



LOMA LINDA UNIVERSITY
School of Allied Health Professions

Doctor of Science (DSc) in Physical Therapy (PT) at Loma Linda University (LLU):

In addition to the required course work, the DSc in PT program at LLU has the following 18 program elements:

1. Entrance Examination
2. Matching of Student & Dissertation Chair
3. Selection of Dissertation Chair & Research Guidance Committee
4. Written Comprehensive Examination
5. Development of Research Topic & Question
6. Oral Defense of Research Topic & Question
7. Confirmation of Research Guidance Committee
8. Form A. - Admission to Candidacy
9. Further Development of the Research Project
10. Quarterly meetings with Research Guidance Committee
11. Submission & IRB Approval of Research Project
12. Data Collection
13. Form C. – Petition for Graduation
14. Data Reduction & Analysis
15. Preliminary Dissertation
16. Dissertation
17. Defense of Dissertation
18. Form D. – Statement of Completion of Requirements for Degree

NB: Dissertation format per the “Thesis and Dissertation Format Guide”, Loma Linda University, Graduate School, March 2003

Each of these 18 program elements are described in greater detail below:

1. Entrance Examination
 - a. The Entrance Examination will cover 4 primary competencies in the practice of physical therapy: 1) Neurological PT Rehabilitation (25 questions), 2) Orthopaedic PT Rehabilitation (25 questions), 3) Pediatric & Geriatric PT Rehabilitation (25 questions), and 4) General Medicine/Basic Science (25 questions). The examination will be computer-based in a multiple-choice format and will be a timed (3 hour maximum) and monitored test.
 - b. The Entrance Examination may be developed to include an integrative written essay.
 - c. A minimum score of 75% will be required for both components of the entrance examination for admission into the DSc in PT program. The entrance examination will also be used to help determine the total number

of advanced standing units (if any) for those students with a DPT degree and also to assist the program director in determining the appropriate curriculum for students with advanced standing. The Graduate Committee, based on areas of strength of competencies as determined by the Entrance Examination, Board Certification, and demonstration of topic mastery, may approve a maximum of 18 units of advanced standing for applicants with a Doctor of Physical Therapy (DPT) degree. The only program requirements open for advanced standing are clinical, elective, and repetitive coursework. The only research-related course that can be replaced by advanced standing units are Critical Analysis of Literature, Research & Statistics I and II. The DSc student will work with their program director to submit a request for advanced standing units via a Petition for Academic Variance form to both the Graduate Councils – School of Allied Health Professions (Sponsoring School) and Faculty of Graduate Studies (Oversight Body), respectively. No advanced standing will be available for applicants with their highest degree being a master's degree (e.g., MPT).

2. Matching of Student & Dissertation Chair

- a. Starting in the Winter quarter of the student's second year, each student will meet with their program director to discuss potential research interests and to discuss the selection process of their Dissertation Chair. The student will receive a list of the Major Professors who may serve as a dissertation chair. Students will initiate appointments with potential dissertation chairpersons from the approved Major Professor List to discuss each advisor's area of research interest and expertise. A signature sheet (DSc in PT check list form) verifying these appointments will be filed with the program director. These appointments will allow students to focus on available areas of research support. They are intended to provide a background against which each student can begin to evaluate their own general area of research interest and move toward selection of a dissertation chair. Some students will seek admission to this program based on prior knowledge of and/or experience with the program or one or more of its faculty. In some of these cases, the student will enter the program having had prior interaction with a specific Loma Linda faculty member, and will have *de facto* commitment on the part of that faculty member to serve as the student's dissertation chair, should they enter the program. In such cases, students will still be expected to adhere to the general program requirement of meeting with all eligible research faculty for purposes of becoming acquainted with the native research expertise of the program. All dissertation chairs must be from the Major Professor List.
- b. If a student entering the program has *a priori* interest in a specific topic of research, or specific research project, that information can be communicated during this process and serve as an integral element in pairing that student with the most appropriate dissertation chair and research guidance committee. In any event, the choice of a proposed dissertation chair will be communicated by the student to the program director who will then serve as official liaison between students and

potential dissertation advisors until such time as a dissertation chair has consented to serve and has been formalized.

3. Selection of Research Guidance Committee

- a. The Dissertation Chair will work with the student to select a research guidance committee.
- b. The DSc in PT student's dissertation chair and research guidance committee will include a minimum of three Loma Linda University faculty members with earned doctorate degrees and one external mentor unless otherwise determined by the Graduate Committee.
- c. The dissertation chair will be a member of the Faculty of Graduate studies. Two of the three LLU researcher committee members will be from the School of Allied Health Professions (SAHP) with a minimum of one member from the Faculty of Graduate Studies (FGS). The FGS will approve faculty per their published criteria. A curriculum vitae (CV) will be submitted by the external mentor to the FGS and SAHP Graduate Counsels for acknowledgement.

4. Comprehensive Examination

- a. Comprehensive examinations will be administered when students have successfully completed basic courses in the program. The student must demonstrate competency in the following 4 domains: 1) Advanced clinical practice and science, 2) Research (biostatistics and basic research methodology), 3) Education, and 4) Ethics & professionalism. The comprehensive examination will typically occur during the summer quarter of the student's second year in the DSc in Physical Therapy program. The student will register of PHTH 599 Comprehensive Examination for 0 units prior to taking the examination.
- b. The comprehensive examination will be given in four 3-hour examination sessions over two consecutive days (Two 3-hours sessions per day).
- c. The comprehensive examination will be administered in an essay format (pen-paper or computer).
- d. To continue in the program, students will be required to pass all four domains.
- e. If a student is unsuccessful in passing one or more of the domains, then the student will be given adequate time to prepare for a second examination over the failed domains. If the student fails the second attempt, a panel of SAHP faculty selected by the program director or Graduate Committee will administer an oral comprehensive examination. If the student should fail the oral comprehensive examination the student would typically be dismissed from the program. However, in special circumstances the Graduate Committee does have the authority to recommend a plan of study, which may include additional coursework, independent study, auditing courses, etc., and recommend an appropriate period of time to elapse before the student is eligible for one final opportunity to take the comprehensive examination.

5. Development of Research Topic & Question

- a. The Research Guidance committee will guide the candidate as they explore possible research topics and develop an original and novel research question. The research guidance committee will also assist the candidate in identification of potential study confounders or confines including but not limited to the committee's expertise and the school and candidate's available resources. The dissertation chair will contact the program director to schedule the oral defense of the research topic and question.
 - b. As a part of this process, the candidate will provide a rationale and/or evidence supporting the relevance and importance of this study to the profession or overall body of scientific information. If the dissertation chair lacks familiarity with specifics of the candidate's desired project, this will also allow the chair to evaluate potential resource needs for successful project completion.
6. Oral Defense of Research Topic & Question
 - a. The DSc candidate will defend their proposed research question to the Graduate Committee for Post-Professional Physical Therapy Programs. This oral defense will occur following successful completion of Research & Biostatistics I & II and prior to registration for Research & Biostatistics III, IV, and V. Following the oral defense of the research topic & question the Graduate Committee will take one of the following actions: 1) Approve the research topic and question, 2) Approve with modifications, or 3) Reject. This committee action will be based on the following criteria: 1) Feasibility of the study, 2) rigor of the study, 3) appropriateness and relevance of the study, 4) faculty expertise, and 5) originality, novelty, and creativity.
 - b. Major changes in the DSc candidate's research topic or question following approval will require authorization from the candidate's dissertation guidance committee and these changes will be forwarded to the Graduate Committee to be recorded in the Graduate Committee's minutes.
7. Confirmation of Dissertation Chair & Research Guidance Committee:
 - a. The Graduate Committee for Post-professional Physical Therapy Programs will confirm the selected dissertation chair and the research guidance committee following approval of the research topic and question. If the candidate and the dissertation chair have not already selected a research guidance committee, the Graduate Committee will assist the candidate in this process.
8. Admission to Candidacy
 - a. At this time the student will complete and submit "Form A: Admission to Candidacy" to the Program Director.
9. Further Development of Research Project
 - a. Soon after confirmation, the research guidance committee will again meet to further assist the candidate in further development and advancing of the previously approved topic. During this process, the candidate's

dissertation chair and dissertation guidance committee will begin informally evaluating the candidate's aptitude for conducting original research. The candidate will be expected to engage in a comprehensive literature search, providing a basis for assessing originality and viability of the proposed project.

- b. As the research topic is further developed through this process, the candidate will communicate to their dissertation chair regarding specific objectives of the proposed project. The candidate will articulate concepts he/she believes to be vital to the study. The role of the dissertation chair will be to probe the candidate's understanding of her/his proposal and its implementation. The dissertation chair and the dissertation guidance committee members can initiate research topic enhancement, but at each step, it will be expected the candidate will take the lead in design and implementation. Because experimental design is one of the most significant components of any research endeavor, the DSc candidate will be expected to demonstrate independent skills in research design. The role of the dissertation chair and dissertation guidance committee will be to nurture and facilitate maturation on the part of the candidate.
- c. At this point, the dissertation chair will require an oral research proposal from the DSc candidate to the research guidance committee. Once approved by the research guidance committee, the dissertation chair will guide the DSc candidate through a formal proposal submission and approval by the LLU Institutional Review Board (IRB). The oral and written proposal should include:
 - i) A description of the problem to be investigated. This description should be presented within the context of a body of literature supporting the proposal as representing a valid and important study within its discipline and/or realm of scientific inquiry.
 - ii) A description of hypotheses and assumptions being advanced by the student. These can include original thought on the part of the student, as well as uninvestigated hypotheses and assumptions appearing in relevant literature. The candidate's presentation of this material should indicate familiarity with, and an understanding of, the research problem and the context in which it is being proposed it will be investigated.
 - iii) A description of the proposed experimental design. Experimental design should be exhaustive in its coverage. The final proposal can be trimmed if needed, but the initial proposal should be an indicator of both the depth and breadth of the problem being investigated. This proposal is also an indicator of the student's current mastery of the topic of proposed study and thus, should err on the side of proliferation, not brevity.
- d. The proposal must also demonstrate the student's understanding of the concept of variables. If the study is to be experimental rather than descriptive, the proposal should differentiate, where appropriate, between dependent and independent variables and clearly distinguish between control and experimental elements.
- e. The proposal must describe protocols the candidate has designed for both experimental and/or descriptive elements of the study. It should also speculate regarding possible outcomes/results for each component of the

study and how certain outcomes/results might redirect efforts or even modify study design. The proposal should also include tentative milestones by which to gauge progress both temporally and substantively.

- f. During the planning stages of the study the candidate will use effect size to attempt to determine the needed sample size. The research guidance committee may recommend an initial pilot study that will allow the candidate make reasonable estimates for mean differences, correlations, and variances. These elements will allow the student to perform a power analysis. If a larger sample size is needed, a study addendum will need to be forwarded to the Office of Sponsored Research for an amendment.

10. Proposal Submission and IRB Approval

- a. Following research committee approval, the DSc candidate will formally submit a research proposal to the Office of Sponsored Research through the dissertation chair. Upon approval of the research proposal by the Institutional Review Board (IRB) the candidate will be expected to progress in a relatively continuous fashion for the duration of her/his dissertation.

11. Quarterly Meetings with Research Guidance Committee

- a. The DSc candidate and her/his dissertation guidance committee members will meet a minimum of four times a year. Significant hiatuses will not typically be allowed.
- b. Quarterly meetings will also serve as a progress report. Students failing to demonstrate progress towards completion of their dissertation will receive an unsatisfactory grade for that quarter's research and statistics class. The candidate can only carry an "In Progress (IP)" grade in a research and statistics course for a maximum of 5 quarters, after which the dissertation chair will enter time an unsatisfactory grade. The student may re-register for the class at a tutorial rate for one additional quarter. If the candidate should fail to complete the course at this time the candidate will meet with the graduate committee and/or the graduate council.

12. Data Collection

- a. The data collection process is expected to progress in a relatively continuous process. In human it is not uncommon that subject recruitment will yield fewer subjects than initially expected. The research guidance committee should work with the student to develop contingency plan, such as alternate recruitment sites or expansion of inclusion criteria, when the sample size is substantially short of expectations. A student in a research-oriented doctorate program can not simply lower the number of subjects since sample size directly affects the statistical power of the study.
- b. Once the research guidance committee has verified that the data collection process has been successfully completed, the dissertation chair will submit a satisfactory grade for Research & Statistics III.

13. Form C. – Petition for Graduation

- a. Two quarters prior to the contemplated quarter of graduation Form C is due at the FGS (e.g., for a contemplated spring quarter ceremony participated would require that Form C reach the FGS prior to Fall quarter). This will typically occur once the student has successfully completed Research & Statistics III and has registered for Research & Statistics IV. The program director will contact the dissertation chair to determine if the Spring Graduation completion date is feasible. Once completion feasibility is confirmed, the program director will submit copies of Form C to both the Graduate Committee in the SAHP and the Faculty of Graduate Studies. It is the DSc candidate's responsibility to follow up with the program director to affirm that a spring quarter has been deemed feasible and Form C has been both submitted and approved by the sponsoring school and the oversight body at the FGS. Failure to do so may result in the unfortunate event that the candidate will be eligible to participate in contemplated year's graduation ceremony.

14. Data Reduction & Analysis

- a. It will also be expected the candidate will regularly and often reduce and analyze accumulated data for purposes of evaluating acceptability of protocols and data collection. These interim assessments will be a conjoint effort between the candidate and advisor. Important course corrections often arise from analysis of data subsets and the candidate needs to recognize the value of these exercises early in their research program.
- b. The dissertation chair will submit a satisfactory grade for Research and Statistics IV once the candidate has formally completed data analysis and have discussed the study output with the research guidance committee. During this meeting, questions may be generated that may require additional statistical tests. The DSc candidate must demonstrate a good understanding of the conceptual foundations of the statistical tests used in the study.

15. Preliminary Dissertation

The candidate will next register for 3 units of Research & Statistics V. The requirement for completion of this element of the research process is a substantial and acceptable draft of written dissertation material in either the formal dissertation or multiple chapter format. The publishable paper, a program requirement, must be the format of the journal in which the candidate plans to publish. Once the research guidance committee is satisfied that the intent of the Research & Statistics V course has been completed; the dissertation chair will submit a satisfactory (S) grade. This will signify the end of the required didactic and research units if the candidate has followed the suggested sequencing of the program coursework.

16. Dissertation

- a. Each DSc in Physical Therapy candidate will complete a dissertation. The dissertation will include all necessary documents that demonstrate competency in their research and related topics consistent with a candidate

of a research-based academic doctorate. In a subsequent chapter, the student will include a publishable paper. The dissertation must be approved by all members of the student's research committee a minimum of four weeks before the end of the contemplated quarter of graduation (spring quarter); however the student must submit Form C to the program director two quarters prior to the contemplated quarter of graduation. The chair of the dissertation guidance committee and the candidate will contact the program director to work with the candidate to submit the Form D (explained in Element 18) once the candidate has satisfied all the requirements of the dissertation and the defense of the dissertation. At the request of the DSc candidate, the student's dissertation guidance committee may approve a series of publishable papers in lieu of a traditional dissertation (refer to page 14 of the "Thesis and Dissertation Format Guide"). Please refer to the "Thesis and Dissertation Format Guide", Loma Linda University, Graduate School, March 2003 for the following: 1) Preparing the manuscript, 2) format of the dissertation, 3) published paper format, 4) published material & copyright, 5) filing of the manuscript, 6) checklist for filing, 7) sample pages, 8) format checklist, and 9) required official copies.

- b. The DSc must formatted their dissertation in accordance with the published Faculty of Graduate Studies guidelines, and submit their dissertation to the Faculty of Graduate Studies' dissertation formatting secretary. The dissertation secretary will sign and date the format checklist once the candidate's dissertation is formatted correctly.
- c. The DSc candidate will assemble a compilation of the study results and an in-depth discussion section; the research guidance committee will determine if an additional literature review (additional dissertation chapter) is appropriate to determine or discuss the underlying mechanisms of novel research findings or if the ongoing literature review is adequate with appropriate modifications. The DSc candidate is expected to continue to update their literature review chapter in pace with emerging research.

17. Defense of Dissertation

- a. Each student will orally defend the results and findings of their research project. This oral defense will occur no later than one month before graduation. The student will be approved to give their oral defense once their dissertation chair and guidance committee has had adequate time to review the student's full research manuscript and have determined that the student has demonstrated an adequate understanding of their research to successfully defend their study. The chair of their research guidance committee will schedule the oral defense once the DSc student has successfully presented their oral defense to her/his dissertation chair and dissertation guidance committee. The dissertation chair will work with the program director in scheduling the oral defense as well as sending out public notices.
- b. At the conclusion of the presentation, the floor will be opened for questions from the general audience and the research guidance committee. Once these questions have been satisfied, the audience will be excused and

the candidate's dissertation guidance committee members will privately and will then examine the DSc candidate. The guidance committee may ask additional questions, request further clarification, and inquire into plans for publishing the research in peer-reviewed journals. The program director and the department chair may be present during this portion of the defense.

- c. Following the oral defense the candidate will be excused and the entire dissertation guidance committee, if present, will determine if the candidate demonstrated competency in their research area consistent with a candidate of a research-oriented doctorate degree in a timely manner. The dissertation guidance committee may assign additional edits or study-related clarification at this time as deemed appropriate and necessary. The candidate must successfully defend their dissertation a minimum of four weeks before the end of the contemplated quarter of graduation (spring quarter).
- d. If the decision is positive the guidance committee members will sign the "Faculty of Graduate Studies – Form D, Certification of Completion of Requirements for Degree" with assurances that the final corrections or clarifications of the dissertation will be made according to the committee's recommendations.
- e. If the decision is that the candidate has failed to pass the dissertation defense the guidance committee will so inform the candidate and will file with the program director, and on occasions the dean of FGS, a written analysis of the candidate's performance with a plan and timetable for remediation or other course of action. The student will receive a copy of the guidance committee's decision, analysis and recommendations.
- f. Once the DSc candidate's dissertation has been correctly formatted and signed by the research committee it will be submitted to the Assistant/Associate Dean of the FGS at the Nelson House.

18. Form D. – Statement of Completion of Requirements for Degree

- a. The student must schedule an appointment with the program director to review the Degree Compliance Report (DCR) and DSc Program Checklist to ensure that all program requirements have been met. Form D is due at the SAHP Graduate Committee via the program director and the Faculty of Graduate Studies a minimum of nine (9) days before the end of the contemplated quarter of graduation (spring quarter).
- b. This one month period between the Oral Defense of the Dissertation and graduation will allow adequate time for the program director and the FGS to review the forms and the preliminary DCR, prior to the end of spring term, ensuring that all documents (transcripts, academic variances, checklists, forms, etc) have been received and/or processed and that degree requirements have been satisfied.
- c. Diplomas will not be processed until Form D has been received by University Records. Diplomas will be issued with the name of the sponsoring school (SAHP) with the additional statement "Awarded in conjunction with the Faculty of Graduate Studies" on the diploma.

NOTE: The Faculty of Graduate Studies will provide oversight of the rigor and quality of the research projects and dissertations as well as providing guidance and resources for the dissertation chair and research guidance committee (Faculty of Graduate Studies, Graduate Council Approval February 21, 2006). January 20, 2008: Appropriate changes were made to the original approved document in accordance with new policies approved by FGS during General Session in January 2008.