CAMOSUN COLLEGE	***School of Health & Human Services*** Medical Radiography Technology **Course Name:** **Physics** **Course Number:** **MRAD 113**

COURSE OUTLINE

The Approved Course Description is available on the web:
http://camosun.ca/learn/calendar/current/web/mrad.html#MRAD113

Please note:

- *This outline will be electronically stored for five (5) years only. It is strongly recommended students keep this outline for their records.*
- *This course is only open to students in the Medical Radiography program.*

Introduction:

This is an introductory level course that emphasizes the application of physical phenomena in medical radiography. Topics include structure of matter, electromagnetic radiation, electrostatics, direct and alternating current circuits, magnetism and production of x-rays. The physics of x-ray tubes and the x-ray generator components, including heat dissipation, will also be discussed. Students will relate the production of radiation to a resultant radiographic image. Also discussed will be radiation exposure factors/setting and their direct effect on image diagnostic quality.

Students must achieve a minimum of a C+ (65%) to use this course as a prerequisite. Refer to the Camosun Calendar for detailed information about course prerequisites.

1. Instructor Information

(a)	Instructor:	Christopher Avis
(b)	Office Hours:	8:00 – 8:30 AM, MTWT or by appointment
(c)	Location:	Fisher 340C
(d)	Phone:	250-370-3513
(e)	Email:	avisc@camosun.bc.ca*
(f)	Website:	http://online.camosun.ca/

* Contact via email is preferred.

2. Intended Learning Outcomes/Competencies

Letters and numbers following certain learning outcomes indicate the specific competencies covered from the CAMRT Medical Radiography Competency Profile:

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

1. Perform relevant numerical calculations with careful attention to units throughout. (A5.1)
2. Apply basic physical concepts in the nature of light to calculate wavelength, frequency and energy of a photon. (A 4.2)
3. Describe the structure of matter using appropriate terms. (A4.2, A5.1)
4. Draw, label and use energy level diagrams to calculate emitted photon energies. (A4.2)
5. Describe and perform calculations relating to static electricity including electrostatic repulsion and attraction, electric fields, electrostatic charging and electric potential. (A4.2, A5.1)
6. Describe and perform calculations dealing with DC circuits, including Ohm's law, series and parallel circuits, energy and power. (A4.2, A5.1)
7. Describe and perform calculations dealing with magnetism, including sources of magnetic fields, magnetic properties of matter, electromagnets and mutual induction (transformers).
8. Describe and perform calculations relating to AC circuits. (A4.2, A5.1)
9. Compare single phase, three phase, and high frequency x-ray generators, with respect to the voltage ripple produced. (A4.2)
10. Describe the physical meaning of x-ray technique factors. (A4.2)
11. Describe the modes of x-ray production, and calculate energies of Bremsstrahlung and characteristic X-rays. (A4.2, E1.1)
12. Describe how changes in technique factors will change the x-ray spectrum. (A4.2, E1.1)

CAMRT Medical Radiography Competency Profile

3. Learning Resources

Required Textbooks:
Fossbinder and Orth, ***Essentials of Radiologic Science*****.** 1st Edition
Fossbinder and Mason, ***Essentials of Radiologic Science Workbook.***

Optional Textbooks:
Bushong, S. ***Radiologic Science for Technologists*****.** 9th or 10th Edition.

D2L: Assignments and all other course handouts will be duplicated on the class D2L website. As well, multiple choice review questions will be accessible through D2L.

Other Materials: MRAD 113 Laboratory Manual. Scientific Calculator (to be brought to every class).

4. Student Assessment

Module Quizzes	10 %
Assignments	10 %
Lab	10 %
Mid Term	20 %
Cumulative Final Exam	50 %
TOTAL	**100%**

Students must achieve a C+ (65%) to use this course as a prerequisite.

Assessment Details

Module Quizzes are short, 15 minute quizzes that will be delivered during the start of each tutorial period every week. They will include straightforward multiple choice questions drawn from the multiple choice problem sets on the course website and may also include definitions of important vocabulary terms.

Assignments will be handed out on a Monday every week. The assignments will include problems for you to work on in class as in class examples, as well as extra problems to do for homework. Help on the assignments will be available during tutorial periods during the lab time slot, every second week. The assignments will be due on the Tuesday of the following week.

Labs will be done every second week and will be due the following Thursday. There will be a total of 6 labs completed over the course of the term. You must be present to take your own data for each lab.

Mid Term / Final Exam: There will be two midterm exams on October 10th and November 14th. Problems on the midterm will be similar to those in the assignments and on the quizzes. The final exam will be cumulative, covering all content in the course and will take place in the final exam period.

Unless otherwise specified, labs and assignments will be due at the beginning of class on their due dates. Late labs/assignments will be subject to a 10 % per day late mark deduction.

Tests and Quizzes must be written at the designated times.

Exceptions to the above policies will be made only in the case of exception circumstances such as for documented illnesses or medical emergencies. Should such eventualities arise, please contact the instructor as soon as possible.

Please note the following Physics Department Policies.

PHYSICS DEPARTMENT POLICIES REGARDING TESTING:

1. The final exam will cover the entire course and will be 3 hours long. As stated in the current college calendar on page 29, "students are expected to write tests and final exams at the scheduled time and place." Exceptions will only be considered due to emergency circumstances as outlined in the calendar. Holidays or scheduled flights are not considered to be emergencies."

2. Instructors are not required to provide make-up tests. At their discretion, instructors may waive a test or provide a make-up test only in the event of documented illness or other extenuating circumstances.

PHYSICS DEPARTMENT POLICIES REGARDING LABS:

1. All assigned laboratory exercises and reports must be completed and handed in prior to the date of the final exam with an overall grade of 60 % in order to obtain credit for the course. A lab may be waived or made up at a later time only in the case of documented illness or other extenuating circumstances. If you will be absent from a lab period due to illness, it is your responsibility to notify your instructor.

2. At the discretion of the instructor, a student who is repeating this Physics course may apply for lab exemption.

STUDY TIME
It is recommended that you spend between 5 and 10 hours per week (or more for students with a weak background) studying for this course outside of class time.

5. Course Content and Schedule:

Lecture Days/Times & Room Number:

M,Tu, W: 8:30 – 9:20 AM, Fisher 322

Lab & Tutorial Days/Times & Room Number:

Th: 8:30-10:20 AM, Fisher 322 (Lab / Tutorial alternate weeks)

November 6th is the last day to withdraw from this course or switch to an audit status without penalty of failure

6. Grading System

The following two grading systems are used at Camosun College. This course will use:

[X] Standard Grading System (GPA)

[ ] Competency Based Grading System

Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+	Minimum level of achievement to use the course as a prerequisite.	3
60-64	C		2
50-59	D	Minimum level of achievement for which credit is granted.	1
0-49	F	Minimum level has not been achieved.	0

Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at **camosun.ca** for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	*Incomplete*: A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or
IP	*In progress*: A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. *(For these courses a final grade will be assigned to either the 3rd course attempt or at the point of*
CW	*Compulsory Withdrawal:* A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum,

7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

CONDUCT POLICIES

It is the student's responsibility to become familiar with the content of these policies. The policies are available in each School Administration Office, Registration, and on the College web site in the Policy Section.

Academic Policies and Procedures
Student Conduct Policy

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College Calendar, Registrar's Office or the College web site at

http://www.camosun.bc.ca

MRT PROFESSIONAL CODE OF ETHICS

Camosun College Medical Radiography Technology students are expected to abide by the Canadian Association of Medical Radiation Technologist (CAMRT) Code of Ethics insomuch as it applies to them in the learning and clinical environments. This information is available on the CAMRT website at:

CAMRT Code of Ethics

MRT Department Policies & Procedures

Camosun College Medical Radiography Technology students are responsible for knowing all of the MRT Department Policies and must abide by them, including dress codes & lab safety procedures.

http://camosun.ca/learn/programs/mrt/handbook.pdf

8. GENERAL INFORMATION

Suggested Study Time/Study Habits

- You will probably need to spend 6-8 hours outside of class per week reading and studying the content for this course to achieve full marks. Your instructor will be available during the scheduled "open lab" hours for students needing additional support mastering the course content.

Attendance

- You are expected to attend all classes, and be on time. It is your responsibility to keep up to date on *all* information given during a class missed, incl. notes, hand-outs, assignments, changed exam dates etc. Missed exams or quizzes cannot be made up except in case of documented illness (doctor's note required). ***Lab attendance is mandatory.***

The Medical Radiography Technology program is committed to promoting competence, professionalism and integrity in our students and developing their core skills to succeed throughout their academic programs and in their careers. The purpose of Academic Honesty Guidelines is to provide clear expectations of appropriate academic conduct and to establish processes for discipline in appropriate circumstances. It is the student's responsibility to become familiar with the content and the consequences of academic dishonesty. Before you begin your assignments, review the Academic Policies on the Camosun College website: http://camosun.ca/learn/becoming/policies.html