

UNIVERSITY OF CALGARY  
DEPARTMENT OF PHYSICS and ASTRONOMY  
**COURSE OUTLINE**

**1. Course ID and number, Course Title MDPH 711b: Clinical Competency 1**

Reading and practical experience course scheduled to fit clinic operations

Wendy Smith, Ph.D.

Room CCB 08, Tom Baker Cancer Centre.

Tel 403 521 3422

Email: wendy.smith@albertahealthservices.ca

**2. PREREQUISITES:** Registration in Post Ph.D. Diploma in Radiation Oncology Physics and approval of Department.

**3. GRADING:**

- Satisfactory completion of each course component will be indicated by the signatures of the Instructor and Course Leader on this form.
- The course Leader, in consultation with the other Instructors, will evaluate the student's performance in practical clinical applications and assign a letter grade.
- Four oral examinations to test the students in depth theoretical and practical knowledge of the topics covered will take place at approximately equally spaced intervals throughout the course. The Course Leader will schedule the oral examinations and will invite Instructors and other faculty as appropriate.
- The oral examinations will be graded and the student's performance discussed with the student following the examination.
- At the conclusion of the course, the Course Leader in consultation with the other instructors will assign an overall grade based on clinical performance (~25%) and performance in the oral examinations(~75%). The student may choose three of the four oral exams for inclusion in the final grade. Students must achieve a satisfactory level or better on all clinical and exam components to pass the course.

**4. Missed Components of Term Work.** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in section 3.6: <http://www.ucalgary.ca/pubs/calendar/current/sc-3-6.html>. It is the student's responsibility to familiarize himself/herself with these regulations. See also <http://www.ucalgary.ca/pubs/calendar/current/e-3.html>.

**5. TEXTBOOK:** readings are selected from a variety of sources, including

F.M. Khan, "The Physics of Radiation Therapy". 2009, 4<sup>th</sup> edition.

H.E. Johns and J.R. Cunningham, "The Physics of Radiology", 1983, 4<sup>th</sup> edition.

CAPCA standards

AAPM task group reports

ICRP and ICRU publications

NRC regulations

**6. EXAMINATION POLICY:** Four oral examinations to test the students in depth theoretical and practical knowledge of the topics covered will take place at approximately equally spaced intervals throughout the course. The Course Leader will schedule the oral examinations and will invite Instructors and other faculty as appropriate.

Department Approval \_\_\_\_\_ Date \_\_\_\_\_

Associate Dean's Approval for  
out of regular class-time activity: \_\_\_\_\_ Date: \_\_\_\_\_

**11. OTHER IMPORTANT INFORMATION FOR STUDENTS:**

(a) **ACADEMIC MISCONDUCT** (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under K. Student Misconduct (<http://www.ucalgary.ca/pubs/calendar/current/k.html>) to inform yourself of definitions, processes and penalties

(b) **ASSEMBLY POINTS** in case of emergency during class time. Be sure to **FAMILIARIZE YOURSELF** with the information at <http://www.ucalgary.ca/emergencyplan/assemblypoints>.

- (c) **ACADEMIC ACCOMMODATION POLICY.** Students with documentable disabilities are referred to the following links:  
Calendar entry on students with disabilities: <http://www.ucalgary.ca/pubs/calendar/current/b-1.html>  
Disability Resource Centre: <http://www.ucalgary.ca/drc/>
- (d) **SAFEWALK:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call **220-5333** for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- (e) **FREEDOM OF INFORMATION AND PRIVACY:** This course will be conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, **students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page.** For more information see also <http://www.ucalgary.ca/secretariat/privacy>.
- (f) **STUDENT UNION INFORMATION:** VP Academic **Phone:** 220-3911 **Email:** [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca).  
SU Faculty Rep. **Phone:** 220-3913 **Email:** [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca) Website <http://www.su.ucalgary.ca/home/contact.html>.  
Student Ombudsman: <http://www.su.ucalgary.ca/services/student-services/student-rights.html>
- (i) **INTERNET and ELECTRONIC COMMUNICATION DEVICE Information.** You can assume that in all classes that you attend, **your cell phone should be turned off.** Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

## DETAILED COURSE SYLLABUS



**TOM BAKER CANCER CENTRE**  
Department of Medical Physics

Course Name: **Clinical Competency 1**

Course Code: **MDPH 711**

Course Leader: **Wendy Smith**

Academic Year: **2010/2011**

### COURSE OUTLINE

**Class Times**

As required to meet clinical requirements.

**Course Description**

Introductory radiation safety, linac and simulator design and operation, dosimetry equipment calibration. Introduction to brachytherapy, QA on external beam and brachytherapy equipment, IMRT delivery QA.

**Class Format:**

Students are expected to be thoroughly familiar with all background material. The classes take the form of practical instruction and supervision by a staff physicist with increasing independence for the student as the course progresses. Additional clinical components may be introduced and will be credited to the class schedule.

**Class Schedule**

MDPH 711 extends over 8 month period during the Fall and Winter terms of the first year.

**It is the responsibility of the student to schedule meetings and practical sessions with Instructors at mutually acceptable times.**

Component	Topic	Mentor	Instructor Signature	Exam
	Orientation (Appendix B)	PD		
	Linacs at Lunch	IN (RK)		1
	Review CAPCA and AAPM recommendations for megavoltage QC	AH		1
	Review TBCC protocols for megavoltage QC	AH		1
	Review TBCC Radiation Safety Manual	FJ		1
	Review CNSC and ARPA requirements	FJ		1
	Observe 10 simulations/localizations	KR (RK)		1
	Observe 3 treatments on each machine	EM (WS)		2
	Participate in the design and fabrication of 5 shells	RH (WS)		2
	Participate in 5 Linac monthly QC tests	AH		2
	Observe 2 linac PMs	KK (WS)		2
	Review CAPCA and AAPM QC recommendations for simulator QC	MT		2
	Review TBCC protocols for simulators	MT		2
	Participate in at least 3 QCs on Simulators	MT		2
	Take responsibility for and perform on-going QC on one sim	MT		3
	Take responsibility for and perform on-going QC on one linac	AH		3
	Review CAPCA and AAPM recommendations for MLC QC	WS		3
	Review TBCC protocol for MLC QC	WS		3
	Participate in at least 3 QCs on MLCs	IN (WS)		3
	Review CAPCA and AAPM	RK		3

	recommendations for EPID QC			
	Review TBCC protocol for EPID QC	RK		3
	Participate in at least 3 QCs on EPIDs	RK		3
	Observe at least 3 IMRT QAs	MT		3
	Independently QA IMRT plans as requested	MT		3
	Review CAPCA and AAPM recommendations for HDR QC	EV		4
	Review TBCC protocol for HDR QC	EV		4
	Participate in at least 3 QCs on HDRs	EV		4
	Review CAPCA and AAPM recommendations for Prostate Brachy	DB		4
	Review TBCC protocol for prostate brachy	DB		4
	Participate in at least 5 prostate brachy cases	DB		4
	Observe at least 5 HDR treatments including planning	LT (WS)		4
	Attendance at 70% of rounds and seminars			

**Instructors:**

Alana Hudson; Eduardo Villarreal; Derek Brown; Wendy Smith, Rao Khan, Mauro Tambasco

**Evaluation:**

- Satisfactory completion of each course component will be indicated by the signatures of the Instructor and Course Leader on this form.
- The course Leader, in consultation with the other Instructors, will evaluate the student's performance in practical clinical applications and assign a letter grade.
- Four oral examinations to test the students in depth theoretical and practical knowledge of the topics covered will take place at approximately equally spaced intervals throughout the course. The Course Leader will schedule the oral examinations and will invite Instructors and other faculty as appropriate.
- The oral examinations will be graded and the student's performance discussed with the student following the examination.
- At the conclusion of the course, the Course Leader in consultation with the other instructors will assign an overall grade based on clinical performance and performance in the oral examinations. The student may choose three of the four oral exams for inclusion in the final grade.
- The student is also expected to provide to the Program Director his/her evaluation of the course and the Instructors.

**Prerequisites:**

Acceptance into the University of Calgary Post Ph.D. Diploma Program in Radiation Oncology Physics, approval of the Department

**Main References:**

F.M. Khan, "The Physics of Radiation Therapy". 2009, 4<sup>th</sup> edition.

H.E. Johns and J.R. Cunningham, "The Physics of Radiology", 1983, 4<sup>th</sup> edition.

**Other References:**

**Oral exam 1. Quality assurance of External beam therapy equipment (Rao Khan & Alana Hudson)**

C.J. Karzmark, and Robert J. Morton, A primer on Theory and Operation of Linear Accelerators in Radiation Therapy

C.J. Karzmark, (1984) Advances in linear accelerator design for radiotherapy, Medical Physics 11(2) 105-128

CAPCA Linac Standards

CAPCA <sup>60</sup>Co Standards

TG 40 (sections concerning external beam, Co-60)

TG 142

Code of practice for Linacs AAPM TG45 report

Treatment delivery and patient setup (Khan 3<sup>rd</sup> Ed., pp 264-268)

**Oral Exam 2 Simulation, Imaging and Radiation Protection.**(Wendy Smith & Mauro Tambasco)

Van Dyk, J. (ed) The Modern Technology of Radiation Oncology: A Compendium for Medical Physicists and Radiation Oncologists. Medical Physics Publishing, Madison, WI, 1999 "Simulators" Chapter 4 page 95

TG66 CT Sim QC report

Portal imager QA AAPM TG58 report

Course code and number, Winter 2011

CAPCA Conventional Simulators  
CAPCA CT Simulator  
TG40 (simulators)  
CAPCA EPID  
Sections of ICRP 103, and CNSC regulations

**Oral Exam 3 *Dosimeters, MLC and Dynamic Wedges*** (Wendy Smith & Eduardo Villarreal Barajas)

Van Dyk, J. (Ed) *The Modern Technology of Radiation Oncology: A Compendium for Medical Physicists and Radiation Oncologists*. Medical Physics Publishing, Madison, WI, 1999; "Beam Shaping and Intensity Modulation", Chapter 12, pp 437-479

James Galvin, *The Multileaf Collimator – a complete guide*; <http://www.aapm.org/meetings/99AM/pdf/2787-9625.pdf>

Ezzell, GA, et al 2003, "Guidance document on delivery, treatment planning and clinical implementation of IMRT, MP 30(8), pp 2089-2097 (Only MLC sections)

CAPCA MLC

TG 142 QA of medical linacs, Table V, and relevant sections on MLC

TG50 Boyer, et al , *Basic Applications of Multileaf Collimators*, AAPM report no. 72

TG55 Radiochromic film dosimetry

TG62 Diode in vivo dosimetry

**Oral Exam 4 .*Brachytherapy*** (Wendy Smith & Derek Brown)

ICRU 38

TG59 HDR brachytherapy treatment delivery

TG64 Permanent prostate seed implant brachytherapy

TG41 Remote afterloading technology

CAPCA Brachytherapy Remote Afterloaders

CAPCA LDR Prostate Brachytherapy

TG43 Dosimetry of interstitial brachytherapy and its revisions

TG137 permanent interstitial brachytherapy for prostate cancer, MP 36 (11), 2009