



ACADEMIC PROGRAM PROPOSAL FORM

DIRECTIONS: Use this form when proposing a new major or primary field of study, new emphasis, new degree program, or new certificate of achievement.

DATE SUBMITTED: 5/8/14

INSTITUTION: University of Nevada, Las Vegas

Date of AAC Approval:
December 3, 2014

REQUEST TYPE:

- New Degree
- New Major or Primary Field of Study
- New Emphasis
- New Certificate of Achievement (AAC approval only)

Date of Board Approval:

DEGREE (i.e. Bachelor of Science): Doctor of Medical Physics (D.M.P.)

MAJOR (i.e. Animal Science):

EMPHASIS (i.e. Equine Studies):

CREDITS TO DEGREE: 80

CERTIFICATE OF ACHIEVEMENT:

PROPOSED SEMESTER OF IMPLEMENTATION: Fall 2015

Action requested:

Approval of new degree

A. Brief description and purpose of proposed program

Historically, medical physicists have been trained as M.S. or Ph.D.'s in the basic academic field of physics. Clinical experience was obtained on the job as an "apprentice" or junior medical physicist. In order to become certified, the junior medical physicist had to pass three exams given by the American Board of Radiology (ABR). In 2008, the ABR mandated that only graduates of CAMPEP (Commission on Accreditation of Medical Physics Educational Programs) accredited M.S. or Ph.D. programs could take their certification exams. This created a barrier of entry into the medical physics profession and hence provided the impetus for UNLV's M.S. in medical physics specialization to seek accreditation (the specialization is currently accredited through 2018). In 2012, an additional restriction was promulgated by the ABR: to be eligible to take the part 2 exam, candidates must have completed a CAMPEP-accredited clinical training (residency) program. Therefore, upon completion of UNLV's M.S. program, graduates must be accepted into a residency program in order to progress to full certification. According to the American Association of Physicists in Medicine (AAPM Newsletter, Vol. 39, No. 2; March/April 2014), there is an imbalance in graduate production versus

residency opportunities that must be addressed to meet the manpower needs of the profession. Simply put, there are not enough residency programs to accommodate new medical physics graduates. This bottleneck has had a significant impact on M.S. degree holders, including UNLV's, since residency programs tend to accept a larger percentage of Ph.D.s. This is not surprising since most residency programs are housed in academic institutions in which the program leadership consists of Ph.D. medical physicists who tend to prefer candidates with the same credentials as themselves. Even so, the AAPM maintains that adequate didactic preparation for a clinical residency is a two-year graduate program leading to a masters degree. One solution to this imbalance is to create a professional degree, i.e., a doctorate in medical physics (D.M.P.). Presently, there is only one CAMPEP-accredited D.M.P. program in the nation. In comparison, there are 70 accredited residency programs (as of Feb.1, 2014).

Presently, there is a shortage of well-trained medical physicists which is likely to worsen over time as there is increasing demand for medical physicists in radiation oncology, diagnostic imaging and nuclear medicine. This need has been driven primarily by the aging population and the development of new radiation sources and technologies. Additionally, approximately 50% of current medical physicists are over the age of 50 and therefore the demand is likely to increase in the coming decades due to retirement. From the preceding discussion, it is evident that there is a healthy job market for medical physics graduates, especially in the Mountain West region which is growing at a faster pace than most other regions in the nation. In order to meet current demand, the AAPM estimates that around 250-300 new medical physicists are needed per year in the U.S. This demand is not being met by the 70 residency programs which produce approximately 110 medical physicists per annum, most of whom are Ph.D. prepared.

A D.M.P. program at UNLV would help to address the national shortage of residency programs. The need for such a program at UNLV is especially evident since it has been difficult for our M.S. graduates to gain acceptance into residency programs. An accredited D.M.P. program fulfills the residency requirement as it provides two years of clinical training and thus will qualify our students to take all ABR certification exams. Without a D.M.P. program, it will become increasingly difficult to recruit students into the department's medical physics option since we can't offer the clinical training required for full certification. UNLV's M.S. in Health Physics: Medical Physics sub-plan is one of only two programs to receive CAMPEP accreditation without the involvement of a medical school. All other accredited educational programs have close ties to medical schools thus providing their students with easy access to residency programs. The D.M.P. curriculum will be almost identical to the current M.S. program in the first two years of study and will consist of didactic coursework and labs to provide students with the background knowledge required of a clinical medical physicist. The last two years of study will be spent in the clinic. Three clinics have expressed interest in affiliating with UNLV: Comprehensive Cancer Centers of Nevada (Las Vegas), Dixie Regional Medical Center in St. George, Utah and Kaiser Permanente in Los Angeles. We're in preliminary discussions with an additional two facilities (one in Hawaii, the other in Utah). This "hub-and-spoke" approach has been advocated by the AAPM and it fits into the community-oriented approach that we have used for our imaging programs, i.e., sending students to local and regional medical facilities for their clinical education.

B. Statement of degree or program objectives

The educational objectives for the doctorate in medical physics program are as follows:

1. To provide students with a comprehensive understanding of the fundamental principles associated with the clinical use of both ionizing and non-ionizing radiations.
2. To provide students with an understanding of basic sectional anatomy and common pathologies in medical imaging modalities including CT, MRI, ultrasound, and PET.
3. To provide students with an in-depth knowledge of the operation of radiation producing and

- detecting devices commonly used in therapeutic applications.
4. To provide students with an understanding of the basic computational principles associated with therapeutic and diagnostic applications.
 5. To provide students with the clinical experience required for a complete understanding of the wide ranging clinical duties of a therapeutic medical physicist.
 6. To provide students with research experiences in medical physics-related projects.
 7. To produce graduates with a sound understanding of medical physics ethics and capable of rendering appropriate clinical care to patients in a professional manner.
 8. To produce graduates capable of effectively communicating technical information in both oral and written form.
 9. To produce graduates prepared to pursue a lifetime of self-directed learning and professional development.

C. Plan for assessment of degree or program objectives

Planned assessment methods include:

1. Quizzes and written exams. Students must obtain a grade of B or better in all courses.
2. Oral exams. Students must achieve a rating of "satisfactory."
3. National certification exam (ABR part 1). A 90 % pass rate will be considered a success.
4. Clinical research project report. Students must obtain a grade of B or better.
5. Student exit survey. A "satisfactory" evaluation in all categories will be considered a success. Based on scores and comments, an assessment will be made as to whether (a) the program met the student's expectations, and (b) the program adequately prepared the student for a career in medical physics.
6. Alumni survey. The goal is for the program to receive a "satisfactory" in all categories.

D. Plan for assessment of student learning outcomes and the use of this data for program improvement

The Program Director will be responsible for the analysis and reporting with input from dept. faculty and clinical preceptors. Performance of our graduates on the national board exam will be compared with the national average. A 90% pass rate on the national board exam (ABR part 1) will be considered a success (historically, the national pass rate for first takers is around 75%). A 100 % pass rate in all didactic courses (grade of B or better) will be considered a success. At the conclusion of each clinical rotation, students will be subjected to an oral exam (pass/fail) which will be administered by the clinical preceptor and other medical physics staff with whom the student has interacted. A faculty representative from the dept. will also participate in the oral exam. The data will be shared with all program faculty. Additionally, we will seek accreditation of the D.M.P. program (our M.S. in Medical Physics option is accredited by CAMPEP) and, as such, we would be mandated to share graduation rates, board exam results and placement rates with the general public through our website.

The program will be evaluated on an annual basis using the assessment instruments described in Section C. Curricular deficiencies will be identified and corrective action will be taken following consultation with program faculty and clinical preceptors. These discussions will be held during regularly scheduled faculty and/or program meetings. At such meetings, the clinical preceptors will typically participate via video or telephone conferencing. Students who fail a clinical rotation will be informed of their deficiency (ies) and provided an opportunity to re-take the rotation.

E. Contribution and relationship of program objectives to

i. NSHE Master Plan

In the most recent Economic Development State Plan (2012-2014), Governor Sandoval enunciates a vision of developing "a vibrant, innovative, and sustainable economy" resulting in "high-quality jobs for Nevadans". This will be accomplished through five objectives including "advancing targeted sectors and opportunities in the region." On p. 32 of the report, Health and Medical Services is featured prominently as a targeted sector, preceded only by Tourism, Gaming and Entertainment and Clean Energy. The overall objective of the D.M.P. program is to produce highly skilled medical physicists that would address a current shortage of such health care professionals. Medical physicists are integral in the treatment of cancer patients and, as such, the D.M.P. program will provide skilled health care workers for local radiation oncology facilities and hospitals. The need for medical physicists is especially acute in Nevada due to the aging population and the resultant increase in the number of cancer patients requiring radiation therapy during the management of their disease. Traditionally, it has been difficult to attract medical physicists to Nevada. The proposed D.M.P. program addresses this issue by training local area students who are more likely to stay and work in Nevada following graduation.

ii. Institutional mission

In the first paragraph of UNLV's Mission Statement it states that "We produce accomplished graduates who are well prepared to enter the work force, or to continue their education in graduate and professional programs." A D.M.P. program will provide a direct path to certification and hence gainful employment in clinical medical physics. This will certainly promote student learning and success (Core Theme #1). Furthermore, according to the Mission Statement: "Our commitment to our dynamic region and State centrally influences our research and educational programs, which improves our local communities." Las Vegas has a large population of elderly individuals with pressing health care needs including radiation therapy. A D.M.P. program will help to address these needs by providing well trained medical physicists to staff radiation oncology facilities. A D.M.P. program will promote significant engagement with the community (Core Theme #3) since local hospitals and clinics will provide the clinical experience. This is a very familiar approach since the Department's imaging programs (Radiography, Nuclear Medicine, and Comprehensive Medical Imaging) send their students to hospitals and clinics in the Las Vegas area. This community partnership has worked well as it has provided students with clinical experience while also providing a steady source of potential employees for the imaging facilities. A D.M.P. program will certainly help foster engagement with the community as new partnerships are developed with radiation oncology programs in local hospitals and free-standing facilities. According to the Mission Statement: "Our commitment to the national and international communities ensures that our research and educational programs engage both traditional and innovative areas of study and global concerns." D.M.P. programs are highly innovative, in fact, there is currently only one such program in the nation. The establishment of a D.M.P. program will position UNLV as a leader in medical physics education and will likely attract highly qualified applicants not only from the Mountain West region, but the entire nation. Students in the D.M.P. program will be expected to participate in clinical research (Core Theme #2). This is significant since there have been relatively few clinical research projects at UNLV.

iii. Campus strategic plan and/or academic master plan

The University's Master Plan includes the establishment of a Medical School. Although a UNLV Medical School is not essential for the survival of a D.M.P. program, it would certainly provide much needed clinical infrastructure that would help to grow the program. Graduates of the program serve as a source of highly skilled medical professionals for the Medical School and local area hospitals/clinics with radiation oncology needs.

iv. Department and college plan

In the Dept. of Health Physics Goals and Action Items, the number one goal is to “develop additional areas of concentration within the health physics and medical imaging area consistent with the Department’s strengths.” In the most recent School of Allied Health Sciences strategic plan, the primary objective is to “enhance graduate educational and post-baccalaureate opportunities offered in the School.” As is evident, the development of the M.S. in Health Physics: Medical Physics sub-plan in 2009 supported both the Department’s and the School’s strategic plans. The establishment of a D.M.P. program will certainly enhance graduate educational opportunities and it is consistent with the Department’s strength in medical physics. A D.M.P. program will provide a direct path for students to obtain certification in medical physics and, hence increase their likelihood of obtaining employment in the field. The strategic plans provided the rationale for the recent hiring of two additional highly qualified, research focused medical physicists. These hires have made it possible to strengthen the medical physics offerings in the Department and, hence to propose the establishment of a D.M.P program.

v. Other programs in the institution

The D.M.P. program will admit students with bachelors degrees in physics, or closely related disciplines (e.g. engineering and chemistry) and, as such, it will serve as a viable option for students in the physical sciences interested in obtaining a professional degree in the medical sciences field. Over the past two years, UNLV's M.S. in Health Physics: Medical Physics sub-plan has admitted 3 graduates from the Physics Department. These students would have applied for admission to the D.M.P. program had such an option been available.

vi. Other related programs in the System

Notwithstanding UNLV's program, there are no medical physics programs of any kind in the NSHE System. Therefore, a D.M.P. program at UNLV would help to attract students from other NSHE institutions, especially physics and engineering graduates from UNR.

F. Evaluation of need for the program

i. Intrinsic academic value of program within the discipline

In order to alleviate the shortage of medical physics residencies, the professional association (AAPM) has been advocating for the establishment of D.M.P. programs as an alternative pathway to certification. At present, there is only one accredited D.M.P. program in the nation. Therefore an accredited D.M.P. program at UNLV would place it at the forefront of medical physics education and, as such, would help to attract highly qualified students to the University.

ii. Evidence of existing or projected local, state, regional, national and/or international need for program

As previously discussed, there are not enough residency programs to accommodate graduates of medical physics educational programs. Therefore, as an alternative approach to obtain clinical experience, the AAPM is encouraging the establishment of D.M.P. programs. This would certainly help to alleviate the imbalance between the number of graduates looking for residency positions and the number of available residencies. Presently, there's only one accredited D.M.P. program in the nation. Additional D.M.P. programs, such as proposed at UNLV, would certainly help to address the shortage of well-trained medical physicists. This shortage is likely to worsen due to the rapid growth of the three major medical physics subspecialties. This increased demand is primarily due to the aging population and the development of new radiation sources and technologies. Furthermore, approximately 50% of current medical physicists are over the age of 50 and, as such, the shortage is likely to worsen in the near future due to retirement.

iii. If this or a similar program already exists within the System, what is the justification for this addition

There are no other medical physics programs within the System.

iv. Evidence of employment opportunities for graduates (state and national)

No statistics were found for Medical Physics, or closely related professions on Nevada's Department of Employment, Training and Rehabilitation website. Medical Physics is also not listed in the Federal Government's Outlook Handbook. The U.S. Bureau of Labor Statistics states that it does not collect employment data for medical physicists and suggests consulting the professional organization, i.e., the AAPM. According to the March/April 2014 AAPM Newsletter (<http://www.aapm.org/pubs/newsletter/default.asp#nlarchive>), in order to meet current demand, approximately 150-180 new medical physicists are needed per year in the U.S. This demand is not being met by the 70 residency programs. To address the shortage, the article recommends the establishment of D.M.P. programs, especially those incorporating private community-based clinics/hospitals (the so-called "hub-and-spoke" model). This is exactly the type of D.M.P. program that is being proposed at UNLV. Finally, due to the aging population and the aging workforce, it is evident that there is a healthy job market for medical physics graduates, especially in the Mountain West region which is growing at a faster rate than most other regions in the U.S. Unfortunately, there are no residency programs in the Mountain West. The vast majority of residency programs are located in the Eastern U.S.: there are only 17 programs west of the Mississippi (primarily in Texas and California).

v. Student clientele to be served (Explain how the student clientele is identified)

Student recruitment will be accomplished primarily through CAMPEP's website which lists all accredited educational programs (Certificate, M.S., Ph.D. and D.M.P.) and residencies. Students wishing to enter the medical physics field typically consult this website and it has proven to be an excellent tool for recruiting students to our Masters in Health Physics: Medical Physics sub-plan.

G. Detailed curriculum proposal

i. Representative course of study by year (options, courses to be used with/without modification; new courses to be developed)

The D.M.P. is a 4-year program. During the first 5 semesters, students will take courses at UNLV. All but one of these didactic courses have been developed and are currently offered as part of the M.S. in Health Physics: Medical Physics sub-plan. Therefore, the didactic part of the D.M.P. curriculum is almost identical to the current Masters sub-plan. A one-credit course in medical physics ethics must be developed. Additionally, an undergraduate course in sectional anatomy (CMI 376) will be modified and offered as a graduate course (HPS 676). The last six semesters consist of clinical rotations (HPS 770 - 775) in radiation oncology clinics and/or hospitals. Each rotation will emphasize a different aspect of clinical physics and will be taught by a clinical medical physicist. During their last two semesters in the program, students will complete a clinical research project (HPS 794). The 4-year curriculum consisting of 80 credits (for students admitted with a B.S.) is shown below:

Fall 1

HPS 676 (3 cr.): Sectional Anatomy in Medical Imaging

HPS 701 (3 cr.): Applied Nuclear Physics

HPS 730 (3 cr.): Advanced Radiation Biology

HPS 791 (1 cr.): Graduate Seminar

10 cr. total

Spring 1

HPS 703 (3 cr.): Radiation Interactions and Transport
HPS 602 (3 cr.): Radiation Detection
HPS 603 (3 cr.): Radiation Physics and Instrumentation Lab
9 cr. total

Summer 1

HPS 790 (6 cr.): Radiation Oncology Physics Internship

Fall 2

HPS 720 (3 cr.): Radiation Dosimetry
HPS 742 (3 cr.): Radiation Therapy Physics
HPS 791 (1 cr.): Graduate Seminar
7 cr. total

Spring 2

HPS 740 (3 cr.): Medical Imaging Physics
HPS 742L (3 cr.): Therapy Physics Clinical Rotation and Lab
HPS 792 (1 cr.): Ethics for Medical Physicists
HPS 791 (1 cr.): Graduate Seminar
8 cr. total

Summer 2

HPS 770 (6 cr.): Radiation Therapy Physics: External Beam

Fall 3

HPS 771 (6 cr.): Dosimetric Aspects of Radiation Therapy I

Spring 3

HPS 772 (6 cr.): Radiation Therapy Physics: Brachytherapy

Summer 3

HPS 773 (6 cr.): Dosimetric Aspects of Radiation Therapy II

Fall 4

HPS 774 (6 cr.): Clinical Medical Physics I
HPS 794 (2 cr.): Clinical Physics Research
8 cr. total

Spring 4

HPS 775 (6 cr.): Clinical Medical Physics II: Special Procedures
HPS 794 (2 cr.): Clinical Physics Research
8 cr. total

Total program credits: 80

* denotes new course

The doctor of medical physics curriculum (for students admitted with a M.S.) is listed below:

Fall 1

Electives - 10 credits

Spring 1

Electives - 10 credits

Summer 1

HPS 770 (6 cr.): Radiation Therapy Physics: External Beam

Fall 2

HPS 771 (6 cr.): Dosimetric Aspects of Radiation Therapy I

Spring 2

HPS 772 (6 cr.): Radiation Therapy Physics: Brachytherapy

Summer 2

HPS 773 (6 cr.): Dosimetric Aspects of Radiation Therapy II

Fall 3

HPS 774 (6 cr.): Clinical Medical Physics I

HPS 794 (2 cr.): Clinical Physics Research
8 cr. total

Spring 3

HPS 775 (6 cr.): Clinical Medical Physics II: Special Procedures

HPS 794 (2 cr.): Clinical Physics Research
8 cr. total

Total program credits: 60

ii. Program entrance requirements

Students seeking admission to the D.M.P. program must fulfill the following admission requirements:

- Overall GPA of 3.0/4.0 (B average) in undergraduate work. Applicants with a GPA below 3.0 but not less than 2.75 may be admitted as provisional students.

- Bachelor's Degree in Physics, Applied Physics, Physical Science, or Engineering (with an equivalent of a minor in physics) from an accredited college or university.
- A score ranking in the 50th percentile or higher on the verbal and quantitative sections of the Graduate Record Examination (GRE).
- Three letters of recommendation from former instructors or employers that speak to the applicant's potential as a graduate student. The individual writing the letter may use the form available from the Graduate College, which includes a release form for the student to sign.
- A statement of approximately 300 words indicating the student's professional goals and reason for seeking graduate education.
- International applicants whose native language is not English must show competency in the English language before they can be admitted. A satisfactory score (minimum 550 on the written version or 213 on the computerized version) on the "Test of English as a Foreign Language" (TOEFL) or comparable evidence of competency in English must be submitted by students as part of their application.

Applicants with a master's degree from an accredited medical physics program who meet the entrance requirements may be considered for admission to the program. In addition, these applicants must have taken the American Board of Radiology (ABR) part 1 exam as a condition for admission to the program. These students will be required to take an additional 20 credits of electives (determined by the Health Physics Graduate faculty).

iii. Program completion requirements (credit hours, grade point average; subject matter distribution, preprogram requirements)

To progress in the program, students must:

- Maintain a cumulative GPA of 3.0/4.0 or above each semester enrolled.
- Receive a grade of B (3.0) or above (or satisfactory, where applicable) in all courses. If less than a B (or unsatisfactory) is earned, the course may be repeated. The student must be in good standing to repeat a course, and any course may be repeated only once.
- A student may register for a course only twice. A student who registered for the same course twice and has received a grade of less than B (or an unsatisfactory) is ineligible for readmission unless unanimously approved by Health Physics graduate faculty.
- Complete a minimum of six semester hours in each calendar year.

A minimum of 80 credit hours is required for graduation from the D.M.P. program. The total number of credits required for masters students may be less as transfer credits may be applied towards graduation.

iv. Accreditation consideration (organization (if any) which accredits program, requirements for accreditation, plan for attaining accreditation - include costs and time frame)

The program must be accredited by the Commission on Accreditation of Medical Physics Education Programs (CAMPEP) in order for our students to be board eligible. The didactic component of the D.M.P. curriculum (initial two years) essentially mirrors the CAMPEP-accredited M.S. in Health Physics: Medical Physics sub-plan and, as such, we have a high degree of confidence that the proposed program will receive accreditation status. It is our intent to submit a Self-Study to CAMPEP as soon as the program receives final approval from the Board of Regents. If approval is obtained during the Fall 2014 semester, the Self-Study will be submitted sometime in the late fall (2014) or early spring (2015). Following submission of the Self-Study, it typically takes 9-12 months for the accreditation agency to render a decision. New programs are seldom turned down. The most likely scenario is to be granted a 2-year accreditation followed by another Self-Study and then 5-year accreditation. Therefore, there's a very high probability that the first D.M.P. graduates will graduate from an accredited program.

v. Evidence of approval by appropriate committees of the institution

A pre-proposal has been approved by UNLV's Vice Provost for Academic Affairs. The Dean of the School of Allied Health Sciences and all Department of Health Physics graduate faculty are strong advocates of the proposed program.

H. Readiness to begin program

i. Faculty strengths (specializations, teaching, research, and creative accomplishments)

Three of the six graduate faculty in the Department (Drs. Yu Kuang, Bing Ma and Steen Madsen) are medical physicists and, as such, are intimately familiar with medical physics education programs. They are capable of teaching all therapeutic and imaging physics courses in the proposed curriculum. The remaining three faculty members (Drs. Gary Cerefice, Frank Cucinotta and Ralf Sudowe) have strong backgrounds in nuclear physics, radiation science and radiation biology. They have extensive experience teaching the type of fundamental radiation science courses in the proposed curriculum. All six graduate faculty have active research programs funded from both intra and extramural agencies including the NIH, NASA and DOE. In short, the backgrounds of the graduate faculty are ideally suited for the proposed curriculum and their expertise will be complemented by the clinical experience of the medical physics preceptors at affiliate clinics and hospitals who will guide students through their clinical rotations. The three medical physics faculty will act as liaisons between the University and the clinical facilities to ensure uniformity of the clinical experience for all students.

ii. Contribution of new program to department's existing programs (both graduate and undergraduate) and contribution to existing programs throughout the college or university

A CAMPEP-accredited M.S. in Health Physics: Medical Physics sub-plan currently exists in the Department of Health Physics and Diagnostic Sciences. Since the D.M.P. program has a residency component and, hence provides a direct path to board eligibility, it is likely that all medical physics applicants will apply for admission to the proposed program. In that case, the M.S. sub-plan will likely be closed. The Department has a number of undergraduate imaging programs (Radiography, CT/MRI, Ultrasound and Nuclear Medicine). In the past, qualified graduates from these programs have been admitted to the M.S. sub-plan and it's likely that a D.M.P. program will attract more applicants from these undergraduate imaging programs. Based on past experience with the M.S. sub-plan, it is likely that a D.M.P. program will attract applicants from other UNLV departments and schools, including Physics and Engineering.

iii. Completed prior planning for the development of the program (recent hires, plans for future hires, securing of space, curricular changes, and reallocation of faculty lines)

In the past two years, three hires were made in anticipation of developing a doctorate program. Dr. Yu Kuang was hired in Fall 2012. He has a strong background in both therapeutic and diagnostic medical physics. Drs. Bing Ma and Frank Cucinotta were hired in Summer 2013. Dr. Ma is a diagnostic medical physicist and Dr. Cucinotta is a radiation physicist/biologist. With these hires, the Department is sufficiently staffed for the didactic component of the D.M.P. program and, as such, there are no plans for additional hires. Three clinical sites have agreed to affiliate with the D.M.P. program: Comprehensive Cancer Centers of Nevada (Las Vegas), Kaiser Permanente (Los Angeles) and Dixie Regional Medical Center (St. George, UT). This is an adequate number of sites to open the program. We will continue to seek new affiliates and to that end, we have received interest from additional sites in Utah and Hawaii. No additional space is required for the program and the didactic component of the D.M.P. curriculum is essentially identical to the CAMPEP-accredited M.S. specialization curriculum. Reallocation of faculty lines will not be required.

iv. Recommendations from prior program review and/or accreditation review teams

Following the initial accreditation site visit for the M.S. in Health Physics: Medical Physics sub-plan (June 2011), the program was accredited. Due to the similarity between the M.S. and proposed D.M.P. programs there is a high degree of confidence that the D.M.P. program will receive accreditation status. During the initial site visit in 2011, the evaluators suggested that we consider establishing a D.M.P. program. This was not unexpected since the American Association of Physicists in Medicine has been advocating for such programs in order to alleviate the shortage of residency programs.

v. Organizational arrangements that must be made within the institution to accommodate the program

No organizational arrangements are envisioned.

I. Resource Analysis

i. Proposed source of funds (enrollment-generated state funds, reallocation of existing funds, grants, other state funds)

The D.M.P. program is likely to replace the M.S. in Health Physics: Medical Physics sub-plan and, as such, five GAs will become available to fund D.M.P. students during their first two years at UNLV. The GAs will be awarded on a competitive basis and therefore, some students will be admitted to the program without financial support. Students will not receive GAs during their last two years in the clinic. During this time, efforts will be made by faculty to support students working on clinical research projects. This support will come from research grants associated with the clinical projects.

ii. Each new program approved must be reviewed for adequate full-time equivalent (FTE) to support the program in the fifth year. Indicate if enrollments represent 1) students formally admitted to the program, 2) declared majors in the program, or 3) course enrollments in the program.

a. (1) Full-time equivalent (FTE) enrollment in the Fall semester of the first, third, and fifth year.

1st Fall semester 5

3rd Fall semester 15

5th Fall semester 20

(2) Explain the methodology/assumptions used in determining projected FTE figures.

Enrollments represent students formally admitted to the program. The projection is based on the number of qualified applicants to the CAMPEP-accredited M.S. medical physics specialization (since 2010). Compared to the M.S. program, it is expected that the D.M.P. program will attract more highly qualified applicants since it provides a direct path to certification. However, due to limited number of clinical sites, the number of students will be capped to 5 per year. It is anticipated that enrollment will grow as more clinical sites are added.

b. (1) Unduplicated headcount in the Fall semester of the first, third, and fifth year.

1st Fall semester 5

3rd Fall semester 15

5th Fall semester 20

(2) Explain the methodology/assumptions used in determining projected headcount figures.

All students in the program will be full-time and, as such, the forecasted FTE and headcount are identical. Students will spend their first two years at UNLV for their didactic coursework. In years 3 and 4, students will be performing clinical duties at affiliate sites.

iii. Budget Projections – Complete and attach the Five-Year Budget Projection Table.

Please refer to the table.

J. Facilities and equipment required

i. Existing facilities: type of space required, number of assignable square feet, space utilization assumptions, special requirements, modifications, effect on present programs
No additional space is required.

ii. Additional facilities required: number of assignable square feet, description of space required, special requirements, time sequence assumed for securing required space
No additional facilities are required.

iii. Existing and additional equipment required

No additional equipment is required.

K. Student services required – Plans to provide student services, including advisement, to accommodate the program, including its implications for services to the rest of the student body

No additional student services are required. Advisement will be provided by the Graduate Coordinator and the Program Director.

L. Consultant Reports – If a consultant was hired to assist in the development of the program, please complete subsections A through C. A copy of the consultant's final report must be on record at the requesting institution.

i. Names, qualifications and affiliations of consultant(s) used
Not applicable.

ii. Consultant's summary comments and recommendations
Not applicable

iii. Summary of proposer's response to consultants
Not applicable

M. Articulation Agreements

i. Articulation agreements were successfully completed with the following NSHE institutions. (Attach copies of agreements)
NA

ii. Articulation agreements have not yet been established with the following NSHE institutions. (Indicate status)

NA

iii. Articulation agreements are not applicable for the following institutions. (Indicate reasons)

Articulation agreements are not required with any NSHE institutions. The proposed professional program is the only one of its kind in the State of Nevada and all courses are unique to the program and are not offered at any other NSHE institution.

N. Summary Statement

The proposed D.M.P. program supports the economic goals of Nevada and is closely alligned with UNLV's mission. As one of only a few programs in the nation, the D.M.P. program would be at the forefront of medical physics education and, as such, it would attract highly qualified students from across the nation. Graduates would help to address the current shortage of qualified medical physicists. This is particularly relevant for the State of Nevada due to its growing elderly population and the subsequent need for state-of-the-art cancer therapy facilities. The program requires minimal resources since the didactic curriculum is almost identical to the M.S. in Health Physics: Medical Physics sub-plan curriculum. In the last two years of the program, students will be in hospitals and/or radiation oncology facilities for their clinical education. The program can be supported by current faculty and no additional equipment or research infrastructure is required. Upon approval of the program, accreditation will be sought from CAMPEP. Due to our familiarity with the accreditation process, there is a high degree of confidence that the program will receive accreditation status. In the initial stages, five students will be admitted per year. The program will likely grow as more clinical sites are added.

DIRECTIONS: Complete the following cost estimates for the first, third, and fifth year budget projections for the proposed new program in Section A. If the total budget for the program is not reflected in the "Existing" or "New" categories, please provide further explanation in the space provided below (EXPLANATION). Any "new" costs must be noted by source in Section B.

Section A.	Year 1: <u>5</u>				Year 3: <u>15</u>				Year 5: <u>20</u>			
	Year 1/Start-up				Year 3				Year 5			
	Existing ¹	New ²	Total	FTE	Existing ¹	New ²	Total	FTE	Existing ¹	New ²	Total	FTE
PERSONNEL												
Faculty (<i>salaries/benefits</i>) ³	172,000	0	172,000	1.5	182,000	0	182,000	1.5	192,000	0	192,000	1.5
Graduate Assistants	36,904	0	36,904	0.3	36,904	0	36,904	0.3	36,904	0	36,904	0.3
Support Staff	22,000	0	22,000	0.3	23,000	0	23,000	0.3	24,000	0	24,000	0.3
Fellowships/Scholarships	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
Personnel Total	\$230,904	\$0	\$230,904	2.1	\$241,904	\$0	\$241,904	2.1	\$252,904	\$0	\$252,904	2.1
OTHER RESOURCES												
Library Materials (<i>printed</i>)	0	0	0		0	0	0		0	0	0	
Library Materials (<i>electronic</i>)	0	0	0		0	0	0		0	0	0	
Supplies/Operating Expenses	0	0	0		0	0	0		0	0	0	
Equipment	0	0	0		0	0	0		0	0	0	
Other Expenses	0	0	0		0	0	0		0	0	0	
Other Resources Total	\$0	\$0	\$0		\$0	\$0	\$0		\$0	\$0	\$0	
PHYSICAL FACILITIES												
Construction	0	0	0		0	0	0		0	0	0	
Major Renovation	0	0	0		0	0	0		0	0	0	
Other Facility-Related Expenses	0	0	0		0	0	0		0	0	0	
Physical Facilities Total	\$0	\$0	\$0		\$0	\$0	\$0		\$0	\$0	\$0	
TOTAL	\$230,904	\$0	\$230,904		\$241,904	\$0	\$241,904		\$252,904	\$0	\$252,904	
Section B.	↓				↓				↓			
	Amount		%		Amount		%		Amount		%	
EXPLANATION OF "NEW" SOURCES²												
State Support	0				0				0			
Federal Grants/Contracts	0				0				0			
State Grants/Contracts	0				0				0			
Private Grants/Contracts	0				0				0			
Private Gifts	0				0				0			
Other (<i>please specify</i>)	0				0				0			
TOTAL	\$0		0.0%		\$0		0.0%		\$0		0.0%	

¹Resources re-allocated from existing programs in Year 1 should be noted in the "Existing" column. In addition, "New" costs from Year 1 that will continue in the third and fifth year should also be noted in the third and fifth year as "Existing."

²Any "New" resource utilized to fund a new program must include the source to be provided in the "Explanation of New Sources" section. Total "New" sources for each year must equal the total for each year under "Explanation of New Sources."

³Budget estimates for faculty salaries and benefits must include estimated merit and COLA increases in Year 3 and Year 5.

EXPLANATION (*Please provide any additional information pertinent to the budget projection, including for example, explain for any new funding sources that are not guaranteed receipt by the institutions how the program will make-up for the potential loss in expected new funding.*): **An additional \$6,000 to convert two Master level Graduate Assistantships to Doctoral level Graduate Assistantships will be funded through allocations by the Graduate College. The rest of the resources required will be reallocated from existing sources.**