

# **Request from the Department of Physiology and Biophysics of Case Western Reserve University for the Off-Site Delivery of the current Master of Science in Medical Physiology Degree Program**

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## **Objectives of the Proposed Degree Program**

The primary objective of the proposed program is to provide a means for individuals to complete our existing Plan B Master of Science in Medical Physiology degree program, in part or in total, through an on-line mechanism of course delivery. Currently, 21 of the 30 required hours of course work for the degree are available online. We will encourage the development of additional online basic science courses, both inside and outside the department, so that students can eventually satisfy all the course requirements of the MS degree via the off-site, Internet mechanism. The Plan B MS program also requires that the students take and pass a qualifying exam that is taken the first week of May after the first two semesters of study. We use the computer-based National Board of Medical Examiners (NBME) shelf exam in Physiology and Neurophysiology as this exam. Students enrolled in the Internet option will take the exam at a qualified testing center close to their residence during the same week as the resident students.

The academic standards of admission and performance of the current resident degree option will also apply to the off-site option, ensuring that the quality of the degree is maintained. Expanding our Plan B MS program to include an on-line delivery mechanism will enable us to extend the Master of Science in Medical Physiology degree program to a student audience for whom regular travel to campus would be difficult or impossible. The off-site, Internet delivery option is of particular interest to students who are working full time, who must live some distance from campus, and/or who have time schedule limitations.

When we began the Plan B MS in Medical Physiology program in the fall semester of 2011, we began video recording all the lectures. We placed these recordings, along with all course materials (Learning Objectives, PowerPoint files used in class, reading materials, etc.) online through Blackboard for the following courses: Medical Physiology

I and II - PHOL 481 and 482 - (a total of 12 credit hours), Translational Physiology I and II - PHOL 483 and 484 - (a total of 4 credit hours), Physiology Seminar I and II - PHOL 498 - (a total of 2 credit hours), and Independent Study in Physiology - PHOL 451 - (a total of 3 credit hours). Survey's showed that students in these classes find these on-line resources, particularly the video recordings of lectures, very valuable, particularly when students are unable to attend class for one reason or another. From these survey results, we realized the potential to offer these classes totally online and will offer them all as on-line courses beginning fall semester 2013.

One first year student was out of town for family reasons for an extended time fall semester 2012. During that time, she relied on the on-line resources to keep up with the fall courses and we were able to successfully deliver secure quizzes and block exams through a testing center in New Mexico. Thus, we have had experience making learning resources available online for nearly two years and experience delivering secure quizzes and exams at a distance. Each student who requests to take a course via the Internet will be given permission to do so upon the condition that an adequate testing center is identified.

Because we recognize the potential of reaching more students with our program via the Internet, we request permission for the off-site delivery of the established Plan B Master of Science in Medical Physiology degree program.

**Response to program standards:**

***1. The program is consistent with the institution's role and mission.***

The approved MS in Medical Physiology program in the Graduate School of Case Western Reserve University is designed to provide advanced training in physiology to students who wish to apply to health-science professional programs (Ph.D., MD, DO, dental, pharmacy, veterinary, physician assistant programs, etc.) or to students who wish to seek or advance their employment in biotechnology companies. The proposed program facilitates our ability to achieve this mission by making it easier for students to overcome the logistical and financial barriers imposed by commuting to campus, and allows students outside the Cleveland area to pursue the Master of Science in Medical Physiology degree.

***2. The institution's accreditation standards are not appreciably affected by offering the program, especially via alternative delivery mechanisms.***

The proposed distance learning courses and degree programs are identical to our current on-campus degree program. Student performance assessments are the same regardless of the delivery mechanism, as required by our university accreditation agency: The Higher Learning Commission. Grades on the block exams in the current PHOL481, 482, 483, and 483 are set at A = 100% - 85%, B = 84%, and C <70%. On each block exam, if the median score is less than 85%, points (termed the Difficulty Factor) are added to make

the median = 85%. The Difficulty Factor for students taking these courses either on-site or off-site will be determined by the performance of the on-site students. Immediately after each quiz and block exam, resident students have the opportunity to review their quizzes and exams with the teaching assistants and faculty making up the quiz or exam. Because this is a valuable learning experience, these sessions can be streamed over the Internet to students who have taken the quiz or exam at a distance at exactly the same time. Since most students in the Internet option will not take the quizzes and exams at exactly the same time, they will be assigned a teaching assistant who will personally review each quiz and secure exam with them after the administration of the quiz or exam via Skype.

The passing mark on the qualifying exam has been set at 2 standard deviations below the mean of all students taking the NBME Physiology and Neurophysiology shelf exam = 760 for the last administration in May of 2013 (the 3<sup>rd</sup> percentile or higher).

***3. The institution's budget priorities are sufficient to sustain the program in order for a selected cohort to complete the program in a reasonable amount of time.***

Because the infrastructure for providing internet delivery of lectures and course materials is already in place, the resources required for expanding the program to off-site delivery are incremental and are covered by the university and school budgets. We also expect increased enrollment as a result of this offering, thus increasing the financial resources available to the department.

Furthermore, the 21 credit hours of coursework that are currently available online are all part of our standard curricula and are offered on a regular schedule. This allows off-site students to complete the degree requirements over a predictable and reasonable time period. The remaining 9 credit hours of coursework can be accomplished by taking additional Independent Study in Physiology courses (PHOL 451 – In this course, students typically select a physiological or pathophysiologic topic of interest and write a review paper on the subject under the supervision of a faculty member. Students may take this course multiple times with the permission of their Academic Advisor.), taking online courses at the 400 level or above that are increasingly being offered at CWRU, and transferring up to 6 credit hours of approved course work earned at an accredited institution closer to the student's residence.

Appendix A lists the required course for the MS in Medical Physiology program and the semesters when they are offered for on-site students. All of these courses are available online. Appendixes B - E provide 4 sample curricula that students can follow to satisfy the 30 credit hour requirement of the program in 2 – 5 semesters. As noted above, the 12 hours of elective courses required by the curriculum can be taken through CWRU on-site or off-site. Up to 6 credit hours can be taken at another accredited institution. Each student will meet with their Academic Advisor prior to beginning the program to determine their customized course of study to achieve the degree. Students taking

courses off-site do not have to take them in the same semester as on-site students, greatly increasing the flexibility of the program.

***4. The institution has in place sufficient technical infrastructure and staff to support offering the program, especially via alternative delivery mechanisms.***

Technical support is available through the CWRU office of Instructional Technology and Academic Computing (ITAC) which currently provides us support for Blackboard and MediaVision. The MediaVision team is responsible for providing traditional audio-visual services; technology enhanced classrooms as well as a set of “video-centric” technologies that are designed to take advantage of the university’s world-class, gigabit-to-the-desktop network, and is responsible for placing lectures on-line for distance student access, and for maintaining dedicated classrooms with lecture recording facilities. Pedagogical support for faculty is provided through the University Center for Innovation in Teaching and Education, UCITE.

Dr. Walter Boron, Chair of the Department of Physiology and Biophysics, has appointed Dr. Thomas M. Nosek, Professor of Physiology and Biophysics and Director of Graduate Education for the department, to oversee the distance education program. Dr. Nosek oversees a staff member who is responsible for processing applications, enrollment, and programs of study for students in the Master of Science in Medical Physiology Program. Dr. Nosek also manages three teaching assistants who help to administer the MS in Medical Physiology program. The full time staff member acts as a point of contact for students in this program.

Students in the Master of Science program apply and are managed through the School of Graduate Studies in the same way as on-campus students. We anticipate that a student wishing to satisfy any of the credit requirements of the program via the Internet would indicate this intention in their personal statement. Acceptance of such a student would be conditional upon identification of a testing center where secure exams could be administered.

The School of Graduate Studies is devising a way for separately identifying distance education students in the Master of Science program so that their progress can be assessed separately. They are also in the process of devising a mechanism for students to specifically apply for the Internet option of our program through the online application form. Until that change has been made to the online application form, students will indicate their application to the Internet option in their personal statement. Acceptance and advising of students (each student is assigned two faculty members who serve as their Academic and Career Advisors), developing each student’s programs of study, and marketing/recruiting/enrollment are all executed at the department level. As enrollment in distance education programs increases, we will expand support to meet the need.

***5. The institution has in place sufficient protocols for ensuring instructional commitments are met, including instructor/staff training, compliance with copyright law, and quality instruction among other variables.***

All of the courses to be offered off-site via the Internet are part of the standard curriculum. Faculty members who teach these courses are familiar with having their lectures recorded and with having their teaching materials placed on-line via Blackboard. The requirement to comply with copyright laws is well understood and actively promoted. There will be no difference between the on-site and off-site teaching and assessment.

***6. The institution has in place a relevant and tested method of assessing learning outcomes, especially in the case of alternative delivery mechanisms.***

Assessment of our graduate programs is a continual process and is required to maintain our accreditation.

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***7. As new delivery mechanisms are brought into course instruction, students and faculty are presented with sufficient training and support to make appropriate use of new approaches.***

The MediaVision-supported distance education mechanism is already used by a large number of faculty on the CWRU campus and requires minimal change in how faculty deliver course material. Students have adapted well to the use of Blackboard and MediaVision web based resources.

***8. The institution assures that the off-site/alternatively delivered program meets the same quality standards for coherence, completeness and academic integrity as for its on-campus programs.***

The courses and degree program are the same for both on-campus and distance students, the same standards are applied, and we will perform the same assessments for the distance students as we do for the on-campus students.

A qualified proctor (typically at a University, College, or Community College testing center) will administer all exams taken by distance students off campus. All exams for on-site students are administered on paper. A PDF file of the exam will be e-mailed to the qualified proctor before each exam. The proctor will be asked to print this file and administer the exam to the student under the conditions we specify. The proctor will FAX the exam back to the department as soon as it has been completed by the student. The original copy of the exam will be mailed back to the department with assurance by the proctor that the security of the exam has been maintained. Written proctor verification is required to ensure the academic integrity and credibility of the program and to maintain accreditation by the Higher Learning Commission of the North Central Association. Testing centers typically charge between \$0.00 and \$10.00/administration for providing this service. The cost of these services will be borne by the Department of Physiology and Biophysics. Before a student is accepted into the Internet option of the Plan B MS program, we will work with the student to identify a qualified testing center near their residence. The chosen testing center must also have the capability of administering our qualifying exam, the computer-based NBME shelf exam in Physiology and Neurophysiology. The cost of administering this exam will be borne by the Department of Physiology and Biophysics. All arrangements for administration of this exam will be handled by the Department of Physiology and Biophysics in conjunction with the NBME. Identification of a qualified testing center is a precondition for accepting a student into the Internet option of our program.

All exams are secure and are not returned to the students. Distance students that live near the Case Western Reserve campus can make arrangements to take exams on campus with the class or at an alternate time if mutually agreed. Distance students who are not able to take exams on the Case Western Reserve campus are required to submit a testing center proctor information form with their application materials. The proctor is responsible for maintaining the academic integrity of the exam process. If the proctor believes the

academic integrity of the exam process has been compromised, he/she has the right to stop the exam. Whether or not the proctor stops the exam, he/she will report the incident to the faculty member in charge of the course, who will decide on the appropriate action, consistent with the University's policy on academic integrity.

<http://www.case.edu/president/facsen/frames/handbook/chapters/ch4-7.html>).

***9. The faculty offering the program maintains the same standards and qualifications as for on-campus programs.***

The course offerings using a distance mechanism are taught by the same faculty who teach our on-campus courses and the same standards and qualifications are applied uniformly to all on-campus and off-campus students enrolled in a course.

***10. The institutions assures that, for all off-site and alternative programs, students will have access to necessary services for registration, appeals, and other functions associated with on-campus programs.***

The CWRU School of Graduate Studies has extensive experience with off-site students and mechanisms are already in place for handling transactions for registration, appeals, etc.

Advising for students in graduate programs that use distance education will be the responsibility of the department or school offering the program. Students pursuing a Master of Science in Medical Physiology degree through the distance education program will have access to faculty through video conferencing, phone, and e-mail. We currently have 16 faculty who serve as Academic Advisors and 2 who serve as Career Advisors. It is difficult to predict how many students will eventually enroll in the off-site MS program. We do not anticipate that any faculty member will have to advise more than 10 students at any one time.

***11. In those instances where program elements are supplied by consortia partners or outsourced to other organizations, the university accepts responsibility for the overall content and academic integrity of the program.***

Not applicable.

***12. In those instances where asynchronous interaction between instructor and student is a necessary part of the course, the design of the course, and the technical support available to both instructor and student are sufficient to enable timely and efficient communication.***

The MediaVision and Blackboard web resources provide excellent communications support between students and instructors/teaching assistants. Further, faculty currently involved in teaching parts of courses via distance mechanisms communicate regularly with students via e-mail and phone. Skype is also often used by faculty in the Department of Physiology and Biophysics for two-way audio and video communication when necessary.



***13. Faculty are assured that appropriate workload, compensation, and ownership of resource materials have been determined in advance of offering the off-site or alternatively delivered course.***

Because the off-site courses will use the same resources used by on-site students, the course workload for faculty will only be impacted by increased number of students who may contact them with questions on course presentations. We will use the same mechanisms for teaching assignments and compensation as we presently use, and additional resources are made available to faculty teaching off-campus students on an as needed basis. Teaching assignments are made at the department level. The chair of the Department of Physiology and Biophysics has agreed to offer courses on a regular and predictable basis so that distance students can plan a predictable and timely program of study.

***14. Program development resources are sufficient to create, execute, and assess the quality of the program being offered, irrespective of site and delivery mechanism employed.***

Because the proposed program is only an addition of a delivery mechanism, the same processes are in place as for the on-campus programs.

***15. Procedures are in place to accept qualified students for entry in the program—it is imperative that students accepted be qualified for entry into the on-campus program. In addition, program costs, timeline for completion of the cohort program and other associated information is made clear to prospective students in advance of the program's initiation.***

The same mechanisms and standards will be used for the off-site program as for the existing on-site program. All information about program costs, timelines, etc. are available on the Case Western Reserve University website.  
(<http://physiology.case.edu/education/graduate-programs/master/post-baccalaureate-program-ms-medical-physiology/>)

***16. Assessment mechanisms appropriate to the delivery approach are in place to competently compare learning outcomes to learning objectives.***

We will employ the same assessment mechanisms for off-site students as employed in our on-site program.

***17. Overall program effectiveness is clearly assessed, via attention to measures of student satisfaction, retention rates, faculty satisfaction, etc.***

We will make use of all of the current assessment mechanisms that are in place for this degree program whether it is presented on-site or off-site.

# Appendix A

**Required Courses:** The required core courses and the semesters when they are offered on-site are listed below. Appendixes B - E contain sample curricula for students desiring to complete the program in four different time frames. Other combinations are possible with the approval of the student's Academic Advisor. Each student will meet with their Academic Advisor prior to beginning the program to determine their customized course of study to achieve the degree. Students taking these courses off-site do not have to take them in the same semester as on-site students, greatly increasing the flexibility of the program. Part time student should follow the sample curriculum in Appendix E, taking 6 credit hours/semester. After the first year of studies, the course load could be as little as 3 credit hours/semester. It is anticipated that part time students will take no more than 8 semesters (including summer semesters) to complete the program.

## Fall Semester

PHOL 481	- Medical Physiology I*	6 Credits
PHOL 483	- Translational Physiology I*	2 Credit
PHOL 499-1	- Physiology seminar	1 Credit

## Spring Semester

PHOL 482	- Medical Physiology II*	6 Credits
PHOL 484	- Translational Physiology II*	2 Credit
PHOL 499-2	- Physiology Seminar	1 Credit

\*Textbook for these courses is: *Medical Physiology: A Cellular and Molecular Approach* by Walter F. Boron and Emile L. Boulpaep.

Total Required Physiology Courses	18 Credits
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# Appendix B

There are many combinations of courses/term that a student can make to graduate with 30 credits in as few as 2 terms (9 months). However, it is highly recommended that the curriculum be decompressed over a longer time frame. Four examples of specific curricula are provided in Appendixes B – E.

## Sample Curriculum #1

Completing the curriculum in 9 months (2 terms, Fall and Spring). This curriculum is VERY intense and is recommended for only very well prepared students and requires the permission of the MS in Medical Physiology Administration Committee.

### Fall

PHOL 481	- Medical Physiology I	6 Credits
PHOL 483	- Translational Physiology I	2 Credits
PHOL 499	- Physiology seminar	1 Credit
Elective #1	-	3 Credits
Elective #2	-	3 Credits

### Spring

PHOL 482	- Medical Physiology II	6 Credits
PHOL 484	- Translational Physiology II	2 Credits
PHOL 499	- Physiology Seminar	1 Credit
Elective #3	-	3 Credits
Elective #4	-	3 Credits

Total 30 Credits

# Appendix C

## Sample Curriculum #2

Completing the curriculum in 12 months (3 terms; Fall, Spring, and Summer).

### Fall

PHOL 481	- Medical Physiology I	6 Credits
PHOL 483	- Translational Physiology	2 Credits
PHOL 499	- Physiology seminar	1 Credit
Elective #1	-	3 Credits

### Spring

PHOL 482	- Medical Physiology II	6 Credits
PHOL 484	- Translational Physiology II	2 Credits
PHOL 499	- Physiology Seminar	1 Credit
Elective #2	-	3 Credits

### Summer

Elective #3	-	3 Credits
Elective #4	-	3 Credits

Total 30 Credits

# Appendix D

## Sample Curriculum #3

Completing the curriculum in 2 academic years (4 terms, 2 Fall and 2 Spring terms)

### Fall #1

PHOL 481	- Medical Physiology I	6 Credits
PHOL 483	- Translational Physiology	2 Credits
PHOL 499	- Physiology seminar	1 Credit

### Spring #1

PHOL 482	- Medical Physiology II	6 Credits
PHOL 484	- Translational Physiology II	2 Credits
PHOL 499	- Physiology Seminar	1 Credit

### Fall #2

Elective #1	-	3 Credits
Elective #2	-	3 Credits

### Spring #2

Elective #3	-	3 Credits
Elective #4	-	3 Credits

Total 30 Credits

# Appendix E

## Sample Curriculum #4

A laboratory technician working full time at Case Western Reserve University has as a fringe benefit free tuition for up to 6 credit hours of course work/semester at CWRU. If the student takes 6 credit hours/semester, it would take at least 5 semesters (including summer semesters) to complete the program. If the student takes fewer hours each semester, the duration of the program would be extended. This curriculum may also be desirable for other students who cannot take a course load of more than 6 hours of courses/semester.

### Fall #1

PHOL 481	- Medical Physiology I	6 Credits
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### Spring #1

PHOL 482	- Medical Physiology II	6 Credits
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### Summer #1

Elective #1	-	3 Credits
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Elective #2	-	3 Credits
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### Fall #2

PHOL 483	- Translational Physiology I	2 Credit
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PHOL 499	- Physiology seminar	1 Credit
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Elective #3	-	3 Credits
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### Spring #2

PHOL 484	- Translational Physiology II	2 Credit
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PHOL 499	- Physiology seminar	1 Credit
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Elective #4	-	3 Credits
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Total		30 Credits
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