BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

School of Health Sciences
Program: Medical Radiography
Option:

Course Outline

MRAD 3316
Radiographic Procedures 3

Start Date: January, 2002 **End Date:** April, 2002

Course Credits: 8 **Term/Level:** 3

Total Hours: 120
Total Weeks: 15

Hours/Week: 8 **Lecture:** 3 **Lab:** 5 **Shop:** **Seminar:** **Other:**

Prerequisites

Course No.	Course Name
MRAD 2216	Radiographic Procedures 2
MRAD 2214	Radiographic Anatomy and Physiology 2

MRAD 3316 is a Prerequisite for:

Course No.	Course Name
MRAD 4400	Level 4 Clinical

Course Calendar Description

Course instruction will cover positioning techniques in combination with appropriate technical factors and imaging theory required to produce non-routine radiographs of the urinary and digestive systems, vertebral column, pelvic girdle, thoracic cage and chest. Routine skull radiography as well as trauma and pediatric topics will be covered. Students will also learn how to evaluate the diagnostic acceptability of skull radiographs as well as all the radiographic positions covered in the course. Labs will reinforce the theoretical components.

Course Goals

- To provide students with knowledge of positioning techniques for radiographs of the skull and additional views of the urinary and digestive systems, vertebral column, pelvic girdle, thoracic cage and chest as well as pediatric and trauma radiography.
- To give students an understanding of the relationships among skull anatomy, beam direction and radiographic anatomy.
- To enable students to evaluate the diagnostic acceptability of skull radiographs and the additional views covered.
- To understand the differences between the various radiographic contrast media and their possible reactions
- To understand radiographic considerations for the geriatric, pediatric and trauma patient.
- To understand various tomographic applications
- To formulate technique charts and recognize variables of techniques for various exams and the variations of the normal patient.

- **Evaluation**

Final Examination	35%	All labs must be satisfactorily completed before a course mark
Midterm	25%	will be given.
Technique Chart	10%	
Video	10%	60% is considered as a pass.
Junior Video	5%	
Quizzes	10%	
Lab	5%	
TOTAL	100%	

Course Learning Outcomes/Competencies

Upon successful completion of this course, the student will be able to:

1. list and locate the surface landmarks, localizing lines and planes of the skull.
2. describe the routine and specialized projections for the various aspects of the skull and be able to differentiate between them.
3. describe and discuss beam direction and centering points for the various views/projections of the skull.
4. demonstrate the ability to correctly position the patient for the required projections/views of the skull.
5. define, describe and demonstrate beam directions, centering points and patient positioning relating to the radiography of additional, non-routine views of the:

Spine, urinary system, GI system, biliary system, pelvic girdle, shoulder girdle, thoracic cage

6 describe patient reparation, required projections and contrast medial relating to radiographic examinations of the urinary, digestive and biliary systems.

7 Describe contrast reactions of various contrast media and the pertinent treatment.

8 Describe tomographic considerations for various anatomical structures

9. demonstrate the ability to adapt positioning in order to accommodate patient limitations
10. demonstrate the ability to integrate patient care, communication and organizational skills when positioning for skull and additional views studied..
11. evaluate organizational, communication and positioning skills and provide appropriate feedback.
12. evaluate sample radiographs of the studied areas for diagnostic acceptability.
13. assess main contributing factors to the overall radiographic quality.
14. propose possible solutions to poor radiographic quality.
15. develop a radiographic technique chart using the DuPont Bit System.

16 outline technique chart adjustments to be made with respect to; body habitus, pathology, age and specific equipment used ie generator, film/screen, grid.

CAMRT COMPETENCIES

On successful completion of the above outcomes, you should be prepared to perform the following competencies as defined in the "Competency Profile" for radiographers established by the CAMRT.

RADIOGRAPHIC PROCEDURE 3

CRITICAL TASK LIST

A1 ***Utilize the request for consultation***

A1.1 Verify that examination is ordered by authorized professional
A1.2 Verify the patient's means of transport
A1.4 Correlate clinical information to the prescribed examination
A1.5 Prioritize work
A1.6 Plan the radiographic imaging procedure

A2 ***Prepare room for radiographic imaging procedures***

A2.1 Clean the examination room and the equipment
A2.2 Change the linen on the x-ray table
A2.5 Obtain accessory imaging apparatus
A2.6 Select the correct image receptor system (conventional vs digital)

A3 ***Prepare the patient***

A3.1 Identify the patient
A3.2 Verify clinical information with the patient or clinical staff
A3.3 Ensure proper patient attire for the procedure
A3.4 Confirm patient preparation
A3.5 Remove all items that would compromise the quality of the image
A3.6 Explain the procedure to the patient
A3.7 Confirm that patient's consent is obtained before commencing the procedure
A3.8 Take appropriate action if patient refuses procedure
A3.9 Document patient's history of allergies when using contrast media
A3.10 Record additional clinical information
A3.11 Facilitate patient transport using good body mechanics

A4 ***Position the patient***

A4.1 Plan the examination according to patient condition, to minimize patient discomfort
A4.2 Demonstrate a knowledge of the imaging procedure
A4.3 Inform the patient of the need to touch in order to position, prior to touching
A4.4 Use touch for guidance, safety and comfort
A4.5 Touch the patient at the anatomical landmark(s) required for positioning for the examination
A4.6 Position the patient to demonstrate the required anatomical structures
A4.7 Use immobilization and positioning aids as required
A4.8 Direct the central ray to the correct anatomical landmark(s)
A4.9 Align the imaging system with the required anatomical structures
A4.10 Collimate to the area of interest only to maximize image quality
A4.11 Instruct the patient as to breathing requirements
A4.12 Use proper body mechanics when moving patient

A5 Operate image equipment

A5.1 Select and use apparatus and accessory equipment safely
A5.2 Perform the initial set-up of the equipment
A5.4 Select the source-image distance

A5.5 Use radiographic markers
A5.6 Select the fastest film/screen/grid combination for optimum image quality appropriate for the examination
A5.7 Select appropriate kV, mA and time or automatic exposure control parameters
A5.8 Modify exposure factors on the basis of the patient's age, physique and condition
A5.9 Take the exposure

A6 ***Process images***

A6.1 Imprint ID information
A6.3 Unload the film cassette/magazine and process exposed film
A6.4 Reload the cassette/magazine

A7 ***Critique images and implement corrective measures***

A7.1 Verify patient/film ID
A7.2 Check for correct use and proper placement of markers
A7.3 Identify anatomy and patient position on the image
A7.4 Verify that required structures are demonstrated
A7.5 Recognize film artifacts and take appropriate action
A7.6 Determine whether the diagnostic quality of the image is acceptable
A7.7 If image is unacceptable, determine the reason
A7.10 Determine corrective action and repeat the procedure, if the image is unacceptable
A7.12 Determine whether additional views are required

A8 ***Complete post-procedural tasks***

A8.1 Complete the examination within an appropriate time frame
A8.3 Explain post-procedural activities to the appropriate person(s)
A8.4 Dismiss the patient

B1 ***Protect the patient***

B1.1 Question female patients to ascertain possibility of pregnancy
B1.5 Use protective practices to reduce the risk of damaging effects of radiation in the diagnostic range
B1.6 Collimate only to the area of interest to minimize patient dose
B1.7 Select exposure factors consistent with optimal image quality and minimum radiation dose

B2 ***Protect the technologist***

B2.1 Stand behind protective barriers
B2.2 Wear lead protective apparel when remaining in the radiation area
B2.3 Remain as far as possible from patient and source during exposure
B2.4 Use positioning aids/immobilization devices to avoid having to hold the patient during the procedure
B2.5 Direct x-ray towards primary barriers only

B4 ***Protect others not required to be present during the procedure***

B4.1 Close the doors of the radiation area when in use
B4.2 Instruct people to leave the vicinity during imaging procedure

B5 ***Monitor personal radiation exposure***

B5.1 Wear radiation monitoring device

C1 ***Ensure patient safety***

C1.1 Confirm the patient's identity
C1.2 Provide for the patient's safety needs

C1.3 Use proper patient transfer techniques
C1.4 Use stretcher and wheelchair locks and guardrails

C2 ***Establish patient trust and confidence***

C2.1 Dress in a professional manner
C2.2 Introduce self to the patient
C2.3 Explain the procedure at an appropriate level of understanding for the patient
C2.4 Answer the patient's questions as fully as possible
C2.5 Avoid inappropriate conversation in the presence of the patient
C2.6 Use reassuring verbal and non-verbal communication techniques
C2.8 Perform tasks in an organized and confident manner

C3 ***Attend to the patient's trust and confidence***

C3.1 Assess the patient's comfort needs
C3.2 Assess and attend to the patient's physical needs
C3.3 Move patient during procedure, with consideration to patients physical condition
C3.4 Provide proper care as necessary to meet the patient's comfort and physical needs
C3.5 Provide for patient privacy

C4 ***Perform patient care procedures***

C4.1 Maintain a clean/aseptic work environment (medical asepsis)

C5 ***Assist in the administration of contrast media and other drugs***

C5.1 Obtain the patient's history to determine contraindications to contrast media
C5.2 Inform the patient regarding the possible effects of contrast media and other drugs
C5.3 Select and prepare contrast media and other drugs
C5.8 Watch for changes in patient's status after the administration of contrast media and other drugs

D1 ***Monitor and maintain processing equipment and facilities***

D1.2 Prepare new chemicals
D1.3 Perform start-up/shut-down procedures
D1.7 Check solution levels
D1.9 Inspect the safelight filter
D1.10 Ensure that the dark room is light-tight
D1.13 Perform sensitometry
D1.14 Use sensitometry results to initiate corrective action

D2 ***Monitor radiographic equipment***

D2.1 Perform visual inspection of cables and equipment
D2.2 Recognize improper functioning of imaging and accessory equipment/devices
D2.4 Record and report equipment malfunctions to the appropriate person

D3 ***Perform quality control tasks***

D3.1 Perform quality control tests on imaging and accessory equipment
D3.3 Record and maintain records/charts of all tests

E2 ***Demonstrate professional behavior***

E2.1 Participate as a member of the health care team
E2.2 Practice effective communication and conflict resolution skills
E2.3 Respect values, beliefs and needs of others

E2.4 Take responsibility for actions
E2.5 Demonstrate professional deportment

Course Content Verification

I verify that the content of this course outline is current, accurate, and complies with BCIT Policy.

M. Iubelli
Program Head/Chief Instructor

Dec 2001
Date

Note: Should changes be required to the content of this course outline, students will be given reasonable notice.

Instructor(s)

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Learning Resources

Required:

1. *Merrill's Atlas of Radiographic Positions and Radiologic Procedures* — 9th Edition — Volume 2.
2. *Medical Radiography Positioning/Laboratory Manual — Level 3.*
3. *Radiographic Critique* — Martenden/McQuillen.

Recommended:

1. *Textbook of Radiographic Positioning and Anatomy* — Bontrager and Anthony.
2. *Radiography of the Skull and Brain* — DuPont.

BCIT Policy Information for Students

Video projects have a new importance in Level 3. Skull procedures are not often done in the clinical area and therefore competence in this area of positioning is required prior to attempting it in the clinical area. In order to attempt to ensure competency, stringent regulations and marking have been adapted. It is the objective of this assignment to have each student practice his or her positioning skills prior to attempting the video project process.

The production of the video and marking will be as follows:

Video Assignment

- video cannot be repeated, however a new requisition envelope may be requested and a new video completed.
  - prior to receiving a new requisition, a completed self-evaluation form must be submitted on the first video, then a new video project envelope will be issued.
- the envelopes are dated and numbered and must be completed prior to the next positioning lab.
- the procedure must be completed within 30 minutes.

- the requisition envelope must be opened in front of the camera and be recorded .
  - requisition must be completed with patient history, date and signature, etc.
- the camera must be recording from the time the envelope is opened until the conclusion of the video.
  - projects not adhering to this rule are considered *unacceptable*.
- details such as technique, cassette sizes and screen/film combinations can be recorded on the requisition
- emphasize that the patient should really "act" the part. This makes it far easier for you to role play as a technologist and makes the video project fun.
- instructor interviews must be booked at the completion of the video (i.e., booking must be done prior to next positioning lab however actual interview can take place anytime during the term).
- interviews can be booked with any instructor involved in MRAD 3316.
- **REMEMBER, DO NOT SPEAK TO THE CAMERA, but rather SPEAK TO THE PATIENT.**

Patient Feedback Form

- forms are to be filled out by the patient at the end of the video, placed in the envelope, sealed and returned to the student.
- please encourage patients to give written, honest and complete feedback, rather than checkmarks.
- envelopes will be opened during the instructor interview and the patient's feedback will be reviewed.
- patient feedback will not be worth any marks.

Evaluation Forms

- forms must be completed, including comprehensive personal feedback prior to instructor review.
  - an X will be levied for incomplete documentation.
- there are no free Xs.
- the marking scheme will be as follows:

PART A – GENERAL SKILLS

- an X will count as 1 mark off of the total mark.
- if an adequate analysis is made of the area receiving an X, only 1/2 mark will be taken off.

PART B

- an X in any one of the 4 areas listed under each projection/view will result in the loss of all marks for that entire view.
- if an adequate analysis is made of that view/projection, two marks can be earned back.

PART C

- an X in any one of the areas will result in a loss of marks for that entire section.
- if an adequate analysis is made, half the marks can be earned back.

MEDRAD VIDEO ASSIGNMENT

STUDENT: _____ SET: _____

TOTAL MARK: _____/20

Use the evaluation criteria in your clinical manual as a guideline for acceptable standards for the video.

Watch your videotape carefully. Identify incorrect and correct aspects of the procedure by placing (x) or (√) in the grey shaded boxes in the S (student) column. Justify your decisions on the lines provided. If you recognize your error and provide a correct analysis, you will only lose a ½ mark.

A. GENERAL SKILLS

I	S	
☐	☐	**ROOM PREPARATION**

Prepare room with all necessary supplies.

_____

_____

☐	☐	**PATIENT IDENTIFICATION & COMMUNICATION**

Interpret requisition accurately; correctly identify patient; instruct patient properly.

_____

_____

☐	☐	**PATIENT PREPARATION & DISMISSAL**

Obtain accurate history/assessment; assist patient appropriately (safety, privacy, etc.); remove extraneous items from patient (jewelry, etc.); ascertain probability of pregnancy (as required).

_____

_____

☐	☐	**TECHNICAL FACTORS**

Select suitable technical factors; select appropriate film/screen/grid; indicate appropriate factors and cassette size and type.

_____

_____

☐	☐	**RADIATION PROTECTION**

Collimate beam properly; shield patient appropriately; protection of self and others.

_____

_____

MEDRAD VIDEO ASSIGNMENT

☐ ☐ **INHERENT SKILLS**

Select correct SID; utilize markers correctly; perform positioning efficiently (sequence, speed, etc.).

_____

_____

(SECTION A) MARKS /6

B. POSITIONING SKILLS

Identify if the technical aspects were correct for each view/projection by placing (√) or (x) beside each item. Indicate the view/projection on the line provided. Indicate the required CR direction and angulation and correct CP on the lines provided. If any of these aspects are incorrectly performed and would result in a repeat film, there will be a loss of the full 4 marks for that view/projection. If a correct analysis is provided, half marks will be assigned for that view/projection.

VIEW PROJECTION 1 _____

☐ ☐ **A** Correct centering point

☐ ☐ **B** Utilize correct CR angulation

☐ ☐ **C** Position patient correctly

☐ ☐ **D** Alignment (tube/part/film, etc.)

VIEW PROJECTION 2 _____

☐ ☐ **A** Correct centering point

☐ ☐ **B** Utilize correct CR angulation

☐ ☐ **C** Position patient correctly

☐ ☐ **D** Alignment (tube/part/film, etc.)

VIEW PROJECTION 3 _____

☐ ☐ **A** Correct centering point

☐ ☐ **B** Utilize correct CR angulation

☐ ☐ **C** Position patient correctly

☐ ☐ **D** Alignment (tube/part/film, etc.)

(SECTION B) MARKS /12

C. COMPREHENSION, EFFICIENCY & ORGANIZATION

☐ ☐ **COMPREHENSION**

Justification of why views were done the way you did them (i.e., order of views, manner in which views were done).

_____

_____

☐ ☐ **EFFICIENCY & ORGANIZATION**

_____

_____

(SECTION C) MARKS /2

Upon completion and critique of an acceptable video, arrange to review video with an instructor. Hand in completed requisition and sealed patient feedback at this time. The instructor will review the video at that time and provide feedback in the box column marked **I** (Instructor) and through discussion.

Comments:

_____

_____

_____

_____

Junior Video Feedback Assignment

Providing and receiving feedback is an important aspect of any career. Providing informal feedback to peers occurs on a regular basis.

It is important that feedback be given in a helpful manner. It is also important to recognize that for learning to occur, feedback must also contain suggestions for alternate methods of improvement.

The feedback assignment will consist of a Level 3 student providing feedback to a Level 1 student on the Level 1 student's video project. Names will be randomly drawn and the list of partners will be posted outside 4060.

Level 1 students will provide Level 3 students with their video and a feedback form. Level 3 students are to provide feedback in written and verbal form. Level 3 students are also to complete a feedback form on the Level 1 student regarding the interview. This form is on the following page. Level 1 students are to submit both of these completed forms during the instructor interviews.

This assignment mark will be based on your feedback to the Level 1 student.

Junior Video Interview Feedback Regarding Level 1

COMPLETED FORMS TO BE GIVEN DIRECTLY TO THE INSTRUCTOR.

Level 3 Student: _____

Level 1 Student: _____

Check the appropriate box for the statement which best describes your experience in each section. Your comments will not affect the Level 1 student mark. Appropriate specific comments must be provided.

1. ☐ The Level 1 student sought me out for introductions and to make arrangements for the interview.

   ☐ I sought out the Level 1 student to introduce myself and to make arrangements for the interviews.

   Comment: _____

   _____

2. The Level 1 student was:

   ☐ approachable ☐ neutral ☐ unapproachable

   Comment: _____

   _____

3. The Level 1 student:

   Comment: _____

   _____

4. For the interview, the Level 1 student was:

   ☐ punctual ☐ a few minutes late ☐ very late

5. During the interview, the Level 1 student was:

☐ interested ☐ neutral ☐ disinterested

Comment: _____

_____

6. During the interview when alternate suggestions were given, the Level 1 student appeared:

☐ defensive ☐ accepting

Comment: _____

_____

7. How did you feel during the interview session? (You may check more than 1 box.)

☐ comfortable
☐ anticipatory
☐ uncomfortable
☐ humbling
☐ stressed
☐ knowledgeable
☐ bored
☐ Other _____

8. I thought my feedback to the Level 1 was:

☐ valuable
☐ overcritical
☐ not critical enough

Comment: _____

_____

9. I perceived that the Level 1 thought my feedback was:

☐ valuable
☐ overcritical
☐ not critical enough

Comment: _____

_____

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MRAD 3316
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Week No.	Dates	No. of Lectures & Topics	Lab Contents/Format	Notes
1	Jan 2–4	1. No class 2. No class 3. Course Outline and Technique Chart Assignment	POSITIONING: NO LAB RAD EVAL LAB –none APPLIED LAB – none	No labs.
2	Jan7–11	1. Intro to UGIs 2. Stomach AP/obl/lat 3. SBFT	CLINIC: Radiography from Level1/2 RADIOGRAPHY:L Spine experiment APPLIED LAB: Miscellaneous RAD EVAL LAB: None	Daylight processing this week Quiz on Level 1/2 work New partner and room assignment. Collimator Test Safelight Test
3	Jan 14-18	1.- Additional views of the pelvic girdle 2.- FP/Judet/Inlet/Outlet views 3.-Pubic Bones/Ilium and pediatrics	POSITIONING: Stomach RAO & lat CLINIC: UGI Clinic RADIOGRAPHY: RAO Stomach APPLIED LAB:UGI & Ba En views RAD EVAL LAB: UGI review QUIZ –None.	Darkroom processing week Sensitometry Bunnying Demo Incubator chest
4	Jan 21-25	1.-Tomography 2.-Contrast Material 3.-Retrogrades and Cystograms	POSITIONING: Inlet/Outlet, Judet and False Profile views CLINIC: Hip clinic RADIOGRAPHY: Special hip view APPLIED LAB :Hip views RAD EVAL LAB: Hip review QUIZ: UGI	Daylight Processing week Dose experiment

Week No.	Dates	No. of Lectures & Topics	Lab Contents/Format	Notes
5	Jan 28 – Feb 1	Sternoclavicular Jts Sternum and AC Jts Midterm #1	POSITIONING: Tomos of chest/L Spine CLINIC: Miscellaneous RADIOGRAPHY: QC tomo tests APPLIED LAB Miscellaneous RAD EVAL LAB: Retrogrades QUIZ: Hip	Darkroom Processing QC tomo tests
6	Feb 4-8	Intro to skull radiography FO/OF Skull Townes and Lateral	POSITIONING: Lat and RAO sternum CLINIC: Miscellaneous RADIOGRAPHY: Sternum scenario APPLIED LAB: Miscellaneous RAD EVAL LAB:SC Sternum & AC Jts	Daylight Processing New Room and partner assignment
7	Feb 11-15	Intro to Sinuses Waters and Caldwells SMV and Lateral	POSITIONING: FO/OF, Townes & lat skull – table work CLINIC: Miscellaneous RADIOGRAPHY: Skull scenario APPLIED LAB: Sternum, SC AC Jts RAD EVAL LAB: Skull review QUIZ : Surprise	Daylight Processing Importance of Centering Assignment
8	Feb 18-22	Facial Bones-Reverse Waters & Caldwells Nasal Bones Zygoma	POSITIONING: Waters, Caldwells, SMV & lat sinuses – all upright CLINIC: Skull clinic RADIOGRAPHY: Sinus Scenario APPLIED LAB: Skull RAD EVAL LAB: Sinus review QUIZ : Skull	Darkroom Processing
9	Feb 25-Mar 1	TMJs-reverse Townes , Lat obls Mandible, Obl, lat, AP& axial PD Day	POSITIONING: Reverse Waters, SI nose and zygomatic arches CLINIC: Sinus clinic RADIOGRAPHY: Caldwell scenario APPLIED LAB: Sinuses RAD EVAL LAB: Facial bones review QUIZ: Sinuses	Daylight Processing

Week No.	Dates	No. of Lectures & Topics	Lab Contents/Format	Notes
10	Mar 4-8	Sacrum & Coccyx, C. spine Mastoids, Sella and IACa Guest Lecturer -	POSITIONING: Schullers, Reverse Townes, Lateral oblique mandible CLINIC: Facial & nasal bones clinic RADIOGRAPHY: TMJ & Mandible scenario APPLIED LAB: Facial & Nasal Bones RAD EVAL LAB: TMJ & Mand review QUIZ: Facial Bones	Darkroom Processing
	Mar11-15		**SPRING BREAK**	
11	Mar 18-22	Trauma Radiography C Spine, Shoulder Hip Midterm # 2	POSITIONING: AP lat sacrum AP coccyx CLINIC: Spine clinic RADIOGRAPHY: Mastoid Scenario APPLIED LAB:TMJ & Mandible RAD EVAL LAB: Sacrum, coccyx, c.spine, mastoids QUIZ: TMJ & Mand	Daylight Processing New room and partner assignment
12	Mar 25-29	Additional chest views Ribs & Scapula Easter Holiday	POSITIONING LAB for SET C only this week. CLINIC: Spine clinic RADIOGRAPHY: Trauma C spine, Bumped up shoulder, Hip scenario. APPLIED LAB (All Sets): Spine RAD EVAL LAB (Sets B,D only): Trauma films QUIZ: Spine	Darkroom Processing

Week No.	Dates	No. of Lectures & Topics	Lab Contents/Format	Notes
13	Apr 1-5	Easter Holiday Pharynx, Larynx Trachea	POSITIONING LAB for SET A,D & BCLINIC: Spine clinic RADIOGRAPHY: Trauma C spine, Bumped up shoulder, Hip scenario APPLIED LAB: None RAD EVAL LAB: (Sets A,C only) Trauma films QUIZ: Spine	Daylight Processing
14	Apr 8-12	Oral chole T-tube, Operative chole ERCP	POSITIONING: Decub, axial chest, ribs & AP Scapula CLINIC: Trauma clinic RADIOGRAPHY: Chest, Rib & Clavicle scenarios APPLIED LAB Miscellaneous RAD EVAL LAB: Chest, ribs, scapula QUIZ: Surprise	Darkroom Processing
15	Apr 15-19	**REVIEW WEEK**	**LEVEL 1 EXAM WEEK**	
16	Apr 22-26		**LEVEL 3 EXAM WEEK**	