

## **SYLLABUS**

COURSE: DENF 3703 Oral and Maxillofacial Radiology II:  
Extraoral Techniques and Basic Interpretation Skills  
SEMESTER: Fall  
CREDIT HOUR: 1.0

REVISED: 2001  
REPRINTED: 2009

COURSE DIRECTOR: Kenneth Abramovitch, D.D.S., M.S.

## GOAL

The purpose of this course is to introduce the student to some advanced aspects of oral and maxillofacial radiology. The radiographic examination plays an integral role in the diagnostic process in dentistry. The practitioner uses radiographic images to diagnose those structures which cannot be seen during the clinical evaluation. The dentist must therefore possess a sound knowledge of radiographic principles and be highly proficient in certain extraoral techniques to complement their overall diagnostic skills.



8. State the radiographic features that determine if there is active periodontal disease.

### III. RADIOGRAPHIC CHANGES IN PERIAPICAL DISEASE

1. Describe the radiographic change in the lamina dura associated with periapical disease.
2. Define the following terms associated with acute periapical disease and describe their radiographic features:
  - 2.1 acute apical periodontitis
  - 2.2 acute apical abscess
3. Define the following terms associated with chronic periapical disease and describe their radiographic features:
  - 3.1 apical granuloma
  - 3.2 apical cyst
  - 3.3 chronic apical abscess
  - 3.4 apical condensing osteitis
4. Recognize the radiographic pattern associated with:
  - 4.1 periapical cementoosseous dysplasia
  - 4.2 hypercementosis

### IV. BASIC PRINCIPLES OF PANORAMIC RADIOGRAPHY

#### **Principles of Image Formation**

1. Describe the practical aspects of panoramic radiography by reviewing the following areas:
  - 1.1 indications
  - 1.2 advantages
  - 1.3 disadvantages
2. Describe the projection in the vertical plane of a panoramic image.
3. Describe the projection of the panoramic image in the horizontal dimension.
4. State the patient variables for determining the exposure settings (i.e., kilovoltage or milliamperage).

#### **Image Layer Analysis**

5. Describe the relative path of rotation of the radiation source, and the cassette carriage as they rotate around the patient's head.
6. Describe the movement of the film cassette relative to the cassette carriage during a panoramic exposure.
7. Define focal trough.
  - 7.1 list the factors that affect the size and shape of the focal trough.

8. Describe the movement pattern of the x-ray beam during panoramic exposure.

### **Concepts of Image Formation**

9. Recognize the distortion pattern of creating a flattened image of a curved surface. (Concept 1)
10. State which midline structures project as single images and which midline structures project as double images. (Concept 2)
11. List the five properties of double images. (Concept 3)
12. Describe how ghost images project on a panoramic radiograph. (Concept 3)
13. List the six characteristics of ghost images. (Concept 3)
14. List prominent soft tissue shadows present on the panoramic image. (Concept 4)
15. Recognize the projection pattern of the pharyngeal airspaces, nasal and paranasal airspaces and the palatoglossal airspace. (Concept 5)
16. Identify the artifacts created by superimpositions of hard tissues, soft tissues and airspaces on the panoramic image. (Concept 6)
17. State the benefit of imaging the entire dentition on a single panoramic projection. (Concept 7)

### **Recognition of Basic Anatomy**

18. Identify the anatomy on a panoramic radiograph listed in the 3703 monograph.

## **V. TECHNICAL ASPECTS OF PANORAMIC RADIOGRAPHY**

1. List the procedures that are required or are helpful in preparing a patient for a panoramic radiograph.
2. List the instructions that each patient should be given prior to exposing a panoramic radiograph.

## **VI. RECOGNITION OF PANORAMIC ERRORS ASSOCIATED WITH PATIENT POSITIONING**

1. Describe the resulting error on a panoramic film in each of the following situations where the patient is improperly positioned.
  - 1.1 mid-sagittal plane off-center
  - 1.2 head rotated
  - 1.3 patient's chin too low
  - 1.4 patient's chin too high
  - 1.5 patient slumped while sitting or standing
  - 1.6 positioning a patient's jaws anterior to the focal trough.
  - 1.7 positioning a patient's jaws posterior to the focal trough.

## VII. RECOGNITION OF ERRORS ASSOCIATED WITH PANORAMIC TECHNIQUE

1. State the possible errors that will cause a low-density film (one that is too light).
2. State the possible errors that will cause a high-density film (too dark).
3. Describe the most likely cause for the following errors on panoramic films:
  - 3.1 vertical white lines
  - 3.2 streaking, splotches, specks
  - 3.3 smudge marks, or "naked tree" streaks
4. Identify the following errors when demonstrated on a panoramic radiograph. State the cause and correction of each problem.
  - 4.1 radiopaque ghost obscuring the lower center of the film
  - 4.2 radiopaque images or ghosts obscuring either side of center or the lower center of the film
  - 4.3 radiolucent shadow obscuring the apices of maxillary teeth
  - 4.4 blurred and wide anterior teeth
  - 4.5 blurred and thin anterior teeth
  - 4.6 radiopaque palate obscures apices of maxillary teeth
  - 4.7 flat or reversed occlusal curvature ("smile line")
  - 4.8 exaggerated occlusal curvature ("smile line")
  - 4.9 condyles and/or lower border of chin projecting off edge of the film
  - 4.10 unequal proportions of contralateral posterior teeth

## VIII. Digital Imaging

1. List the component layers that make up:
  - 1.1 a sheet of dental film.
  - 1.2 charge coupled device
  - 1.3 phosphor image plate
2. Differentiate between the sizes and speeds of commercially available extraoral film and digital sensors.
3. Identify the two methods for acquiring direct radiographic images in digital form.
4. List the hazards from which;
  - 4.1 dental film must be protected during storage.
  - 4.2 Photostimulable phosphor plates must be protected during storage
5. Define the "latent image."
6. Describe the mechanism of image formation for the following direct digital radiography systems:
  - 6.1 charge coupled device
  - 6.2 phosphor image plate
7. Define the following digital detector characteristics

- 7.1 Contrast resolution
  - 7.2 Spatial resolution
  - 7.3 Detector latitude
  - 7.4 Detector Sensitivity
8. List and describe the two types of digital image displays
- 8.1 CRT
  - 8.2 TFT
9. Identify and correct technical errors on extraoral film and sensors that are related to:
- 9.1 film positioning
  - 9.2 film exposure
  - 9.3 film handling
  - 9.4 film processing
10. Identify advantages and disadvantages of digital technology as it relates to radiology.
11. List the different image enhancement tools available for digital image formats.

IX. DEVELOPMENTAL AND ACQUIRED ABNORMALITIES OF TEETH

1. Define the following terms with regard to supernumerary teeth:
- 1.1 mesiodens
  - 1.2 paramolar
  - 1.3 distodens (distomolar)
  - 1.4 peridens
2. Explain the significance of supernumerary teeth from a clinical standpoint.
3. Define the following terms with regard to developmentally missing teeth:
- 3.1 hypodontia
  - 3.2 oligodontia
  - 3.3 anodontia
4. Name the most commonly missing teeth.
5. Define and briefly describe the radiographic features of these alterations associated with tooth size.
- 5.1 macrodontia
  - 5.2 microdontia
6. Define and briefly describe the radiographic features of these alterations associated with tooth shape.
- 6.1 gemination (schizodontism)
  - 6.2 fusion (syndontism)
  - 6.3 concrescence
  - 6.4 dilaceration
  - 6.5 taurodontism
  - 6.6 supernumerary roots

- 6.7 enamel pearls
  - 6.8 dens invaginatus (dens in dente)
  - 6.9 dens evaginatus (Leong's premolar/Leong's tubercle)
7. Define and briefly describe the radiographic features of these alterations associated with tooth structure.
- 7.1 enamel hypoplasia
  - 7.2 amelogenesis imperfecta
    - 7.2.1 hypomature
    - 7.2.2 hypoplastic
    - 7.2.3 hypomineralized
  - 7.3 dentinogenesis imperfecta
  - 7.4 dentinal dysplasia
  - 7.5 regional odontodysplasia
8. Define and briefly describe the radiographic features of these alterations associated with acquired defects of teeth.
- 8.1 attrition
  - 8.2 abrasion
  - 8.3 erosion
9. Define and briefly describe the radiographic features of these alterations associated with tooth eruption.
- 9.1 drift and migration
  - 9.2 translocation (transposition) and ectopic eruption
  - 9.3 embedded versus impacted teeth

X. EXTRAORAL RADIOGRAPHIC ANATOMY

1. For each of the following extraoral views, identify the anatomic landmarks specific to that view, as outlined in the Appendix for this course:
- 1.1 lateral oblique radiograph of mandible (ramus)
  - 1.2 lateral skull radiograph/cephalogram
  - 1.3 posteroanterior radiograph
  - 1.4 Waters' (occipitomeatal) radiograph
  - 1.5 submentovertex radiograph

XI. EXTRAORAL IMAGING APPARATUS

- 1. List the function of the intensifying screen used for extraoral radiology.
- 2. State the function of the cassette for extraoral radiography.
- 3. List and describe the function of each component layer in an intensifying screen.
- 4. State the relation between film speed and image resolution.

5. State what safelighting modification for the darkroom may be required when processing films used in with intensifying screens.
6. List two advantages of using rare-earth phosphors as compared to calcium tungstate phosphors in an intensifying screen.
7. List the composition and function of an x-ray grid.
8. State the difference between a standard grid versus a focused grid.
9. State the significance of the grid ratio.
10. State the adjustment to exposure factors that must be made when using a grid.

## XII. TYPES OF EXTRAORAL RADIOGRAPHIC EXAMINATIONS

1. Describe the rationale and technique for the lateral oblique mandibular projection. This description for the mandibular body and ramus variations should include the following areas:
  - 1.1 anatomic area or structures to be covered
  - 1.2 head position and film placement
  - 1.3 projection of the central ray
2. State why a lateral oblique mandibular ramus projection could be useful in patients unable to tolerate an intraoral film.
3. State why the mandible should be protruded in the lateral oblique mandibular ramus projection.
4. Name the anatomical landmarks that are used to determine the Frankfurt line and the canthomeatal line.
5. Describe the rationale and technique for the posteroanterior skull projection. This description should include the following areas:
  - 5.1 anatomic area or structures to be covered
  - 5.2 head position and film placement
  - 5.3 projection of the central ray
6. State how a lateral cephalometric skull projection is differentiated from the lateral skull projection.
7. State the technique used to reveal the soft tissue outline of the patient's face in the lateral cephalometric projection.
8. Describe the rationale and technique for the lateral skull projection. This description should include the following areas:
  - 8.1 anatomic area or structures to be covered
  - 8.2 head position and film placement
  - 8.3 projection of the central ray

9. Describe the rationale and technique for the Waters' (occipitomeatal) skull projection. This description should include the following areas:
  - 9.1 anatomic area or structures to be covered
  - 9.2 head position and film placement
  - 9.3 projection of the central ray
10. Describe the rationale and technique for the submentovertex (basilar) skull projection. This description should include the following areas:
11. State the advantage of reducing the exposure parameters by one third of that normally used in the submentovertex projection.

### XIII. OCCLUSAL RADIOGRAPHY

1. List three indications for an occlusal radiograph, and state six cases in which it would be especially useful.
2. Describe the following occlusal projections with respect to a) image field, b) film placement, c) projection of central x-ray and d) point of entry:
  - 2.1 Maxillary
    - 2.1.1 standard cross-sectional
    - 2.1.2 lateral cross-sectional
    - 2.1.3 anterior topographical
  - 2.2 Mandibular
    - 2.2.1 standard cross-sectional
    - 2.2.2 lateral cross-sectional
    - 2.1.3 anterior topographical

### XIV. SPECIALIZED RADIOGRAPHIC TECHNIQUES

#### **Standard Tomography**

1. Describe how a sharp image layer is produced in conventional tomography.
2. Define the factors affecting the thickness of the image layer.
3. Define the factors affecting the sharpness of the image layer.
4. List the different types of x-ray tube and film movement used in conventional tomography and state why these different types exist.
5. Differentiate between the two different machine designs' operating principles used in conventional tomography.
6. State two examples of the use of tomography in dental radiology.

#### **Computed Tomography**

7. List the four functional components of a computed tomography (CT) system.
8. Describe the function and makeup of the radiation detector in computed tomography.

9. Describe how tissue density is produced on a computed tomography image.
10. Define a Hounsfield unit (HU).
11. State the density of the following tissues on a computed tomography image:
  - 11.1 air spaces
  - 11.2 soft tissue
  - 11.3 bone
12. State the function of a pixel in computed tomography image resolution.
13. State the function of a voxel in computed tomography image resolution.
14. List the advantages of a CT imaging system over conventional radiography with a silver halide film emulsion imaging system.
15. List the recent advances in CT scanner design.

### **Cone Beam Computed Tomography**

16. Contrast the scanning technique for image acquisition with medical CT image acquisition.
17. State the type of detector used for CBCT.
18. Define FOV and explain its significance in patient evaluations.
19. List the advantages and disadvantages of using CBCT.
20. Describe the benefits for using CBCT in the following disciplines
  - 20.1 Implant dentistry
  - 20.2 Orthodontics
  - 20.3 Oral Surgery
  - 20.4 Radiologic and Pathologic evaluations

### **Nuclear Medicine**

21. List the two types of tissues that are good candidates for nuclear scans when studying dental pathology.
22. List the two different types of radiopharmaceuticals used in nuclear medicine.
23. List four advantages for using technetium as a radioisotope for nuclear medicine scans.
24. List the advantage of using Ga-citrate as a radiopharmaceutical in nuclear medicine.

### **Magnetic Resonance Imaging**

25. Define nuclear precession as it relates to M.R.I.
26. State the significance of water in generating MR images.
27. Describe how protons are excited to generate an MR image.

28. Define T1 relaxation time and state which tissues are best imaged with this timing sequence.
29. Define T2 relaxation time and state which tissues are best imaged with this timing sequence.
30. List four advantages of MRI in diagnostic imaging.
31. List three disadvantages of MRI as a diagnostic imaging procedure.
32. List two absolute contraindications for an MRI scan.
33. Describe magnetic resonance imaging (MRI).
34. State the advantage of MRI as compared to conventional radiographic techniques.

XV. SPECIALIZED DIAGNOSTIC EXAMINATIONS

**Sialography**

1. Define sialography.
2. State the approximate filling volumes of dye for the parotid and submandibular salivary glands.
3. List three indices that help determine when a salivary gland is fully injected with a contrast dye.
4. State the advantage(s) of the 5 different radiographic projections that can be used for sialographic examinations.
5. State the significance of taking salivary gland radiographs shortly after the cannula is removed during sialography.
6. List three radiographic findings that can be interpreted from sialograms.
7. Compare the advantages and disadvantages of nuclear scans to sialography for diagnostic evaluations of the major salivary glands.

**Arthrography**

8. Define arthrography.
9. State the indications for TMJ arthrography.
10. List the contraindications and risks to performing TMJ arthrography.
11. List four side effects to TMJ arthrography.
12. State the pertinent radiographic findings that can be interpreted about meniscal position and integrity from TMJ arthrograms.

## RESOURCES

### I. Media Resources

#### A. Printed media

##### 1. Required textbook

White, S.C. and Pharoah, M.J.  
*Oral Radiology: Principles and Interpretation*, 5<sup>th</sup> Ed.  
Mosby, Inc., 2004

Langland, O.E., Langlais, R.P. and Preece, J.W.  
*Principles of Dental Imaging*, 2<sup>nd</sup> Ed.  
Williams & Wilkins, 2002

Langlais, R.P.  
*Exercises in Oral Radiography and Interpretation*, 4<sup>th</sup> Ed.  
W.B. Saunders, 2004, 381p.

##### 2. Supplemental references

*Successful Panoramic Radiography*  
Eastman Kodak Company, 1991  
(available through Section of Radiology)

Monograph

Kenneth Abramovitch, DDS MS  
*Oral and Maxillofacial Radiology II*  
University of Texas Dental Branch, 2001

### II. Human Resources

Kenneth Abramovitch, DDS, MS  
Phone: 713-500-4109 (Room 1.072C)  
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Course Director

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Email: Inga-Lill.K.Leon@uth.tmc.edu

Lab Coordinator

Anita B. Rodriguez, CDA  
Phone: 713-500-4043 (Room 1.072)  
Email: Anita.B.Rodriguez@uth.tmc.edu

Sr. Support Specialist

## STUDY PLANS AND REQUIREMENTS

This course is to be completed in the fall semester of the Third Year. While this course utilizes the textbook, *Oral Radiology: Principles and Interpretation*, 5<sup>th</sup> Ed. (2004) by White, S.C. and Pharoah, M.J., its sequence differs somewhat from the text. In addition the textbook, *Principles of Dental Imaging*, 2<sup>nd</sup> Ed. (2002) by Langland, O.E., Langlais, R.P., and Preece, J.W. also has appropriate sections that serve as reference literature for this course.

### ATTENDANCE

You must attend all lectures and the lab sessions to which you are assigned. Lab assignments will be made during the semester. Punctuality is essential; we have limited facilities and the scheduling consequently is complex. We therefore regret that the laboratory sessions cannot be re-assigned. The lab sessions are one or two hours each and there is also a scheduled "take home" assignment.

You will be penalized for any unexcused absence as stipulated in the evaluation methods. Students must also be on time. Late arrivals are disruptive. Consequently students arriving later than 10 minutes after the hour will be counted as an unexcused absence.

The schedules for the lectures and lab sessions are listed on the following page. All laboratory sessions will be held in the Radiology Clinic area.

To prepare for this course:

1. Review the objectives.
2. Study the appropriate sections of the two reference textbooks and answer all objectives.
3. Review the anatomic landmarks on the radiographic views taken during your laboratory sessions.
4. Pay particular attention to all illustrations found in these sections of your text.

### LABORATORIES

LAB #1 Each lab group will be subdivided into smaller working groups of three - four students. Group assignments are listed on page 18-19. Each group will then expose, process and label the following radiographs: 1) Lateral Skull; 2) Posteroanterior; 3) Lateral Oblique; 4) Water's View.

You will be expected to turn in the labeled radiographs within one week of your scheduled Lab 1 period in order to receive credit.

LAB #2 Each lab group will be subdivided into working groups of three - four students. Each group of students will be responsible for exposing, processing and evaluating the following occlusal views: 1) Maxillary anterior cross-sectional; 2) Maxillary anterior topographical; 3) Maxillary lateral cross-sectional; 4) Mandibular anterior cross-sectional; 5) Mandibular anterior topographical; 6) Mandibular lateral cross-sectional.

**DENF 3703 ORAL AND MAXILLOFACIAL RADIOLOGY II**  
**2009 Fall Semester Lecture Schedule**

Lectures: Tuesdays, 11-11:50 am; Room 132.  
 Labs: See lab sessions schedule for specific time and groups  
 Final Examination: Dec. 9, 10 - 11:50 am in Room 207

DATE	LECTURES
Aug 18	Radiographic Manifestations in Dental Caries
Aug 25	Radiographic Manifestations in Periodontal Disease
Sep 01	Radiographic Changes in Periapical Disease
Sep 08	Panoramic Radiography – Technique
Sep 15	Panoramic Radiography - Anatomic Landmarks
Sep 22	Panoramic Radiography - Handling, Exposure & Processing Errors
Sep 29	Skull Radiography
<b>Oct 06</b>	<b>Lab I Begins – See Lab Sessions Schedule</b>
Oct 06	Developmental and Acquired Abnormalities of Teeth - Part I
Oct 13	Developmental and Acquired Abnormalities of Teeth - Part II
Oct 20	<b>MID-TERM EXAMINATION                      Room 207</b>
Oct 27	See Lab Sessions Schedule <i>(no lecture)</i>
Nov 03	See Lab Sessions Schedule <i>(no lecture)</i>
Nov 10	See Lab Sessions Schedule
Nov 10	Occlusal Radiography
<b>Nov 17</b>	<b>Lab II Begins – See Lab Sessions Schedule</b>
Nov 24	See Lab Sessions Schedule <i>(no lecture)</i>
Dec 1 <b>10-11:50 am</b>	Specialized Imaging Techniques
<b>Wed, Dec 09 10-11:50 am</b>	<b>FINAL EXAMINATION                      Room 207</b>

***CLINIC ATTIRE MUST BE WORN DURING ALL LAB SESSIONS***

**DENF 3703 ORAL AND MAXILLOFACIAL RADIOLOGY II**  
**2009 Fall Semester Laboratory Schedule**

Labs: Tuesday, Wednesday or Thursday mornings. Times vary. See schedule.

DATE	LAB SESSIONS
	<b>LAB I – EXTRAORAL VIEWS</b>
Tue, Oct 06 9-10:00 10-11:00	Lab I / Group 1 - Extraoral Views <b>Radiology Clinic</b> Lab I / Group 2 - Extraoral Views <b>Radiology Clinic</b>
Tue, Oct 13 8-9:00	Lab I / Group 3 - Extraoral Views <b>Radiology Clinic</b>
Wed, Oct 14 8-9:00	Lab I / Group 4 - Extraoral Views <b>Radiology Clinic</b>
Tue, Oct 27 11-12:00	Lab I / Group 5 - Extraoral Views <b>Radiology Clinic</b>
Tue, Nov 03 8-9:00 11-12:00	Lab I / Group 6 - Extraoral Views <b>Radiology Clinic</b> Lab I / Group 7 - Extraoral Views <b>Radiology Clinic</b>
Wed, Nov 04 8-9:00	Lab I / Group 8 - Extraoral Views <b>Radiology Clinic</b>
Tue, Nov 10 8-9:00	Lab I / Group 9 - Extraoral Views <b>Radiology Clinic</b>
Wed, Nov 11 8-9:00	Lab I / Group 10 - Extraoral Views <b>Radiology Clinic</b>
	<b>LAB II – OCCLUSAL VIEWS</b>
Tue, Nov 17 11-12:00	Lab II / Group 1 - Occlusal Views <b>Radiology Clinic</b>
Wed, Nov 18 8-9:00	Lab II / Group 2 - Occlusal Views <b>Radiology Clinic</b>
Thu, Nov 19 8-9:00	Lab II / Group 3 - Occlusal Views <b>Radiology Clinic</b>
Tue, Nov 24 8-9:00 9-10:30 10:30-12:00	Lab II / Group 4 - Occlusal Views <b>Radiology Clinic</b> Lab II / Group 5, 6 & 7 - Occlusal Views <b>Radiology Clinic</b> Lab II / Group 8, 9 & 10 - Occlusal Views <b>Radiology Clinic</b>

## EVALUATION METHODS

### LECTURE

There will be a mid-term and a comprehensive final examination for this course. The material on the examinations will include all information pertinent to Oral and Maxillofacial Radiology as covered in the lecture series, associated reference pages and the objectives as listed in this syllabus.

### LABORATORY

Each group of students will be responsible for completing one set of skull/mandibular radiographs consisting of a lateral skull, PA skull, Waters' skull and lateral oblique of the mandible view. Each radiographic view should be neatly labeled with the appropriate anatomical landmarks as stipulated in the monograph. The labeled radiographs must be turned into the Radiology Sr. Support Specialist within one week of the scheduled lab period, in order to receive credit. Assigned student groups will also be responsible for exposing and formally evaluating a set of maxillary and mandibular occlusal radiographs. Students must attend the lab period to which they have been assigned by the Office of Academic Affairs. If a student cannot attend an assigned lab period due to medical reasons, they may be able to switch a lab period with a consenting classmate. Such changes must be approved by the Lab Coordinator no later than twenty-four (24) hours prior to the scheduled lab. In all lab sessions, students are expected to look and act in a professional manner. This includes following the clinic dress code. Proper clinical attire is listed in the Dental Branch Clinic Manual.

### ATTENDANCE

**Attendance is mandatory** for all lectures and lab sessions. A student will be penalized for any lecture or lab session missed without an excused absence as determined by the *Student Guide to Academic Studies*. Students must also be on time. Late arrivals are disruptive. Consequently students arriving later than 10 minutes after the hour will be counted as absent (unexcused).

### GRADES

The course grade will be assigned according to the following criteria:

Lecture: (70% of final grade)

Lab: (30% of final grade)

Mid-term exam	40%	Lab Exercise I	70%
Final comprehensive exam	50%	Lab Exercise II	20%
Attendance	10%	Attendance	10%
<hr/> Total	100%	<hr/> Total	100%

### DENF 3703 Lab Group Assignments

It is mandatory that group assignments are followed.

<b>GROUP 1 (9)</b> Oct 6 <sup>th</sup> - 9:00 am & Nov 17 <sup>th</sup> - 11:00 am	<b>GROUP 2 (9)</b> Oct 6 <sup>th</sup> - 10:00 am & Nov 18 <sup>th</sup> - 8:00 am
APODACA, Karla	CHIQUET, Brett
ARAMWATTANANONT, Stephanie	COBB, Nick
BAKER, Justin	COTTON, Pam
BAUCH, Allyson	CULLY, Tara
BELKEN, Megan	DAMON, Clark
BOTELLO, Liz	DANG, Nguyet
BRAUNLIN, Eric	DAUTERIVE, Chris
CARRION, Carlos	ELDIWANY, Mary
CASTELO, Lively	FITZGERALD, Mike
<b>GROUP 3 (9)</b> Oct 13 <sup>th</sup> - 8:00 am & Nov 19 <sup>th</sup> - 8:00 am	<b>GROUP 4 (9)</b> Oct 14 <sup>th</sup> - 8:00 am & Nov 24 <sup>th</sup> - 8:00 am
FRAZIER, Kyle	GOLSHANI, Zarrin
FRELS, Leslie	GREGORY, Andra
FRITZ, Jamie	HARRIS, III, RJ
GALLANT, Austin	HASHEMI, Marjon
GARCIA, Delia	HUNTER, Ross
GARZA, John	IVY, Stephanie
GARZA, Senaido	JADAV, Urvi
GIV, Daniel	JANAK, Patricia
GLOGOWSKI, Amanda	JETTON, Brad

### DENF 3703 Lab Group Assignments

It is mandatory that group assignments are followed.

<b>GROUP 5 (8)</b> Oct 27 <sup>th</sup> - 11:00 am & Nov 24 <sup>th</sup> - 9:00 am	<b>GROUP 6 (8)</b> Nov 3 <sup>rd</sup> - 8:00 am & Nov 24 <sup>th</sup> - 9:00 am	<b>GROUP 7 (8)</b> Nov 3 <sup>rd</sup> - 11:00 am & Nov 24 <sup>th</sup> - 9:00 am
JONES, Katy	LISKA, Justin	MUN, Chris
KELLEY, Connor	LOPEZ, Sergio	MURARKA, Anisha
KETRON, Summer	LY, Chau	MYSER, Tyler
KEYS, Kevin	MARQUESS, Jennifer	NGUYEN, Jennifer
KONDO, Sayaka	MARTINEZ, Carla	NGUYEN, Monalisa
LE, Connie	MARTINEZ, Juan	NGUYEN, Quyen
LE, Giao	MATHEW, Tina	NGUYEN, Tina
LE, Man	MOLAVI, Shieva	OLIM, Sarah
<b>GROUP 8 (8)</b> Nov 4 <sup>th</sup> - 8:00 am & Nov 24 <sup>th</sup> - 10:30 am	<b>GROUP 9 (8)</b> Nov 10 <sup>th</sup> - 8:00 am & Nov 24 <sup>th</sup> - 10:30 am	<b>GROUP 10 (8)</b> Nov 11 <sup>th</sup> - 8:00 am & Nov 24 <sup>th</sup> - 10:30 am
OROZ, Kris	REYES, Adrian	SORGEN, Bryan
PACK, Brandon	REYES, Syeda	SWEARINGEN, Blake
PAN, Philip	ROSSI, Drew	TEITELBAUM, Austin
PHAM, Michelle	RUDLOFF, Lindsey	TOLLETT, Jeff
PHAM-NGUYEN, Aegean	SCHUDY, Robert	TURCIOS, Neomi
PHAN, Dorothy	SENULES, Emily	TURNER, Garrett
PISHEH, Shai	SHELTON, Kacie	UPRIGHT, Diana
RAMIREZ, Vicki	SHEVCHENKO, Katya	WU, Jun