



Course Specification

243 DDS 2014/ 2015

*In Accordance to the Guidelines by the
National Commission for Assessment and
Academic Accreditation NCAAA*

Vice-Dean Ship for Development and Quality at College of Dentistry , King
Saud University

Vice Dean-Ship for Development & Quality





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COURSE SPECIFICATION 243 DDS



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Institution	King Saud University
College/Department	: College of Dentistry/ Department of Oral Medicine and Diagnostic Sciences

A Course Identification and General Information

1. Course title and code:	Physics of Diagnostic Radiology and Oral and Maxillofacial Radiology (243 DDS)
2. Credit hours:	4
3. Program(s) in which the course is offered.	
	(If general elective available in many programs indicate this rather than list programs)
	BDS- Bachelor of Dental Surgery
4. Name of faculty member responsible for the course	
	Dr. Reema Al-Shawaf (GUC)
	Dr. Hazem Marzouk (DUC)
5. Level/year at which this course is offered :	
	2nd year (first and second semester)
6. Pre-requisites for this course (if any)	
	Not Applicable
7. Co-requisites for this course (if any)	
	Not Applicable
8. Location if not on main campus	
	GUC and DUC



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B Objectives

1. Summary of the main learning outcomes for students enrolled in the course. (following BDS program ILOs)

On successfully completing the course, the student should be able to:

1. Discuss and explain the production and different interactions of x-radiation. (1.4)
2. List and describe the different types of dental x-ray films and digital imaging used in dentistry and match their indications. (1.4, 2.1)
3. Recognize the different advanced imaging modalities used in maxillofacial imaging and their indications, uses, and limitations. (1.4, 2.1)
4. Produce complete intra-oral radiographic survey [CMS] on patients with minimal errors. (1.4, 2.2, 3.1, 5.1)
5. Identify both intraoral and extraoral radiographic anatomical landmarks. (1.1, 2.1)
6. Discuss the harmful effects of radiation, and apply radiation protection measurements. (1.4, 1.6, 1.7)
7. Identify, and describe the radiographic appearance of dental caries, periodontal, periapical pathosis, various dental anomalies and regressive changes. (1.1, 1.2, 1.3, 2.1, 2.2)
8. Write a detailed report of the abnormalities identified in a complete mouth survey (CMS). (1.1, 1.2, 1.3, 2.1, 2.2, 3.1)
9. Practice infection control measures in dental radiography. (1.4, 1.6, 1.7)
10. Determine and justify the appropriate type of radiographic examination for a particular diagnostic task. (1.4, 2.1, 2.2)

2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

- 1. Introduction of digital radiography systems, as well advanced imaging modalities (cone beam computed tomography) to the practical component of the curriculum**
- 2. Use of web-based interactive exercises as an adjunct to the basic training received in the course**



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C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

1 Topics to be Covered			
First Semester			
Topic	No of Weeks	Contact Hours	
		Lecture	Teaching Lab
Orientation to the course	1	1	3
Radiation Physics I	1	1	3
Radiation Physics II	1	1	3
Dental X-ray Film	1	1	3
Processing of X-ray Films	1	1	3
Image Characteristics	1	1	3
Quality Assurance and Infection Control in Radiography	1	1	3
Intra-Oral Radiographic Techniques I	1	1	3
Intra-Oral Radiographic Techniques II	1	1	3
Normal Radiographic Anatomy	1	1	3
Radiation Biology	1	1	3
Radiation Protection	1	1	3
Common Causes of Unsatisfactory Radiographs and Their Correction	1	1	3
Revision	1	1	3
Second Semester			
Topic	No of Weeks	Contact Hours	
		Lecture	Teaching Lab



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Interpretation of Dental Caries	1	1	3
Interpretation of Periapical Pathosis	1	1	3
Interpretation of Periodontal Pathosis	1	1	3
Dental Anomalies I	1	1	3
Dental Anomalies II	1	1	3
Traumatic Injuries to the Teeth	1	1	3
Occlusal Radiography/ Localization Techniques	1	1	3
Extraoral Radiography	1	1	3
Panoramic Radiography	1	1	3
Panoramic Anatomical Landmarks	1	1	3
Digital Radiography	1	1	3
Digital Image Processing	1	1	3
Advanced Imaging Modalities	1	1	3
Guidelines for Prescribing Radiographs	1	1	3

2. Course components (total contact hours per semester):

Lecture:	Tutorial:	Practical/Fieldwork/Internship:	Other:
14		42	

3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week)



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2 hours

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skills.
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

a. Knowledge

(i) Description of the knowledge to be acquired

By the end of the course, the student should be able to:

- 1. Describe the physics concerned with dental radiography (film based and digital).** (1.4, 2.1)
- 2. Recognize the equipment in use (including the latest technologies).** (1.4, 2.1)
- 3. Name the different maxillofacial radiography plain views and indicate their uses.** (1.4, 2.1)
- 4. Identify images from advanced imaging modalities and relate their uses in oral and maxillofacial radiology.** (1.1, 1.4, 2.1)
- 5. Recognize radiographic anatomy.** (1.1, 1.4, 2.1)
- 6. Identify various dental pathologies.** (1.4, 2.1, 2.2)
- 7. Relate the applications of dental and maxillofacial radiography in dental specialties.** (1.4, 2.1, 2.2)

(ii) Teaching strategies to be used to develop that knowledge

Lectures and clinical and practical interpretation exercises.

(iii) Methods of assessment of knowledge acquired



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Evaluation of practical assignments, evaluation of clinical procedures, quizzes, theoretical examinations, practical examinations (interpretation of radiographs)

b. Cognitive Skills

(i) Cognitive skills to be developed

1. Ability to think critically and analytically

1. Critique the diagnostic quality of radiographs. (1.4, 2.1)
2. Analyze the causes of radiographic errors. (1.4, 2.1)
3. Determine methods of correcting and/or avoiding radiographic errors (troubleshooting). (1.4, 2.1)
4. Interpret abnormal findings according to class of pathology. (1.4, 2.1, 2.2)
5. Identification of different diseases, and extent of disease. (1.4, 2.1, 2.2)
6. Report on the comprehensive findings in intraoral radiography. (1.1, 1.2, 1.3, 2.1, 2.2, 3.1)

(ii) Teaching strategies to be used to develop these cognitive skills

- Students will be given assigned cases to identify and describe radiographic errors, normal structures, and pathological processes.
- Comprehensive clinical cases will be presented to the students and they will be asked to report on all aspects of the dental and associated structures

(iii) Methods of assessment of students cognitive skills

- Discussing the cases with the students, followed by evaluation.
- Discussing the different disease entities with the students followed by evaluation.
- Practical examination where students answer questions regarding radiographs of patients.
- Practical exercises where students submit digital radiographs processed in accordance with various diagnostic tasks, and answering questions regarding the processing procedures.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed



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<p>At the end of the course, the student should have developed the ability to:</p> <ul style="list-style-type: none"> – Communicate effectively and professionally with patients regarding radiographic hazards and procedures. (1.4, 1.6, 1.7) – Paraphrase the radiographic findings in a clear and concise manner. (1.1, 1.2, 1.3, 2.1, 2.2) – Prescribe dental radiographs utilizing the lowest Radiation dose and finical cost to achieve the proper diagnosis. (1.4, 1.6, 1.7)
<p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> – Students will be trained on simulated situations (Case Studies). – Students will be assigned to particular patients for radiography (Clinical Practice).
<p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> – Tutorials with instructors.
<p>d. Communication, Information Technology and Numerical Skills</p>
<p>(i) Description of the skills to be developed in this domain.</p>
<p>(ii) Teaching strategies to be used to develop these skills</p>
<p>(iii) Methods of assessment of students numerical and communication skills</p> <p>Evaluation of the taken radiographs, as well as the assigned cases and associated exercises and questions.</p>
<p>e. Psychomotor Skills (if applicable)</p>
<p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p>At the end of the course, the student should have gained the psychomotor skills to properly position patients, x-ray source, and x-ray receptor to obtain diagnostic quality radiographs. (1.1, 1.2, 1.3, 1.4, 1.6, 1.7, 2.1, 2.2, 3.1)</p>
<p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> – Exercises on x-ray receptor placement on phantom heads, colleagues, and patients. – Analysis and correction of causes of errors in faulty radiographs.
<p>(iii) Methods of assessment of students psychomotor skills</p> <ul style="list-style-type: none"> – Students will be evaluated for different assignments involving the acquisition of



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radiographs.

5. Schedule of Assessment Tasks for Students During the Semester

Assessment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	Continuous assessment- theory		30 %
2	Continuous assessment- practical		30 %
3	Final exam- theory and practical		40 %

D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

Each group of students is assigned to a particular faculty where he or she will provide academic and scientific counseling during specific academic hours (amount of time: two hours per week per instructor).

The course director is also available for any guidance regarding the content of the course during specified office hours (2 per week) and through daily communication via e-mail (amount of time: unrestricted).

E. Learning Resources

1. Required Text(s)

1. **Dental Radiography- Principles and Techniques.** 4th edition By: *Joan H.lannucci and Laura Jansen Howerton*

Oral radiology- Principles and Interpretation. 6th edition By: *White and Pharoah*

2. Essential References **Principles of Dental Imaging.** By: *Langland, Langlais, and Preece*

3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

- **Sources and Effects of Ionizing radiation.** United Nations Scientific Committee on the



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Effects of Atomic Radiation (UNSCEAR 2008). Report to the General Assembly with Scientific Annexes. Vol. 1. United Nations 2010.

- Rahmatullah M, Almas K, al-Bagieh N. **Cross infection in the high touch areas of dental radiology clinics.** Indian J Dent Res 1996; 7: 97-102.
- Stanczyk D, Paunovich E, Broome J, Fatone M. **Microbiologic contamination during dental radiographic film processing.** OOO 1993; 76: 112-9.

4-.Electronic Materials, Web Sites etc

- www.marcilan.com
- www.learndigital.net
- <http://www.cdc.gov/mmwr/PDF/rr/rr5217.pdf>
- <http://www.osap.org/>
- <http://ddsdx.uthscsa.edu/dig/digimage.html>
- http://www.nlm.nih.gov/research/visible/visible_human.html
- <http://www.rad.washington.edu/AnatCaseList.html>
- **American Academy of Oral and Maxillofacial Radiology:**
<http://www.aaomr.org/index.php>

Separate recommendations for further reading and interactive exercises will be given at the end of each lecture.

5- Other learning material such as computer-based programs/CD, professional standards/regulations

Interactive Programs:

- **Anatomical Landmarks in Dental Radiology**
- **Anatomical Landmarks in Rotational Panoramic Radiology**

Videos:

- **Visibility. A Video Essay after a Photograph by Wilhelm Roentgen (1896)**



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- **W.C. Röntgen and X-Rays (1 of 2)**
- **1940 X Ray Physics Documentary By William D Coolidge**

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Lecture rooms, laboratories, etc.)

For each campus:

- **Classroom accommodating the total number of students**
- **Radiology clinics, at least 3 per session**
- **Interpretation room, accommodating the students and instructors**

2. Computing resources

- **Computers and monitors for presentation and discussion of images, as well as practical examinations.**
- **Computers for viewing and management of digital images**

3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

Students will be asked to answer questions on Instructor and Course Evaluation Forms

2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department

Review of students' strength and weaknesses in the different aspects of the course



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3 Processes for Improvement of Teaching

The acquisition of more digital radiographic systems are planned, as well as another Cone beam CT machine, to enable more hands-on experience for the students with such imaging modalities.

4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)

- **Students are allocated to different instructors throughout the year**
- **Assigned comprehensive cases are checked by more than one staff member**

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Periodic upgrade of imaging devices and software, as needed**
- **Frequent revision of the content of the curriculum to reflect the advances in the field**