/BLOG grading

Discussion postings that meet all criteria for a grade level will receive the highest points possible at that level. Postings that meet mixed levels of criteria will receive a score within the point range of the appropriate levels. Participation in discussion activities can only be measured by the date on the discussion posting. For example, participating 3 times during the week is measured by postings on 3 different days; there may actually be 5-6 postings, but participation only occurred 3 times during the week.

A Discussion (90-100): Distinguished/Outstanding

Students earning an “A” for discussion activities have participated 3 or more times during the week and have posted outstanding information.

“A” discussion postings:

- are made in time for others to read and respond
- deliver information that is full of thought, insight, and analysis
- make connections to previous or current content or to real-life situations
- contain rich and fully developed new ideas, connections, or applications

B Discussion (80-89): Proficient

Students earning a “B” for discussion activities have participated at least 2 times during the week and have posted proficient information.

- are made in time for others to read and respond
- deliver information that shows that thought, insight, and analysis have taken place
- make connections to previous or current content or to real-life situations, but the connections are not really clear or are too obvious
- contain new ideas, connections, or applications, but they may lack depth and/or detail

C Discussion (70-79): Basic

Students earning a “C” for discussion activities have participated at least 1 time during the week and have posted basic information.

“C” discussion postings:

- may not all be made in time for others to read and respond
- are generally competent, but the actual information they deliver seems thin and commonplace
- make limited, if any, connections, and those are often cast in the form of vague generalities
- contain few, if any, new ideas or applications; often are a rehashing or summary of other comments
D-F Discussion (10-69): Below Expectations

Students earning a “D-F” for discussion activities have participated at least 1 time during the week and have posted information that was below expectations.

“D-F” discussion postings:

- may not all be made in time for others to read and respond
- are rudimentary and superficial; there is no evidence of insight or analysis
- contribute no new ideas, connections, or applications
- may be completely off topic

Bibliography


The eHealth Initiative and the Center for Improving Medication Management (2008) Electronic Prescribing Becoming Mainstream Practice