

Review of Year 1 Cells, Tissues and Organs course

- Course occurs in the fall term of Year 1
- Course Director – Rand Swenson, MD, PhD
- Course has 57* curricular hours
 - 6 are assessment hours
- Course was last reviewed in February, 2016 and presented to the MEC in March, 2016.

Date of this review: April, 2018

Review presented to MEC: April 2018

*Voluntary reduction in 1 hour since last review



Action Plan from Prior Review

- Additional linkages of course objectives to institutional objectives have been made as suggested. ✓
- Course director will speak with the course director for the Biochemical and Genetic Basis of Medicine regarding potential overlap and redundancy. ✓
- The course director will meet with the Health and Values VIG (or the successor to that VIG). ✓
- We are working to replace all traditional lectures with other pedagogies (and have nearly done so). ✓
- We will add a peer evaluation for lab partners in order to evaluate and provide feedback on more non-cognitive objectives. [did not do in AY 2017-18; still considering how to achieve goals of the exercise]
- We plan to split the class in half, effectively doubling the number of faculty available in lab. ✓

Course Objectives

Course Objectives

	To Program Objectives	Course Objective Mapping	
		% Session Time	To Session Objectives Number of Session Objectives
1 Recognize the structure of the components of the cell.	MS.2	3% 	14
2 Explain the correlation between the structure and function of cell components, including organelles.	MS.2	9% 	33
3 Predict how dysfunction of cellular elements would affect cell appearance and function.	MS.2	2% 	7
4 Identify and describe the components of tissues.	MS.2	13% 	47
5 Explain the organization of tissue components and the correlation with function.	MS.2	12% 	40
6 Predict how dysfunction of tissue components would affect tissue appearance and function.	MS.2	2% 	6
7 Describe the tissue components of organs.	MS.2	14% 	78
8 Explain how microscopic structure of organs contributes to organ function.	MS.2	16% 	69
9 Predict the effect of dysfunction of cellular or tissue elements on organ appearance and function.	MS.2	0.4% 	2
10 Differentiate organs and tissues by appearance.	MS.2	6% 	38
11 Predict the functional states of organs and tissues by appearance.	MS.2	0.7% 	2
12 Describe techniques and tools in study of the structure and function of cells, tissues and organs.	MS.2	0.6% 	2
13 Practice and demonstrate systematic problem-solving skills.	MS.2	2% 	7
14 Set up, use and troubleshoot a microscope.	MS.2	2% 	7
15 Communicate cell, organ and tissue composition with fellow students and faculty.	CC.8, CS.1, CS.6, CT.3	7% 	12
16 Practice team skills by participating in team exercises.	CC.1, CS.1	2% 	7
17 Participate in preparatory learning exercises.	P.7	8% 	23

Course Objectives – Comments

- The number of course objectives is appropriate and all course objectives have session objectives that map to them; objectives address medical knowledge, communication skills, professionalism and team skills
- Following our subcommittee meeting, the course director reviewing the mapping of objectives to the Geisel competencies and submitted changes to Geisel Computing

Format of Course & Session Objectives

- Course objectives are provided on Canvas
- Course objectives are written in the correct format
 - Suggest replacing the word “recognize” in the first objective with another verb [although recognize is in Bloom’s Taxonomy, recognition doesn’t ensure comprehension]

Format of Course & Session Objectives

- Session objectives are provided in the course materials
 - Female Reproductive System session does not have mapping for session objectives 3-7
- Session objectives are written in the correct format, with the exception of the issues below
 - suggest replacing the word “memorize” in Connective Tissue objective #3 with another verb
 - the word “understand” needs to be replaced in Hematopoiesis objective #6
 - suggest replacing the word “memorize” in Respiratory System objective #1 with another verb

Issues of Redundancy

- Unplanned redundancy was not found in this course
- Issues of redundancy with the Biochemical and Genetic Basis of Medicine course were identified in the previous review (e.g. with mitosis and meiosis). This content has been discussed by both course directors, and redundancy is no longer present.

Health and Values Goals

Ethics – “Identify key concepts in health care ethics and demonstrate an ability to recognize ethical issues arising in patient care and population health and to think critically and systematically in applying an ethical analysis”

Cultural Awareness – “Demonstrate an understanding and skill in managing patient care of people of diverse cultures, social, economic standing and belief systems”

Health Equity – “Identify the root causes and approaches for addressing health disparities locally and globally”

Resilience – Demonstrate knowledge of skills and practices to prevent and address stress and maintain resilience in caring for patients and oneself

Compassion and Empathy – “Demonstrate abilities to understand each patient’s experience of illness, adapt scientifically appropriate care to conform to that patient’s needs, and communicate in terms that each patient can understand”

There also are synergies to health law, communication skills, professionalism (as LCME requires).

Health and Values Content

Does the course include health and values content?

- Not explicitly, however there are issues of professionalism with teamwork

Are the health and values topics noted in the course and session objectives?

- Not currently; could add something about “developing professionalism” in addition to practicing team skills in objective #16

Nutrition Objectives

Medical Science

1. Describe core nutrition science concepts, such as nutritional biochemistry and metabolism, digestion, endocrinology, and adverse effects of malnutrition on human health.
2. Explain the links between nutrition science and other sciences, including those of the environment, exercise, toxicology, and pharmacology.
3. Apply core nutrition science knowledge to understand and manage human health and disease through the lifespan.

Clinical Care

1. Perform a nutrition assessment and accurately measure anthropometrics.
2. Perform a complete nutritional exam to assess for presence of malnutrition.
3. Interpret, develop, and implement a nutrition plan for treatment, including nutritional additions or restrictions, culinary skill development, artificial nutrition support, and supplementation.

Population Health

1. Explain the impact of nutrition on individual and population health and disease.
2. Assess the impact of social, environmental, behavioral, economic, cultural, and personal factors on the nutritional health of individuals, and the incidence and burden of disease in populations.
3. Explain and exemplify the physician's role for promoting nutrition in public health.

Communication Skills

- 1. Demonstrate empathy for individuals' concerns, and be respectful of others' perspectives and personal, cultural, and religious dietary restrictions and beliefs, and communicate nutrition advice respectfully and without judgment.**
- 2. Promote positive behavioral change through nutrition-specific motivational interviewing and cognitive behavioral therapy.**
- 3. Translate nutrition science concepts into useful information to educate patients, families, peers, and others.**

Personal, Professional, and Leadership Development

- 1. Engage in lifelong learning to improve one's performance in the application of nutrition science.**
- 2. Apply nutrition science and culinary competency to enhance resiliency and physician self-care.**
- 3. Advocate for environments that promote healthy nutritional lifestyles in the community, while removing any existing barriers.**

Evaluation and Improvement

- 1. Identify and utilize healthcare and community resources to provide nutrition care and improve patient outcomes and patient satisfaction.**
- 2. Identify credible, evidence-based sources of nutrition information and apply knowledge gained from the literature to clinical care, teaching, research, and population health.**

Collaboration and Teamwork

- 1. Recognize and capitalize on different roles and strengths of team members, including the clinical dietitian, to develop and address shared goals, and foster a working relationship with all team members built on mutual respect and trust.**
- 2. Demonstrate the ability to share and allocate responsibilities among team members.**

Nutrition Content

Does the course include nutrition content?

- No - the course director and director of the nutrition content agree that it is not relevant for this course

Are the nutrition topics noted in the course and session objectives?

- N/A

Summary of Objectives/Course Content

- The course objectives are appropriate and convey the major content of the course
- Minor edits could improve the clarity of the desired outcome for one course objective and several session objectives; a few session objectives are missing mapping in Ilios
- The course director has communicated with other course faculty and theme directors to eliminate unplanned redundancy and discuss the feasibility of incorporating H&V and nutrition information



Course Learning Opportunities

- Lecture 21 hrs. (37%)
- Flipped classroom sessions 14 hrs. (24.5%)
- Laboratory 10 hrs. (17.5%)
- Discussion, Large Group 6 hrs. (10.5%)
- Assessment Exam 6 hrs. (10.5%)

Course Learning Opportunities

- The course has a nice mix of pedagogies to satisfy different learning styles
 - Question-based flipped classroom sessions and lectures are used to deliver/discuss content
 - Laboratory sessions are problem-based (students work in groups to locate cellular structures and identify unknown slides)
 - Review sessions are question-based

Summary regarding Pedagogy

- Pedagogies currently meet the guidelines of the MEC with regard to engagement, thus no changes are needed
- Student comments indicate that flipped classroom sessions were viewed as being more interesting and effective for learning in contrast to the sessions that were lecture-based
- Laboratory sessions were also cited as valuable, and students appreciate the team aspect of these sessions



Assessment

- Written Quizzes: 27% of final grade (lowest quiz weighted half as much as the other 4)
- Readiness Quizzes: 16% of final grade
- Labs: 14% of final grade
- Lab Exam: 15% of final grade
- Final Exam: 28% of final grade

Assessment for Course Objectives

- Objectives 1-13 cover aspects of medical knowledge
 - assessed on quizzes/exams and during laboratories
- Objective 14: *Set up, use and troubleshoot a microscope.*
 - assessed when students work in the lab looking at slides, and during the practical exam when they are required to identify organs on slides
- Objective 15: *Communicate cell, organ and tissue composition with fellow students and faculty.*
 - assessed informally during laboratories, however students are not provided feedback regarding the objective

Assessment for Course Objectives

- Objective 16: *Practice team skills by participating in team exercises.*
 - assessed by attendance/participation in laboratories, however students are not provided feedback regarding the objective
- Objective 17: *Participate in preparatory learning exercises.*
 - assessed by scores on readiness quizzes



Summary regarding Assessment

- The grading policy is fair and provides multiple opportunities for students to demonstrate mastery
- All course objectives are assessed either formally or informally; students are not provided feedback regarding their communication and team skills

[course director comment: attempts at incorporating peer feedback were tried unsuccessfully in the past – still looking for ideas on how to do this well]



Measures of Quality – Graduation Questionnaire

How well did your study of the following sciences basic to medicine prepare you for clinical clerkships and electives?

Percentage of Respondents Selecting Each Rating

		Poor	Fair	Good	Excellent	Count
Microanatomy/Histology						
All Medical Schools	2017	6.1	21.4	42.7	29.8	15,198
Dartmouth-Geisel	2017	1.6	12.7	47.6	38.1	63
Dartmouth-Geisel	2016	2.9	22.1	44.1	30.9	68
Dartmouth-Geisel	2015	4.2	22.5	42.3	31.0	71
Dartmouth-Geisel	2014	5.8	14.0	48.8	31.4	86
Dartmouth-Geisel	2013	10.2	22.7	44.3	22.7	88

Data from AAMC Graduation Questionnaire

Measures of Quality – Step I

TRADITIONAL CORE DISCIPLINES	2015*	2016*	2017*	Means 15-17
Biochemistry	0.03	-0.04	0.08	0.023
Genetics	0.09	-0.36	0.15	-0.04
Gross Anatomy/Embryology	0.16	-0.12	-0.06	-0.006
Histology/Cell Biology	0.07	-0.09	0.01	-0.003
Microbiology/Immunology	0.02	-0.01	0.09	0.03
Pathology	0.12	-0.10	0.05	0.023
Pharmacology	-0.02	0.0	0.09	0.023
Physiology	0.11	0.06	0.09	0.087

**values reported for core disciplines are SD above the US/Can mean for Geisel mean scores*

Measures of Quality – Course Evaluation

Overall Quality - Year 1 courses	AY 15-16	AY 16-17	AY 17-18
Basic Science of Microbial Disease	4.10 (80.6%)	4.73 (79.3%)	
Biochemical and Genetic Basis of Medicine	4.40 (94.6%)	4.54 (94.6%)	4.61 (61.3%)
Cells, Tissues and Organs	4.06 (95.7%)	4.21 (96.7%)	4.05 (59.8%)
Human Anatomy and Embryology I	4.04 (94.7%)	4.61 (94.6%)	4.39 (60.9%)
Human Anatomy and Embryology II	4.43 (92.6%)	4.74 (59.3%)	4.36 (92.6%)
Immunology and Virology	3.94/3.83 (91.4%)	4.70 (69.6%)	4.46 (90.3%)
Metabolic Basis of Disease	4.48 (89.2%)	4.25 (70.3%)	4.56 (91.6%)
Neuroscience	3.32 (79.8%)	2.93 (82.4%)	
On Doctoring	4.10 (39.2%)	4.07 (100%)	
Pathology	3.06 (87.2%)	2.61 (80%)	
Patients and Populations	2.77 (82%)	2.79 (74.5%)	
Physiology-Cardiovascular	3.41 (95.7%)	3.88 (93.5%)	3.00 (45.2%)
Physiology-Endocrine	3.52 (92.6%)	3.63 (68.5%)	4.13 (63.8%)
Physiology-Renal	3.63 (92.6%)	3.46 (68.5%)	2.92 (90.4%)
Physiology-Respiration	3.41 (95.7%)	3.80 (92.4%)	4.53 (64.5%)

scale [1=poor; 2=fair; 3=good; 4=very good; 5=excellent]; student participation rate in parentheses

Measures of Quality – Course Evaluation

scale [1=poor; 2=fair; 3=good; 4=very good; 5=excellent]

	CTO AY 15-16 (96%)*	CTO AY 16-17 (97%)*	CTO AY 17-18 (60%)*
Pace and workload**	N/A	N/A	3.87
Primary course materials/text**	N/A	N/A	3.64
Organization of the course	4.10	4.17	4.05
Congruence of assessment questions to material emphasized in course	4.20	4.40	3.91
Overall satisfaction of course	4.06	4.21	4.05

**student participation rate on course evaluation*

***new evaluation question in 17-18*

Measures of Quality – Student Comments

Strengths:

- Wealth of study materials
 - “I appreciated all of the study materials (study buddy questions, practice multiple choice questions) available. I always felt prepared going into an exam.”
- Flipped classroom sessions
 - “The flipped classrooms were very helpful for reinforcing information and more enjoyable than pure lecture.”
- Other strengths
 - Organization of the course
 - Histology lab
 - iBook
 - Instructors

Measures of Quality – Student Comments

Suggestions for Improvement:

- Consolidate course resources
 - “It was sometimes hard to streamline my studying for the class because there was different information in the slides, in the lecture and in the ibook.”
 - “There is a fair amount of inconsistency between pre-lecture slides, the ibook, study-buddy questions and readiness quizzes/practice multiple choice questions. You typically have to piece material from all four sources to get everything. It is really inefficient and it would be nice if the necessary material was condensed into one resource.”
- Add more flipped classroom sessions
 - “It seemed that midway through the term the classes all became regular lectures instead of flipped classroom. I think that keeping the classes flipped would have enhanced my learning since it felt redundant to go to class if I had done the prep work since the same material was covered/presented in a similar way.”

Measures of Quality – Student Comments

Suggestions for Improvement:

- Feedback on lab activities
 - “Lab was helpful and informative, but it was often frustrating that the faculty couldn't tell us whether or not we were correct, and that we never received graded feedback on our lab performance. I would have appreciated some kind of feedback so that I knew whether we were on the right track.”
[course director comment: answer keys were provided, but students apparently didn't know where they were]
- Other suggestions
 - Formal sign-up method for group lab practical
 - Reduce focus on details on assessments (encourages memorization of minutia)

Overall, students seemed to really enjoy the class! 😊

Summary regarding Measures of Quality

- The course is consistently rated in the “very good” category by students
- Strengths of the course include the variety of study materials provided and the flipped classroom sessions
- Suggestions for improvement include consolidating the course resources, adding additional flipped sessions and making sure students understand where to view answers to the laboratory exercises



Recommendations

- Make minor edits to the first course objective and several session objectives to improve the clarity of expectations for students
- Continue to replace traditional lectures with flipped sessions where possible; mentor course faculty that need guidance in this process
- Continue to investigate methods to effectively provide students with feedback on teamwork and communication skills



Recommendations

- Review course materials and practice questions for inconsistencies; clarify for students the primary source of information for the course versus the ancillary sources
- Make sure students are aware of the process to view answers to lab exercises



Action Plan

- Modify course and session objectives for the coming term per recommendations
- Implement formative peer feedback (within teams) through anonymous on-line text feedback on Oasis
- Work with faculty to make best use of the “flipped classroom” format
- Review practice questions for consistency
- Identify primary source (vs. ancillary) on Canvas
- Permanent link on canvas “laboratory” site regarding review process for laboratory exercises

