

CUMMING SCHOOL OF MEDICINE GRADUATE COURSE OUTLINE

COURSE TITLE: Measurement in Medical Education			
Course	MDCH 627		
Pre/Co-Requisites	Must be registered in the Medical Education specialization of the Community Health Sciences graduate program. Consent of the instructor is required for all other students.		
Faculty	Cumming School of Medicine, Graduate Science Education		
Instructor Name(s)	Kent Hecker	Email	kghecker@ucalgary.ca
Office Location	TRW1E34	Office Hours	By appointment
Class Term, Days	Winter 2020, Thursdays		
Class Times	1:00-3:50pm		
Class Location	TRW 1E56		

COURSE INFORMATION/DESCRIPTION OF THE COURSE

Approaches to assessment and measurement within the context of competency-based medical education.

LEARNING RESOURCES/REQUIRED READING

The required readings for each class are listed in the course timetable.

Recommended Resources:

- Assessment in Health Professions Education, 2nd Edition (2020) R Yudkowsky, YS Park, M Downing. Routledge, New York NY
- 2. Health Measurement Scales: a practical guide to their development and use, 5th Edition (2015) DL Streiner, GF Norman, and J Cairney. Oxford University Press, Oxford UK.

COURSE OBJECTIVES/LEARNING OUTCOMES

In this course, students learn about assessment methods related to the measurement of student achievement, competency, and performance in the health professional educational settings. Best practices for development and delivery of various assessment methods are explored through interactive learning activities. Current assessment controversies will also be discussed. The principles of Classical Test Theory, Item Response Theory, and Generalizability Theory are introduced



through both formal lectures and lab activities. Specifically, the course focuses on the measurement issues and concerns related to the continuum of medical education, from undergraduate programs to continuing medical education.

Following completion of this course, students will be able to:

- A. To promote and apply the principles of assessment in medical education. To achieve this competency, the course objectives are for students to:
 - 1. Explain what constitutes meaningful assessment in medical education
 - 2. Describe the different assessment methods used in contemporary medical education and critique the adequacy of their use in different settings
 - 3. Select appropriate assessment methods for specific student outcomes
- B. To promote and apply the principles of measurement in medical education. To achieve this competency, the course objectives are for students to:
 - 1. Describe the principles of measurement in medical education
 - 2. Describe the importance of the concepts of reliability and validity in medical education measurement, and how to assess them
 - 3. Describe psychometric theory (classical test theory, generalizability theory and modern test theory) and its applications
 - 4. Describe potential sources of measurement error and how to minimize them

CUT POINTS FOR GRADES

This course adheres to the grading system outlined in the University of Calgary, Faculty of Graduate Studies Calendar. Grades of A+ and A are not distinguished in the calculation of GPAs. Percentage/letter grade conversion used for this course is as follows

Grade	Grade Point Value	Percentage Conversion	Graduate Description
A+	4.00	95-100	Outstanding
А	4.00	90-94	Excellent – superior performance showing comprehensive understanding of the subject matter
A-	3.70	85-89	Very Good Performance
B+	3.30	77-84	Good Performance
В	3.00	72-76	Satisfactory Performance
B-	2.70	68-71	Minimum Pass for Students in the Faculty of Graduate Studies



C+	2.30	63-67	All grades below 'B-" are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course
			requirements

Assessment Components: The University policy on grading related matters is outlined in the <u>2019-2020</u> Calendar.			
Assessment Methods	Description	Weight %	Due Date <u>and</u> Time
Lab Activities (20% of final grade): Throughout the course, computer- based lab activities will be simulated for or conducted by the participant in the completion of the following activities:	Lab 1: Generalizability and Modern Test Theory	10	February 13 th 11:59pm
	Lab 2 : Programmatic Assessment - Design and develop a program of assessment for your specialty/interest.	10	April 9th 11:59pm
Assignments (40% of final grade): Practical test construction projects will be completed by participants in small groups of 3 (or 4) for the following assignments:	Test Construction I : Design and Development of a Table of Specifications/Blueprint, Construction of MCQ Items and setting MPLs.	20	February 27 th 11:59pm
	Test Construction II : Design and development of an observation-based assessment. For example, an OSCE Scenario (e.g., physical exam, procedural skills,) and corresponding examiner checklist, or a workplace-based assessment method with corresponding assessment framework and grading rubric.	20	March 26th 11:59pm



Conference-Style Presentation (10% of final grade):	The conference-style presentations are a short synopsis of the topic chosen for the measurement paper. They will be 10 minutes each with 5 minutes for questions. Presentations should include the problem to be addressed, the method chosen, the relevant research performed, and a synthesis strengths/challenges of the method	10	In-class, April 2 nd and 9 th
Measurement in Medical Education Paper (30% of final grade):	Final paper on a specific measurement method or methods used in medical education that you may want to use in your work. Provide a critical analysis of the relevant/recent research (about last 5 years) on this method. Then, provide a section on why you think that particular method might be useful to assess learners in your field, or a section highlighting the psychometric issues you identified about that method, and how they could be addressed in a future research study. The document may extend from the Lab Activities or Test Construction Assignments topics completed in class but must represent an individual effort and submission of a final paper This paper should be max. 2000-2500 words (Font size 12).	30	April 20th 11:59pm

ASSESSMENT AND EVALUATION INFORMATION

ATTENDANCE AND PARTICIPATION EXPECTATIONS:

This graduate course is discussion based and interactive. Attendance and participation are required.

GUIDELINES FOR SUBMITTING ASSIGNMENTS:

Electronic or handwritten assignments are acceptable. Electronic can be send to kghecker@ucalgary.ca

FINAL EXAMINATIONS:

None

LATE AND/OR MISSING ASSIGNMENTS:

For each week that an assignment is late, 10% will be subtracted from the final mark.

Is a passing grade on a particular component essential to pass the course as a whole?

A passing grade on a particular component is not essential to pass the course as a whole.



	COURSE TIMETABLE		
Course Schedule Date	Topic & Reading	Instruct or	Assignments Dates & Times
January 16 - Overview of Assessment and Measurement in Medical Education	 Class introductions. Who are we? What do we each bring to the class? Course overview and expectations. Broad principles, historical development of evaluation and assessment in medical education, normative/summative assessment evaluations, and outlining the learning and assessment/evaluation cycles Norcini, J., et al. (2018) 2018 Consensus framework for good assessment, Medical Teacher, DOI:10.1080/0142159X.2018.1500016 Chapter 1 Assessment in Health Professions Education, 2nd Edition (2020) R Yudkowsky, YS Park, M Downing. Routledge, NewYork NY Boulet JR. Durning SJ. (2019) What we measure and what we should measure in medical education. Medical Education. 53:86-94 doi:10.1 111/medu.13652 		
January 23- Principles of Educational Measurement I - Validity/Reliabilit Y	 The importance, function and sources of validity evidence for test construction and evaluation (validation theory, Kane's framework, Messick's framework) The function of reliability as it applies to consistency in assessment and the influence of errors of measurement on overall test reliability. Royal KD. Hecker KG. (2016). Understanding reliability: a review for veterinary educators. JVME 43(1): doi: 10.3138/jvme.0315-030R Chapters 2 and 3 Assessment in Health Professions Education, 2nd Edition (2020) R Yudkowsky, YS Park, M Downing. Routledge, New York NY 		
January 30- Principles of Educational Measurement II - Validity/Reliabilit Y	The importance, function and sources of validity evidence for test construction and evaluation (validation theory, Kane's framework, Messick's framework)		



	 The function of reliability as it applies to consistency in assessment and the influence of errors of measurement on overall test reliability. Cook DA, Zendejas B, Hamstra SJ, Hatala R, Brydges R. (2014) What counts as validity evidence? Examples and prevalence in a systematic review of simulation-based assessment. Advances in Health Sciences Education.19:233-250 Tavares W, Brydges R, Myre, P et al. (2017) Applying Kane's validity framework to a simulation based assessment of clinical competence. Advances in Health Sciences Education. <u>https://doi.org/10.1007/s10459-017-9800-3</u> Chapters 2 and 3 Assessment in Health Professions Education, 2nd Edition (2020) R Yudkowsky, YS Park, M Downing. Routledge, New York NY 	
February 06- Principles of Educational Measurement III - Intro to Classical and Modern test theories	 Overview of Item Response Theory – focus on the Item Characteristic Curve as a measure of ability; overview of Classical Test Theory; overview of Generalizability Theory (as it applies to reliability and validity of OSCE scores) De Champlain AF. (2010) A primer on classical test theory and item response theory for assessments in medical education. Medical Education. 44:109- 117. Tavakol M and Dennick R. (2013) Psychometric evaluation of a knowledge based examination using Rasch analysis: An illustrative guide: AMEE Guide No. 72. Medical Teacher. doi: 10.3109/0142159X.2012.737488 Bloch R and Norman G. (2012) Generalizability theory for the perplexed: A practical introduction and guide. Medical Teacher. 34: 960-992 Chapters 4 and 19 Assessment in Health Professions Education, 2nd Edition (2020) R Yudkowsky, YS Park, M Downing. Routledge, New York NY 	Comparison of Generalizability and Item response theory (10%), Due February 13.



February 13- Principles of Test Construction I	 Planning the test, connecting learning objectives, using a taxonomy for level of understanding, and creating a table of specifications/blueprint. Design and development of Multiple Choice, Script concordance, Short Answer, and Essay Questions. Standard Setting. Coderre S, Woloschuk W, McLaughlin K. (2008) Twelve Tips for Blueprinting. Medical Teacher, DOI: 10.1080/01421590802225770 Bandaranayake, R. Setting and maintaining standards in multiple choice examinations: AMEE Guide No. 37. http://dx.doi.org/10.1080/01421590802402247 Chapters 7 Assessment in Health Professions Education, 2nd Edition (2020) R Yudkowsky, YS Park, M Downing. Routledge, New York NY. Selected response section. Case S M, Swanson D B (1998). Constructing Written Test Qs For the Basic and Clinical Sciences, 3rd Ed. Available at: http://medecine.ulb.ac.be/tools/docimo/NBME_MCQ.pdf . Accessed September 12, 2016 	Design and Development of a Table of Specifications/Bluepr int, Construction of MCQ Items and Setting Minimum Performance Levels (20%). Due March 5th
February 20	READING WEEK	
February 27- Principles of Test Construction II	 Development of Objective Test Measures (constructed and selected response). Standard setting. Using Item Analysis statistics to make informed decisions about quality of test items Bandaranayake R. (2008) Setting and maintaining standards in multiple choice examinations: AMEE Guide No. 37. Medical Teacher, 30: 836-845 Chapters 5 and 6 Assessment in Health Professions Education, 2nd Edition (2020) R Yudkowsky, YS Park, M Downing. Routledge, New York NY. Selected response section. 	
March 05- Judgment-based Assessment and measurement in the affective Domain (EPAs, Global ratings)	 Review of judgment based assessments. Using scales to measure attitudes, behaviors, and professionalism. Practice review assessment processes/methods and multi-source feedback. Developing EPAs global ratings etc. Carraccio C, Englander R, Gilhooly, J et al. (2016) Building a framework of entrustable professional 	



	 activities, supported by competencies and milestones, to bridge the educational continuum. Academic Medicine DOI: 10.1097/acm.00000000001141 Royal K, and Hecker K. (2016) Rater errors in clinical performance assessment. Journal of Veterinary Medical Education. doi: 10.3138/jvme.0715-112R 	
March 12- Observation based assessment I (Work Place Based Assessments, OSCEs, OSTEs, ITERS)	 Review of observation based assessments. Overview of Objective Structured Clinical Examinations (OSCEs) as an exemplar in medical education. Kogan, J., Holmboe, E. (2013). Realizing the Promise and Importance of Performance Based Assessment. <i>Teaching and Learning in Medicine</i>. Vol. 25 (Sup1): S68-S74. Kreptul, D. & Thomas, R. (2016). Family Medicine resident OSCEs: a systematic review. <i>Education for Primary Care</i>. Vol. 27(6(: 471-477. Chapters 9 Assessment in Health Professions Education, 2nd Edition (2020) R Yudkowsky, YS Park, M Downing. Routledge, New York NY. Selected response section 	Design and development of an observation based assessment. For example an OSCE Scenario (e.g., physical exam, procedural skills,) and corresponding examiner checklist or a workplace based assessment method with corresponding assessment framework and grading rubric (20%). Due March 26 th .
March 19- Observation based assessment II (Work Place Based Assessments, OSCEs, OSTEs, ITERS)	 Review of work-based assessment continued Barrett A, Galvin R, Stienert Y et. al. (2016) A BEME review of the use of workplace-based assessment in identifying and remediating underperformance among postgraduate medical trainees: BEME Guide No. 43. Medical Teacher Dec;38(12):1188-1198 Massie J, Ali JM. (2016) A review of user perceptions and strategies to address the identified short comings. Advances in Health Sciences Education. DOI: 10.1007/s10459-015- 9614-0 Chapters 10 Assessment in Health Professions Education, 2nd Edition (2020) R Yudkowsky, YS 	



	 Park, M Downing. Routledge, New York NY. Selected response section Ilgen JS, Ma IW, Hatala R, Cook DA (2015) A systematic review of validity evidence for checklists versus global rating scales in simulation- based assessment. Medical Education. Feb;49(2):161-73. 	
March 26- Longitudinal assessment (portfolios/progr ess reviews)	 Utility of portfolio-based methods to measure trajectory of development of learning. Using an evidence/theory-based model for facilitating performance feedback. Pugh D and Regher G. (2016). Taking the sting out of assessment: is there a role for progress testing? Medical Education. doi: 10.1111/medu.12985. Van der Vleuten C. et al. A model for programmatic assessment fit for purpose. Medical Teacher (2012) 34:205-214 Van der Vleuten C. et al. 12 Tips for programmatic assessment. Medial Teacher (2015) 37:7, 641-646 Chapters 12 and 16 Assessment in Health Professions Education, 2nd Edition (2020) R Yudkowsky, YS Park, M Downing. Routledge, New York NY. Selected response section 	Programmatic Assessment: Design and develop a program of assessment for your specialty/interest. This will include justifying what competencies are assessed, by what method, and when during a specified period of time (clinical clerkship or residency) (10%) Due April 2nd
April 2- Narrative Assessment	 Review of how written comments are constructed and assessed Chapters 11 Assessment in Health Professions Education, 2nd Edition (2020) R Yudkowsky, YS Park, M Downing. Routledge, New York NY. Selected response section Ginsburg, S., Eva, K., & Regehr, G. (2013). Do intraining evaluation reports deserve their bad reputations? A study of the reliability and predictive ability of ITER scores and narrative comments." <i>Academic Medicine</i>, Vol. 88(10): 1539-44. 	
April 9- Evaluating Programs of	Identify how data from multiple measures are used to make decisions regarding competencies and assessing the assessment criteria.	Measurement in Medical Education



Assessment and Performance Measures	 Gandomkar R, Jalili M, Mirzazadeh A. (2015) Evaluating assessment programmes using programme evaluation models. Medical Teacher. DOI: 10.3109/0142159X.2015.1042436 	Paper due April 20 th . (30%)
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INTERNET AND ELECTRONIC COMMUNICATION DEVICE INFORMATION

Cell phones must be turned off in class unless otherwise arranged with the instructor.

The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. Students are to refrain from accessing websites that may be distracting for fellow learners (e.g. personal emails, Facebook, YouTube). Students are responsible for being aware of the University's Internet and email use policy, which can be found at

https://www.ucalgary.ca/policies/files/policies/electronic-communicationspolicy.pdf.

MEDIA AND RECORDING IN LEARNING ENVIRONMENTS

Media recording for lesson capture

The instructor may use media recordings to capture the delivery of a lecture. These recordings are intended to be used for lecture capture only and will not be used for any other purpose. Although the recording device will be fixed on the Instructor, in the event that incidental student participation is recorded, the instructor will ensure that any identifiable content (video or audio) is masked, or will seek consent to include the identifiable student content to making the content available on University approved platforms.

Media recording for assessment of student learning

The instructor may use media recordings as part of the assessment of students. This may include but is not limited to classroom discussions, presentations, clinical practice, or skills testing that occur during the course. These recordings will be used for student assessment purposes only and will not be shared or used for any other purpose.

Media recording for self-assessment of teaching practices

The instructor may use media recordings as a tool for self-assessment of their teaching practices. Although the recording device will be fixed on the instructor, it is possible that student participation in the course may be inadvertently captured. These recordings will be used for instructor self-assessment only and will not be used for any other purpose.

Student Recording of Lectures



Audio or video recording of lectures is prohibited except where explicit permission has been received from the instructor.

UNIVERSITY OF CALGARY POLICIES AND SUPPORTS

ACADEMIC ACCOMMODATIONS

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services; SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/. Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full policy on Student Accommodations is available at <u>http://www.ucalgary.ca/policies/files/policies/studentaccommodation-policy.pdf</u>

IMPORTANT INFORMATION

Any research in which students are invited to participate will be explained in class and approved by the appropriate University Research Ethics Board

COPYRIGHT

It is the responsibility of students and professors to ensure that materials they post or distribute to others comply with the Copyright Act and the University's Fair Dealing Guidance for Students (library.ucalgary.ca/files/library/guidance_for_students.pdf). Further information for students is available on the Copyright Office web page (https://library.ucalgary.ca/copyright)

A NOTE REGARDING INSTRUCTOR INTELLECTUAL PROPERTY

Generally speaking, course materials created by professor(s) (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the professor (s). These materials may NOT be reproduced, redistributed or copied without the explicit consent of the professor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course *at the same time* may be allowed under fair dealing

ACADEMIC INTEGRITY

The Cumming School of Medicine expects intellectual honesty from its students. Course participants should be aware of University policies relating to Principles of Conduct, Plagiarism and Academic Integrity. These are found in the printed Faculty of Graduate Studies Calendar, or online under Academic Regulations in the Faculty of Graduate Studies Calendar, or Graduate Studies Academic Regulations.

ACADEMIC MISCONDUCT

For information on academic misconduct and its consequences, please see the University of Calgary Calendar at http://www.ucalgary.ca/pubs/calendar/current/k.html

EMERGENCY EVACUATION AND ASSEMBLY POINTS



Assembly points for emergencies have been identified across campus. The primary assembly points for South Campus (Health Science Centre (HSC); Health & Research Innovation Centre (HRIC); Heritage Medical Research Building (HMRB) and Teaching, Research and Wellness (TRW)) are:

- HSC and HMRB: HRIC Atrium (alternate assembly point is Parking Lot 6)
- HRIC: HMRB Atrium (alternate assembly point is Parking Lot 6)
- TRW: McCaig Tower (alternate assembly point is HMRB Atrium)

APPEALS

If there is a concern with the course, academic matter or a grade, first communicate with the instructor. If these concerns cannot be resolved, students can proceed with an academic appeal, as per Section N of the Faculty of Graduate Studies Calendar. Students must follow the official process and should contact the Student Ombuds Office (<u>http://www.ucalgary.ca/provost/students/ombuds</u>) for assistance with this and with any other academic concerns, including academic and non-academic misconduct

THE FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY (FOIP) ACT

This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP) and students should identify themselves on written assignments (exams and term work.) by their name and ID number on the front page and ID on each subsequent page. Assignments given by you to your course instructor will remain confidential unless otherwise stated before submission. The assignment cannot be returned to anyone else without your expressed permission to the instructor. Grades will be made available on an individual basis and students will not have access to other students' grades without expressed consent. Similarly, any information about yourself that you share with your course instructor will not be given to anyone else without your permission

WELLNESS AND MENTAL HEALTH RESOURCES

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the excellent mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre), <u>https://www.ucalgary.ca/wellnesscentre/services/mental-health-services</u> and the Campus Mental Health Strategy website <u>https://www.ucalgary.ca/mentalhealth/</u>"

SUPPORTS FOR STUDENT LEARNING, SUCCESS, AND SAFETY

Student Ombudsman: The Student Ombuds' Office supports and provides a safe, neutral space for students. For more information, please visit www.ucalgary.ca/ombuds/ or email <u>ombuds@ucalgary.ca</u>

Student Union: The SU Vice-President Academic can be reached at (403) 220-3911 or suvpaca@ucalgary.ca; Information about the SU, including elected Faculty Representatives can be found here: <u>https://www.su.ucalgary.ca</u>

Graduate Student's Association: The GSA Vice-President Academic can be reached at (403) 220- 5997 or gsa.vpa@ucalgary.ca; Information about the GSA can be found here: https://gsa.ucalgary.ca



SAFEWALK

Campus security will escort individuals, day or night, anywhere on campus (including McMahon Stadium, Health Sciences Centre, Student Family Housing, the Alberta Children's Hospital and the University LRT station). Call 403-220-5333 or visit <u>http://www.ucalgary.ca/security/safewalk</u>. Use any campus phone, emergency phone or the yellow phone located at most parking lot pay booths. Please ensure your personal safety by taking advantage of this service.