



**The Hashemite University**  
**Faculty of Allied Health Sciences**  
**Department of Medical Imaging**  
**Course Syllabus**

| Course information   |                                        |
|----------------------|----------------------------------------|
| <b>Course Title</b>  | Quality Control of Radiological Images |
| <b>Course Code</b>   | 110508312                              |
| <b>Prerequisites</b> | 110508211                              |
| <b>Credit Hours</b>  | 3 (2+3) hours                          |

| Course Description                                                                                                                                                                                                                                                                                                                                                                                                    |
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| This course introduces the student to the principles of radiographic techniques which producing the best diagnostic image quality. Therefore, Quality control is the use of diagnostic tools to detect trends that will eventually cause repeated exposures to the patient, and correct them before such unnecessary exposures come about. By definition, then, QC plays a vital role in minimizing patient exposure. |

| Course Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| By the end of this course, the student is expected to:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <ol style="list-style-type: none"> <li>1. Describe the visibility and recognisability of radiographic quality</li> <li>2. Identify contrast, gray scale and resolution</li> <li>3. Give two reasons why mAs should be considered as the primary control for image density</li> <li>4. Define optimum kVp</li> <li>5. Explain the difference between grid ratio and grid radius</li> <li>6. List the methods by which scatter radiation can be reduced or eliminated after it has been produced</li> <li>7. Explain the most effective way for the individual radiographer to minimize patient exposure</li> <li>8. Describe the effect of off-centering and beam divergence on radiographic quality.</li> </ol> |

| Recommended Textbook |                                                   |
|----------------------|---------------------------------------------------|
| <b>Title</b>         | Fuchs's Radiographic Exposure and Quality Control |
| <b>Author</b>        | Quinn Carroll                                     |
| <b>Publisher</b>     | Charles Thomas publisher, Ltd                     |
| <b>Year</b>          | 2003                                              |
| <b>Edition</b>       | 7 <sup>th</sup> , Ed                              |
| <b>Book website</b>  |                                                   |
| Other References     |                                                   |
| <b>Title</b>         | An Analysis of Radiographic Quality               |
| <b>Author</b>        | Daniel Donohue                                    |
| <b>Publisher</b>     | Lippincott Williams and Wilkins                   |
| <b>Year</b>          | 1995                                              |
| <b>Edition</b>       | 3 <sup>rd</sup> Ed                                |

|                  |                                 |
|------------------|---------------------------------|
|                  |                                 |
| <b>Title</b>     | Essential of Diagnostic Imaging |
| <b>Author</b>    | Guebert,                        |
| <b>Publisher</b> | Mosby, Inc                      |
| <b>Year</b>      | 1995,                           |
| <b>Edition</b>   | 1 <sup>st</sup> , Ed            |
| <b>websites</b>  |                                 |
| <b>Website</b>   |                                 |
| <b>Website</b>   |                                 |
| <b>Website</b>   |                                 |
| <b>Website</b>   |                                 |
| <b>Website</b>   |                                 |

| Course Contents                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><u>Chapter</u></b><br><b><u>1:</u></b> | <b>QUALITY OF RADIOGRAPHIC IMAGE</b> <ul style="list-style-type: none"> <li>▪ Quality Assurance QA and Quality Control QC</li> <li>▪ Objectives of QA Program</li> <li>▪ Visibility</li> <li>▪ Recognizability</li> <li>▪ Qualities of the radiographic</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b><u>Chapter</u></b><br><b><u>2:</u></b> | <b>X-RAY TUBE/VISIBILITY FACTORS</b> <ul style="list-style-type: none"> <li>❖ Milliampere-second (mAs) <ul style="list-style-type: none"> <li>• Control of Density</li> <li>• Effect on Contrast</li> <li>• Exposure Time and Motion</li> </ul> </li> <li>❖ Kilo-voltage-Peak kVp <ul style="list-style-type: none"> <li>• Control of contrast</li> <li>• Control of Density</li> <li>• Exposure latitude</li> </ul> </li> <li>❖ Machine Phase and Rectification <ul style="list-style-type: none"> <li>• X-ray quality and quantity</li> <li>• Effect on Density</li> <li>• Effect on Contrast</li> </ul> </li> <li>❖ Beam Filtration <ul style="list-style-type: none"> <li>• X-ray quality and quantity</li> <li>• Compensating Filtration</li> </ul> </li> <li>❖ Focal Spot Limitation <ul style="list-style-type: none"> <li>• Effect on Density</li> <li>• Effect on Contrast</li> </ul> </li> </ul> |
| <b><u>Chapter</u></b><br><b><u>3:</u></b> | <b>X-RAY INTERACTION/ VISIBILITY FACTORS</b> <ul style="list-style-type: none"> <li>• Effect of Scatter radiation on Density and Contrast</li> <li>• Fog versus Blur</li> <li>• Scatter and Radiation Exposure</li> <li>• Effect of Grid on Contrast</li> <li>• Grid Efficiency</li> <li>• Grid Cut-off</li> <li>• Intensifying Screen</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**Chapter**

**4:**

**GEOMETRICAL FACTORS**

- Focal spot size
- The anode bevel
- Source image receptor distance
- Object-image receptor distance
- Distance ratio
- Geometric function of positioning

**Chapter**

**5:**

**EXPOSURE CONTROL**

- Milliampere-seconds (mAs)
- Kilovoltage-Peak (kVp)
- Filtration
- Field size limit
- Grids and Cassettes
- Distance

| Assessment                 |    |
|----------------------------|----|
| First Exam                 | 20 |
| Second Exam                | 20 |
| Final Exam                 | 20 |
| Lab + In course assessment | 40 |