Course Title: Diagnostic Radiology

Course Description: This course is designed to introduce the 5th year undergraduate Thi-Qar medical college students to the principles and practices of diagnostic radiology. The course will cover the basics of radiographic physics , radiation protection ,radiological presentation of common diseases, image interpretation, and clinical applications of radiology.

Course Duration: 30 hours of theory and 30 hours of practice

Course learning Units: 3 units .

Course General Objectives:

By the end of this course, students should be able to:

1. Explain the basic principles of diagnostic radiology
2. Describe the different types of radiographic techniques and their clinical applications
3. Interpret radiographic images and identify common pathologies
4. Demonstrate some proficiency in observing radiographic procedures
5. Understand the risks associated with radiation exposure and apply appropriate safety measures

Course Specific Objectives :

Explained in each lecture given to students .

Intended Learning Outcomes (ILOs):

Upon completion of this course, students will be able to:

- Explain the basic principles of diagnostic radiology and common disease radiological findings —Knowledge
- Interpret common radiographic images--- Skill
- Understand radiation safety measures—Attitude and behavior
- Students should understand the role of radiology in modern medical practice ---- professionalism.

- Students should be able to order radiologic examinations appropriately and judiciously.-----Skills & attitude and behavior
- Students should be able to use radiologic findings to narrow differential diagnoses or to develop a tentative diagnosis.---- Knowledge & Skills
- Students should be able to identify strengths and weaknesses of a radiology department & strength & weakness of each diagnostic modality.--→ knowledge & skills
- Students should understand the role of the radiologist on the health care team and the relationship of radiology to other clinical disciplines; they should be able to use the services of a radiology department appropriately.--→ attitude
- Students should appreciate the radiologist's need for adequate clinical history and a clear statement of the indications for the examinations being requested.---- professionalism

Teaching strategy (overview):

- Objective – based learning
- Student-centered learning
- Active student interaction

Teaching and Learning Methods:

The course will use the following teaching and learning methods:

- **Theory sessions :**
  - **Lectures:** Knowledge acquisition
  - **Visual aids** (e.g., films , videos, , and illustrations): Knowledge acquisition and skill development.
  - **Group discussion** - critical thickening
- **Practical sessions:**
  - **Site visit-observation:** Skill development and attitude formation**.** Visiting the radiology department to see each diagnostic imaging modality & observe several radiographic procedures.
  - **Interpretation of radiographic images**: This activity covers knowledge and skill. Each student is given several previously unseen radiographs to interpret and present to the other students for discussion. This review session is not graded, but does provide an excellent opportunity to observe interpreting and reasoning skills.
    Students must have a good understanding of anatomy and physiology, radiation physics, imaging techniques, and pathologies in order to accurately

interpret radiographic images. They must also have the skills to identify abnormalities, artifacts, and technical errors.

- **Case presentations:** Knowledge acquisition, skill development, and attitude formation
- **Group discussions:** Knowledge acquisition, skill development, and attitude formation
- Power point presentation, slide reviews & photographic films review of emergency cases & most common medical cases.
- Other contact with the students (e.g., discussions while interpreting radiographs) provides information to complete an assessment.

- **Activities and projects :**

  - **Logbook** - a logbook covers both knowledge and skills by keeping Students record of the radiological procedures they have seen , including the number and types of examinations, patient demographics, and imaging findings. This activity allows students to apply their knowledge of radiation physics, imaging techniques, and patient care in a clinical setting, and to reflect on their experiences to identify areas for improvement. Additionally, the activity encourages reflection and self-evaluation, which can help to develop a positive attitude towards ongoing learning and improvement. They are also developing their skills in patient care and communication.
  - **Building up of radiology teaching files** - Students collect and organize images from most interesting radiology cases and observing various radiological examinations, with the goal of creating a resource for future learning and teaching. All students are required to review a teaching file and to contribute two new cases to that file. This has the obvious advantage of building up the teaching file, but, more importantly, it requires the student to integrate a patient's history and physical and clinical data with radiologic data and to present a reasoned diagnosis. This activity allows students to develop their skills in image interpretation and analysis, and to reflect on their experiences to improve their ability to identify key imaging findings.
  - **Internet radiology subject report** - Students conduct research on a specific radiological topic, using online resources to gather information and present their findings. This activity allows students to develop their research and communication skills, and to reflect on their experiences to gain a deeper understanding of the subject matter.

- **Students feedback (course evaluation form)**

Course Outline:

The course will be divided into the following topics:

Blueprint for 5th year medical student in Thi-Qar college of medicine include:

I) Thirty hours lectures: 1 hr. /week including following topics:

(Radiology Course Blueprint – 5th year)

Week No.	Lecture Name	lecturer	ILO	Assessment Method							Total Weight (impact X frequency)
				Summative				Formative			
				Written	Practical	logbook	Course activities - quizzes and teaching file	Quiz	Group discussion	Project homework	
1	Introduction 1	Dr. Riyadh Adel	K:6.21 AB: 5	X				X			20
2	Introduction 2	Dr, Riyadh Adel	K:6,21 S: 3	X				X			20
3	Respiratory system 1	Dr. Riyadh Adel	K:1,6 S:1	X	X	X	X	X	X		28
4	Respiratory system 2	Dr,Riyadh Adel	K:1 S:1,4	X	X	X	X	X	X	X	28
5	Respiratory system 3	Dr, Riyadh Adel	K:1,4,5 S:1,3,4,7,13,17,18, 21, 23, 24 AB, 1, 3, 4, 5, 8, 9	X	X	X	X	X	X	X	28
6	Respiratory system 4	Dr, Riyadh Adel	K:1,4,5 S:1,3,4,7,13,17,18 , 21, 23, 24 AB: 1, 3, 4, 5, 8. 9	X	X	X	X	X	X	X	28
7	Respiratory system 5	Dr,Riyadh Adel	K:1,4,5 S:1,3,4,7,13, 17, 18, 21, 23, 24 AB: 1, 3, 4, 5, 8, 9	X	X	X	X	X	X	X	28
8	CV system	Dr,Riyadh Adel	K:1,4,5,6 S:1,3,4,7,13, 17, 18, 21, 23, 24 AB : 1, 3, 4, 5, 8,9	X	X	X	X	X	X	X	15
9	Plain abdomen	Dr.Riyadh Adel	K:1,4,5,6 S:1,3,4,7,13, 17, 18, 21, 23, 24 AB: 1, 3, 4, 5, 8, 9	X	X	X	X	X	X		29
10	GIT 1	Dr.Sarah Ghaib	K:1,4,5,6 S:1,3,4,7,13, 17, 18, 21, 23,24 AB: 1, 3, 4, 5, 8, 9	X	X	X	X	X	X	X	19
11	GIT 2	Dr.Sarh Ghalib	K:1,4,5 S:1,3,4,7,13, 17, 18, 21, 23, 24 AB: 1, 3, 4, 5, 8, 9	X	X	X	X	X	X	X	19
12	GIT 3	Dr.Sarah Ghalib	K1,4,5 S1,3,4,7,13. 17, 18, 21, 23 AB : 1, 3, 4, 5, 8,9	X	X	X	X	X	X	X	19
13	Hepatobiliary system1	Dr,Riya Abdulameer	K4,5,6 S1,3,4,7,13, 17, 18, 21, 23, 24 AB : 1, 3, 4, 5, 8,9	X	X	X	X	X	X	X	16
14	Hepatobiliary system2	Dr.Riyah Abdulameer	K:1.4,5 S:1,3,4,7,13, 17, 18, 21, 23, 24 AB : 1, 3, 4, 5, 8,9	X	X	X	X	X	X	X	16
15	Hepatobiliary system3	Dr.Riya Abdulameer	K:1,4,5 S:1,3,4,7,13, 17, 18, 21, 23, 24 AB: 1, 3, 4, 5, 8, 9	X	X	X	X	X	X	X	14

16	Breast imaging	Dr.Sarah Ghalib	K1,4,5,6,11 S1,3,4,7,13, 17, 18, 21, 23, 24 AB:, 1,3, 4,5,8, 9	X	X	X	X	X	X		21
17	Urinary tract 1	Dr.Sarah Ghalib	K1,4,5,6 S1,3,4,7,13, 17, 18, 21, 23, 18, 21, 23, 24 AB:1, 3, 4, 5, 8, 9	X	X	X	X	X	X	X	19
18	Urinary tract 2	Dr.Sarah Ghalib	K1,4,5 S1,3,4,7,13, 17, 18, 21, 23, 24 AB: 1, 3, 4, 5, 8, 9	X	X	X	X	X	X	X	19
19	Female genital tract	Dr.Riya Abdulameer	K: 6, S:1,3,4,7,13, 17, 18, 21, 23, 24 AB: 1, 3, 4, 5, 8, 9	X	X	X	X	X	X		17
20	Peritoneal cavity and retroperitoneum	Dr.Riya Abdulameer	K:1,4,5 S:1,3,4,7,13, 17, 18 , 21, 23, 24 AB : 1, 3, 4, 5, 8,9	X	X	X	X	X	X		14
21	Bones 1	Dr.Firas Abdulah	K:1,4,5,6 S:1,3,4,7,13, 17, 18, 21, 23, 24 AB: 1, 3, 4, 5, 8, 9	X	X	X	X	X	X	X	20
22	Bones 2	Dr.Firas Abdulah	K:1,4,5 S:1,3.4,7,13, 17, 18, 21, 23, 24 AB : 1, 3, 4, 5, 8,9	X	X	X	X	X	X		20
23	Joints	Dr.Firas Abdulah	K:1,4.5 S:1,3.4,7,13, 17, 18, 21, 23, 24 AB : 1, 3, 4, 5, 8,9	X	X	X	X	X	X		16
24	Spine	Dr.Firas Abdulah	K:1,4,5 S:1,3,4,7,13, 17, 18, 21, 23, 24 AB:1, 3, 4, 5, 8, 9	X	X	X	X	X	X	X	16
25	Skeletal trauma	Dr,Firas abdulah	K:1,4,5 S:1,3,4,7,13, 17, 18, 21, 23, 24 AB: 1, 3, 4, 5, 8, 9	X	X	X	X	X	X		25
26	Skull and brain 1	Dr,Firas abdulah	K:1,4,5,6 S:7,13, 17, 18, 21, 23 , 24 AB: 1, 3, 4, 5, 8, 9	X	X	X	X	X	X		22
27	Skull and brain 2	Dr,Firas abdulah	:K:1,4,5 S1,3,4,7,13, 17. 18, 21, 18, 21, 23, 24 AB : 1, 3, 4, 5, 8,9	X	X	X	X	X	X	X	22
28	Skull and brain 3	Dr,Firas abdulah	K:1,4,5 S:1,3,4,7,13, 17, 18, 21. 23, 24 AB: 1, 3, 4, 5, 8, 9	X	X	X	X	X	X	X	22
29	Sinus, orbit, neck	Dr,Firas abdulah	K1,4,5 S1,3,4,7, 17, 18, 21, 23, 24 AB: 1, 3, 4, 5, 8, 9	X	X	X	X	X	X	X	14
30	Vascular radiology	Dr.Riya Abdulameer	K6	X	X	X		X	X		12

II) Thirty hours practical sessions: 8 small groups: 3Hrs/days for each group/2 weeks:

Course evaluation form:

The educational objectives were also used to develop a course evaluation form. The form comprises three sections in which students are asked to rate general course characteristics, accomplishment of the general objectives, and usefulness of several

learning activities. In addition, students are asked to write comments and suggestions for improvement.

These three formal student evaluations provide documentation on student achievement on almost all of the objectives. Examples from each section are shown in the table below.

TABLE: COURSE EVALUATION FORM **(students feedback)**

A- Course analysis

	Very strongly Disagree	Strongly disagree	Disagree	Agree	Strongly agree	Very strongly agree
In general :						
1-The course objectives were well defined .	1	2	3	4	5	6
2- the course was well organized.	1	2	3	4	5	6
3- the lectures were informative.	1	2	3	4	5	6
4- I saw an adequate number and variety of x rays.	1	2	3	4	5	6
As a result of this course:						
5- I have reach a through approach of interpreting x-ray .	1	2	3	4	5	6
6- I can incorporate a radiological findings into a differential diagnosis.	1	2	3	4	5	6

B-Please indicate how help each of the followings in your learning

	Did not attend	Not at all helpful	Minimally helpful	Reasonably helpful	Very helpful	Maximally helpful
1-Lectures	0	1	2	3	4	5
2- Visual aids(films , illustrations , etc.).	0	1	2	3	4	5
3-Group discussion.	0	1	2	3	4	5
4-Logbock.	0	1	2	3	4	5
5-Teaching file	0	1	2	3	4	5
6-Internet subject report	0	1	2	3	4	5

Analysis of results : method to analyze data collected using **a Likert scale**

1. Assign numerical values to each response option on the scale. For example, you could assign 1 to "strongly disagree," 2 to "disagree," 3 to "neutral," 4 to "agree," and 5 to "strongly agree."
2. Calculate the mean score for each statement by summing the numerical values for all responses to that statement and dividing by the number of respondents. This will give you an average score for each statement.
3. Interpret the results by considering the mean scores for each statement. Statements with higher mean scores are more positively rated by respondents, while statements with lower mean scores are less positively rated.

Summary :

This approach has allowed the clerkship to be flexible enough to accommodate varying student abilities and interests while also assuring coverage of core concepts and materials.

Conclusion:

The above curriculum design provides a comprehensive framework for teaching and assessing diagnostic radiology in an undergraduate medical college. The course includes a balanced mix of theoretical and practical sessions, and the teaching methods and assessment methods. The ILOs, general objectives, and specific objectives are well-defined, which will enable students to achieve a thorough understanding of diagnostic radiology.

Requirements to completely achieve instructional objective for diagnostic radiology course in our college:

1. Diagnostic radiology is a wide specialty deals with all medical branches & should not be included with surgical department but as a separate department dealing with all other departments.
2. The college should encourage a weekly department conference activities . Students should attend all these interdepartmental conferences

Assessment Methods:

The course will use the following assessment methods:

1. Summative :
   - Written exams (short essay questions ,long essay , SBA, MCQ, Cross match) : to assess the students' knowledge and understanding of the theory.
   - Practical exams (Image interpretation exams) or OSPE : to assess the students' ability to interpret radiographic film and to assess the students' ability to identify common pathologies.
   - Logbook (documentation of the performance of the practical procedure)
   - Collection of two interesting cases to build up the teaching file.
   - Quizzes which are graded
2. Formative assessment :
   - Quizzes in class after most topics- which are not graded
   - Group discussion in class
   - Projects homework : Internet radiology subject report .

Grading and Evaluation:

The grading system for the course will be as follows:

Commutative :

- Written midyear exam = 20%
- Log book = 3 %,
- Course activities (teaching file " 2 cases" 2 % , quizzes =5%)
- Practical exam = 20 %
- written final exam = 50 %
- Total 100 %
- Pass mark = 50%

Formative (no mark given – just take feedback)

- Group discussion.
- Some of the quizzes without mark
- Homework – writing on radiology subject

Textbooks approved: Diagnostic imaging by Peter Armstrong ed.2020

Lecturers :

1- Ass. Prof Dr. Riyadh Adel FICMS-RD- Head of Surgery Department.
2- Ass. Prof Dr. Firas Abdulah FIBMS-RD- Head of anatomy Department.
3- Lecturer Dr. Sara Ghalib CABMS-RD – Surgery Department
4- Lecturer Dr. Rya Abdulameer CABMS-RD – Surgery Department