

Kingdom of Saudi Arabia

**The National Commission for Academic
Accreditation & Assessment**

COURSE SPECIFICATION

Course Specification

Institution King Abdulaziz University
College/Department Faculty of Dentistry

A. Course Identification and General Information

1. Course title and code: Diagnostic Oral Radiology (OBCS 377)
2. Credit hours 2
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Bachelor of Dental Surgery (BDS)
4. Name of faculty member responsible for the course Emad Khan
5. Level/year at which this course is offered Third year – second semester
6. Pre-requisites for this course (if any) PHSD 101, OBCS 223
7. Co-requisites for this course (if any)
8. Location if not on main campus

B. Objectives

<p>1. Summary of main learning outcomes for students enrolled in the Course.</p> <p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Describe the nature and characteristics of radiation, the physics and electronics of x-ray production, and the interaction of ionizing radiation and matter. 2. Describe general function and operation of dental x-ray machines, digital and film image receptors, darkroom procedures and photochemistry, and image acquisition and display. 3. Describe in words or diagrams, the factors involved with image formation. 4. Describe the deficiencies in poor quality radiographs and discuss modifications that will result in improved quality. 5. Describe intraoral radiographic techniques and their appropriate use. 6. Describe the basic principles of radiation biology, radiation safety and protection, risk/benefit considerations, and dose reduction strategies. 7. Describe and recognize the normal anatomic structures needed to correctly mount intraoral radiographs. 8. Apply the aforementioned body of knowledge by successfully completing a laboratory exercise that includes the exposure of a complete intraoral radiographic examination on a manikin and processing, mounting, and critiquing the resultant images. 9. Demonstrate knowledge of infection control principles through consistent application of infection control procedures in all clinical activity. 10. Recognize and diagnose caries and dental developmental anomalies on radiographs and relate their diagnosis to their clinical findings.

<p>2. Briefly describe plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web-based reference material, changes in content as a result of new research in the field)</p> <p>Self-evaluation forms have been designed for objective evaluation and critiquing of FMX. Some topics will be taught through self-instructional modules. Less emphasis will be directed towards the physics part. A mock exam (PowerPoint slides) is to be administered just before the actual exam.</p>

C. Competency Statements:

<p>This course addresses the following competencies of KAU – Faculty of Dentistry: Graduates will be able to:</p> <ol style="list-style-type: none"> 1. Understand basic biological principles with emphasis on their application to the orofacial complex. 2. Understand the biological and physical processes contributing to pathological conditions that impact patient care. 3. Deliver oral health care to patients from a variety of backgrounds, stages of life and in various settings. 4. Recognize and manage patient behavioral and psychological factors that affect oral health and implement strategies to facilitate the delivery of oral health care. 5. Effectively communicate with both patients and other health care providers. 6. Work in various dental settings and assess overall quality in order to facilitate the delivery of appropriate oral health care. 7. Evaluate different models of oral health care delivery. 8. Exhibit professional integrity in their conduct and apply the principles of professional ethics, jurisprudence, and risk management to dental practice. 9. Use information technology and information management systems for patient care, practice management, and professional development. 10. Obtain a patient's medical, behavioral and dental history and assess the implications for dental care. 11. Select, obtain and interpret clinical, radiographic, and other diagnostic information and procedure.

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

1. Topics to be Covered		
Topic	No. of Weeks	Contact hours (for every student)
The Physics of Ionizing Radiation	2	6
Biologic Effects of Radiation	1	1
Radiation Safety and Protection	1	1
Imaging Principles and Techniques	12	29
Radiographic Interpretation of Pathology	2	5

2. Course components (total contact hours per semester):			
Lecture: 14	Tutorial: -	Practical/Fieldwork/Internship: 28	Other:

3. Additional private study/learning hours expected for students per week: (this should be an average for the semester not specific requirement in each week). 1 hour
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4. Development of Learning Outcomes in Domains of Learning
For each of the domains of learning shown below indicate: <ul style="list-style-type: none"> (i) A brief summary of the knowledge or skill the course is intended to develop; (ii) A description of the teaching strategies to be used in the course to develop that knowledge or skill; (iii) The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.
a. Knowledge
<p>(i) Description of the knowledge to be acquired</p> <ol style="list-style-type: none"> 1. Nature and characteristics of radiation, the physics and electronics of x-ray production, and the interaction of ionizing radiation and matter. 2. General function and operation of dental x-ray machines, digital and film image receptors, darkroom procedures and photochemistry, and image acquisition and display. 3. Factors involved with image formation. 4. Deficiencies in poor quality radiographs and modifications that will result in improved quality. 5. Intraoral radiographic techniques and their appropriate use. 6. The principles of panoramic radiography and their common errors. 7. Basic principles of radiation biology, radiation safety and protection, risk/benefit considerations, dose reduction strategies, and high yield selection criteria. 8. Normal anatomic structures of the teeth, jaws and skull as they appear on intraoral radiographs.
<p>(ii) Teaching strategies to be used to develop that knowledge</p> <ol style="list-style-type: none"> 1. Conventional lectures. 2. Laboratory demonstration. 3. Discussion during the critique of student's requirements.
<p>(iii) Methods of assessment of knowledge acquired</p> <ol style="list-style-type: none"> 1. Written and practical examinations.
b. Cognitive Skills
<p>(i) Description of cognitive skills to be developed</p>

<ol style="list-style-type: none"> 1. Perform intra-oral radiographic technique correctly and apply necessary modification to produce diagnostically acceptable images. 2. Applying the aforementioned body of knowledge by critiquing laboratory exercises. 3. Applying corrective measures to improve any deficiency in laboratory exercises.
<p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ol style="list-style-type: none"> 1. Conventional lectures. 2. Laboratory demonstration. 3. Discussion during the critique of student's requirements. 4. Self-evaluation and instructor evaluation of laboratory requirements.
<p>(iii) Methods of assessment of students cognitive skills</p> <ol style="list-style-type: none"> 1. Written and practical examinations. 2. Laboratory requirements.
<p>c. Interpersonal Skills and Responsibility</p>
<p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ol style="list-style-type: none"> 1. Effectively communicating examination instructions to patients using manikins for training. 2. Observing the "patient" and assuring him/her while making exposure. 3. Consistent application of infection control procedures in all laboratory activity. 4. Consistent application of radiation protection procedures in all laboratory activity.
<p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ol style="list-style-type: none"> 1. Laboratory demonstration. 2. Supervising image acquisition exercise.
<p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ol style="list-style-type: none"> 1. Laboratory requirements.
<p>d. Communication, Information Technology and Numerical Skills</p>
<p>(i) Description of the numerical and communication skills to be developed</p> <ol style="list-style-type: none"> 1. Effectively communicating examination instructions to patients using manikins for training. 2. Observing the "patient" and assuring him/her while making exposure. 3. Using appropriate terms for critiquing images and requesting corrective measures. 4. Conversion between different radiation dose units. 5. Calculating radiation exposure using different units and comparing different modalities. 6. Calculating radiation exposure using the inverse square law.
<p>(ii) Teaching strategies to be used to develop these skills</p>

<ol style="list-style-type: none"> 1. Conventional lectures. 2. Laboratory demonstration. 3. Discussion during the critique of student's requirements. 4. Discussion of mid-term exam questions. 5. Supervising image acquisition exercise. 6. Self-evaluation and instructor evaluation of laboratory requirements.
<p>(iii) Methods of assessment of students numerical and communication skills</p> <ol style="list-style-type: none"> 1. Written and practical examinations. 2. Laboratory requirements.
e. Psychomotor Skills (if applicable)
<p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <ol style="list-style-type: none"> 1. Completing an exposure of a diagnostically acceptable complete intraoral radiographic examination (FMX) on a manikin. 2. Processing the exposed films. 3. Mounting the resultant images.
<p>(ii) Teaching strategies to be used to develop these skills</p> <ol style="list-style-type: none"> 1. Conventional lectures. 2. Laboratory demonstration. 3. Discussion during the critique of student's requirements. 4. Self-evaluation and instructor evaluation of laboratory requirements.
<p>(iii) Methods of assessment of students psychomotor skills</p> <ol style="list-style-type: none"> 1. Practical examination.

5. Scheduling of Assessment Tasks for Students During the Semester			
Assessment	Assessment task (e.g. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	Mid-term written exam	7	20%
2	Laboratory requirements (FMX and occlusal radiographs)	12	20%
3	Final written exam	14	45%
4	Final practical exam	13	15%

E. Student Support

1. Arrangements for availability of teaching staff for individual consultations and academic advice. (Include amount of time teaching staff are expected to be available each week)

Course instructors are available for consultation, comments, advice or assistance during their office hours (~4 hours/week) or via email communication or by appointments. Each student is encouraged to seek assistance when needed.

F. Learning Resources

1. Required Text(s)

White, S.C. and Pharoah, M.J., Oral Radiology, Principles and interpretation, 2004.

2. Essential References

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

1. Langland and Langlais, Principles for dental imaging, 2003.
2. Pasler, F., Radiology (Color Atlas of Dental Medicine, Vol 5), 1998.
3. RINN manual (intraoral radiography with Rinn XCP/BAI instruments).

4- Electronic Materials, Web Sites etc.

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

G. Facilities Required

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

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

1. Lecture room accommodating the entire group (one for each gender group).
2. Radiology clinic:
 - a. Rooms with leaded wall, glass window and door equipped with wall-mounted intra-oral x-ray unit, chair, and manikin.
 - b. Darkroom
 - c. Automatic processors
 - d. Daylight manual processors
 - e. Radiograph view boxes

2. Computing resources

The faculty has a library with computers, internet access, and electronic resources and database.

3. Other resources (specify – e.g. If specific laboratory equipment is required, list requirements or attach list)

Phantom head for panoramic radiography demonstration.

H. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching
<ol style="list-style-type: none">1. Periodic departmental meetings.2. An academic advisor is assigned through academic affairs for every 10 students.
2. Other Strategies for Evaluation of Teaching (e.g. by the instructor or by the department)
<ol style="list-style-type: none">1. Periodic division meetings.2. Analysis of exams.
3. Processes for Improvement of Teaching
<ol style="list-style-type: none">1. Periodic meetings.2. Attending faculty training workshops and seminars.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member of the teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with a staff in another institution)
<ol style="list-style-type: none">1. Each faculty member checks questions and marking of other faculty members teaching the same course.2. Periodic comparisons between students' performance from different years.
5. Action planning arrangements for periodically reviewing course effectiveness and planning for improvement.
<p>The faculty is in the process of:</p> <ol style="list-style-type: none">1. Implementing full digital and electronic system.2. Expanding the radiology clinic and increasing the number of necessary personnel.3. Acquiring a cone beam volumetric imaging unit.4. Integrating the faculty with the university ODUS for academic service. <p>This will improve the effectiveness of the course and allow the introduction of several topics like digital radiography and cross-sectional imaging. It will also provide the necessary facility for more effective laboratory exercise and teaching. The student feedback is an integral part of the ODUS system.</p> <p>Another proposal is to be submitted to expand this course to be a full-year-course to allow for enough pre-clinical training before the clinical rotation during the 4th year.</p>