

Background Information

Provide a detailed description of the proposed modification, including its nature and purpose and centrality to institutional mission. (1500 characters)

The nature of this proposed modification to the Healthcare Genetics program is to decrease the total number of required program hours from 70 to 60 by: dropping nine hours of elective credit, dropping three credits in a genetic requirement, and adding two hours of content to a pre-existing course.

- 9 credit hours in electives
- 3 credit hours in general genetic course
- +2 credit hours in interdisciplinary research course
- =10 total credit hours removed

This curriculum revision will make the unique healthcare genetics program more competitive within the state and external to SC. Decreasing the overall number of hours in the doctoral program brings the degree in alignment with other STEM doctorates on campus. In addition, this improves the time to degree for the graduate students allowing them to move more rapidly into the workforce, build their program of research and establish themselves as respected researchers.

We will continue the delivery on the main campus and at the University Center of Greenville. The blended option provides students with the option of face-to-face delivery or online delivery for the HCG courses.

In summary, the HCG program proposed modification will

- a. Increase interdisciplinary research course by two credits.
- b. Replace a non-HCG theory course (3 hours) with one that identifies and analyzes theories commonly used to conduct research in healthcare genetics.
- c. Add the option of a laboratory methods course in Healthcare Genetics (1-9 hours) to improve the students' understanding and ability to communicate about molecular genetics, offer a unique option for their research and provide another option for a career opportunity.

List the objectives of the modified program. (1500 characters)

These original objectives continue to be relevant to the modified program:

- Collaborate with multiple disciplines to generate knowledge and develop theories that focus on the genomic aspects of actual and potential health problems;
- Formulate health promotion, disease prevention and treatment strategies that translate and integrate genomic knowledge from a variety of disciplines;
- Demonstrate leadership that facilitates interdisciplinary development and application of ethical guidelines and health policy in genetics;
- Disseminate research findings to develop models of practice that incorporate the expanding knowledge of genetics.

Assessment of Need

Provide an assessment of the need for the program modification for the institution, the state, the region, and beyond, if applicable. (1500 characters)

Since the completion of the human genome sequencing in 2003 there has been much genetics-related change in the world of prevention, diagnosis, profiling, treatment and follow-up of disease with more changes anticipated. The importance of daily communication between healthcare providers and researchers has become vital and emphasizes the need for rapid translation from bench to bedside for patient care. There are now clinics with genetic/genomic information tested and available for multidisciplinary one-day clinic appointments. The Healthcare Genetics doctoral degree at Clemson University is assisting this dynamic explosion of knowledge translation at the policy, intervention and molecular laboratory levels.

After six years program experience the faculty have identified necessary changes in curriculum content from exchanges with professional colleagues in genetics/genomics within academic and clinical settings, program alumni, students, the Community Advisory Board and research literature. Internal evaluations from students have identified the need to decrease the hours and external feedback is demanding the need for more rapid access to graduates for post-doctoral study and a jobs pipeline that focuses on application of faster, better and greater amounts of relative genomic information to the patient care setting. It is critical to have this PhD prepared individual for this rapidly changing landscape in precision medicine.

Will the proposed modification impact any existing programs and services at the institution?

Yes

No

If yes, explain. (1000 characters)

List of Similar Programs in South Carolina

| Program Name | Institution | Similarities | Differences |
|---------------------|--------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Genetic Counseling | USC | Genetics content Nurse HCG doctoral students and GC students counsel patients. | Clemson Healthcare Genetics — Terminal degree in research. Focuses on application of healthcare genetics in all areas of human genetics including policy, intervention and translational research (Bench to Bedside). USC Genetic Counseling— Master's degree Focuses on patient counseling |

Description of the Program

| Projected New Enrollment | | | | | | |
|---------------------------------|-------------|--------------|---------------|--------------|---------------|--------------|
| Year | Fall | | Spring | | Summer | |
| | Headcount | Credit Hours | Headcount | Credit Hours | Headcount | Credit Hours |
| 2016-17 | 1 | 9 | 1 | 9 | 1 | 3 |
| 2017-18 | 2 | 18 | 2 | 18 | 1 | 6 |
| 2018-19 | 3 | 27 | 3 | 27 | 2 | 15 |
| 2019-20 | 4 | 36 | 4 | 36 | 2 | 15 |
| 2020-21 | 5 | 45 | 5 | 45 | 2 | 15 |

Curriculum

Attach a curriculum sheet identifying the courses required for the program. (See Attached)

Curriculum Changes

Note: Complete this table only if there are changes to the curriculum.

| Courses Eliminated from Program | Courses Added to Program |
|-----------------------------------------------------|--------------------------------------------------------------------------------|
| HCG9030 Interdisciplinary Research in HCG (1 cr hr) | HCG9330 Interdisciplinary Research in HCG (3 cr hrs) |
| Undesignated theory course | HCG9040 Knowledge Development (3 cr hrs) |
| | HCG9090 Laboratory Methods in Healthcare Genetics (variable credit 1-9 cr hrs) |

Faculty

Provide a brief explanation of any additional institutional changes in faculty and/or administrative assignment that may result from implementing the proposed program modification. (1000 characters)

No changes in faculty are necessary.

Resources

Identify any new library/learning resources, new instructional equipment, and new facilities or modifications to existing facilities needed to support the modified program. (2000 characters)

None required.

Financial Support

| Estimated New Costs by Year | | | | | | |
|-------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------|
| Category | 1st | 2nd | 3rd | 4th | 5th | Total |
| Program Administration | - | - | - | - | - | - |
| Faculty and Staff Salaries | - | - | - | - | - | - |
| Graduate Assistants | - | - | - | - | - | - |
| Equipment | - | - | - | - | - | - |
| Facilities | - | - | - | - | - | - |
| Supplies and Materials | - | - | - | - | - | - |
| Library Resources | - | - | - | - | - | - |
| Other* | - | - | - | - | - | - |
| Total | - | - | - | - | - | - |
| Sources of Financing | | | | | | |
| Category | 1st | 2nd | 3rd | 4th | 5th | Total |
| Tuition Funding | 7,500 | 15,000 | 22,500 | 30,000 | 37,500 | 112,500 |
| Program-Specific Fees | | | | | | |
| State Funding (i.e., Special State Appropriation)* | | | | | | |
| Reallocation of Existing Funds* | | | | | | |
| Federal Funding* | | | | | | |
| Other Funding* | | | | | | |
| Total | 7,500 | 15,000 | 22,500 | 30,000 | 37,500 | 112,500 |
| Net Total (i.e., Estimated New Costs Minus Sources of Financing) | 7,500 | 15,000 | 22,500 | 30,000 | 37,500 | 112,500 |

*Provide an explanation for these costs and sources of financing in the budget justification. **R=Resident; NR=Non-Resident**

Budget Justification

Provide a brief explanation for the other new costs and any special sources of financing (state funding, reallocation of existing funds, federal funding, or other funding) identified in the Financial Support table. (1000 characters)

Note: Institutions need to complete this budget justification *only* if any other new costs, state funding, reallocation of existing funds, federal funding, or other funding are included in the Financial Support table.

No new costs or reallocation of existing funds required; this is a curriculum change and a modest increase in enrollment is expected. Faculty members are in place as are all necessary facilities and labs.

The tuition income is based on a modest increase in enrollment of students across the next five year. An average of in-state and out-of-state tuition costs was used in the calculation of tuition income.

Evaluation and Assessment

Will any the proposed modification impact the way the program is evaluated and assessed?

Yes

No

If yes, explain. (1000 characters)

Will the proposed modification affect or result in program-specific accreditation?

Yes

No

If yes, explain; if the modification will result in the program seeking program-specific accreditation, provide the institution's plans to seek accreditation, including the expected timeline for accreditation. (500 characters)

Will the proposed modification affect or lead to licensure or certification?

Yes

No

If yes, explain how the program will prepare students for licensure or certification. (500 characters)

Teacher or School Professional Preparation Programs

Is the proposed modified program a teacher or school professional preparation program?

Yes

No

If yes, complete the following components.

Area of Certification

Attach a document addressing the South Carolina Department of Education Requirements and SPA or Other National Specialized and/or Professional Association Standards.

Interdisciplinary Healthcare Genetics PhD Program

Overview of Program:

The purpose of the Clemson University School of Nursing, Interdisciplinary PhD in Healthcare Genetics is to prepare scientists to: extend the knowledge base relevant to nursing; translate research to advance the science; and, collaborate in interdisciplinary research and practice. Objectives of the program are to:

1. Collaborate with other disciplines to generate knowledge and develop theories that focus on the genomic aspects of actual and potential health problems of diverse individuals, families, groups, and communities while addressing health disparities.
2. Formulate health promotion, disease preventions and treatment strategies that translate and integrate genomic knowledge from a variety of disciplines.
3. Demonstrate leadership that facilitates interdisciplinary development and application of ethical guidelines and health policy in genomics.
4. Disseminate research findings to develop models of practice that incorporates the expanding knowledge of genomics.

Curriculum and HCG Degree Requirements

Core Courses

| Course | Credit Hours=33 |
|-------------------------------------------|-----------------|
| HCG 9010 Advances in Human Genetics | 3 credits |
| HCG 9330 Interdisciplinary Research | 3 credits |
| HCG 9050 Genomics, Ethics & Health Policy | 3 credits |
| HCG 9070 Applied Healthcare Genetics | 3 credits |
| HCG 9040 Knowledge Development | 3 credits |
| Three (3) graduate level genetics courses | 9 credits |
| Two (2) graduate level statistics courses | 6 credits |
| Qualitative research course | 3 credits |

Cognates (Choose one column)

| Ethics & Policy Total = 3-9 credits | Interventionist Total = 3-9 credits | Bench Scientist Total =3-9 credits |
|----------------------------------------|----------------------------------------|----------------------------------------|
| HCG 9100 Research Seminar or Electives | HCG 9100 Research Seminar or Electives | HCG 9100 Research Seminar or Electives |
| HCG 9890 Selected Topics or Electives* | HCG 9890 Selected Topics or Electives* | HCG 9890 Selected Topics or Electives* |

Dissertation*

| | | |
|--------------------------------|--------------------------------|-------------------------------|
| HCG9910 Dissertation 18 cr hrs | HCG9910 Dissertation 18 cr hrs | HCG9910Dissertation 18 cr hrs |
|--------------------------------|--------------------------------|-------------------------------|

The HCG PhD requires a minimum of **60 credit hours**. All Graduate School policies and procedures governing graduate education apply.

**Healthcare Genetics Doctoral Program Intervention/Bench/Policy
 Sample Course Progression with Summers**

Fall Year 1

| | | |
|-----------|--------------------|---------------------|
| GEN 6200 | Molecular Genetics | |
| OR | 6700 | Bioinformatics |
| OR | 6100 | Population genetics |
| HCG 9070 | Applied HCG | 3 |
| | Statistics course | 3 (Odd Years only) |
| | | <u>3</u> |
| | | 9 |

Spring Year I

| | | |
|----------|-----------------------|-----------------------|
| GEN 6700 | Human Genetics | 3 (Odd Years only) |
| | Statistics Course | 3 |
| HCG 9040 | Knowledge Development | <u>3</u> (Even Years) |
| | | 9 |

Summer Year I

| | | |
|----------|--------------------------------------------------|---|
| HCG 9910 | Article I for Dissertation/Revise Grant Proposal | 3 |
|----------|--------------------------------------------------|---|

Fall Year II

| | | |
|----------|-----------------------------------------|----------------|
| HCG 9330 | Interdisciplinary HCG Research | 3 (Even Years) |
| GEN | Graduate level (See above) | 3 |
| HCG 9890 | Selected Topic or 9100 Research Seminar | 3 |
| | Qualitative Research | <u>3</u> |
| | | 12 |

Summer Year II

| | | |
|----------|--------------------------------------------------|---|
| HCG 9910 | Article I for Dissertation/Revise Grant Proposal | 3 |
|----------|--------------------------------------------------|---|

Spring II

| | | |
|----------|-----------------------------------------|---------------|
| HCG 9010 | Advances in HCG | 3 (Odd Years) |
| HCG 9050 | Genomics, Ethics & Health Policy | 3 |
| | Elective | 3 |
| HCG 9890 | Selected Topic or 9100 Research Seminar | <u>3</u> |
| | | 12 |

80% of 52 hours (41 hrs) = Eligible for Comprehensive Exams

Summer II/Fall III

| | | |
|----------|-----------------------|----------|
| HCG 9910 | Dissertation Research | <u>9</u> |
| | | 9 |

Summer III

| | | |
|----------|----------------------------------------------|----------|
| HCG 9910 | Dissertation Research | 3 |
| HCG 9890 | Selected Topics OR HCG 9890 Research Seminar | <u>3</u> |
| | | 6 |

Total= 60 hrs

Healthcare Genetics Doctoral Program Intervention/Bench/Policy
Sample Course Progression *NO Summers*

Fall Year 1

| | | |
|-------------------|---------------------|--------------------|
| GEN 6200 | Molecular Genetics | |
| OR 6700 | Bioinformatics | |
| OR 6100 | Population genetics | 3 |
| HCG 9070 | Applied HCG | 3 (Odd Years only) |
| Statistics course | | <u>3</u> |
| | | 9 |

Spring Year I

| | | |
|-------------------|-----------------------|-----------------------|
| GEN 6700 | Human Genetics option | 3 (Odd Years only) |
| Statistics Course | | 3 |
| HCG 9040 | Knowledge Development | <u>3</u> (Even Years) |
| | | 9 |

Fall Year II

| | | |
|----------|----------------------------|----------------------|
| HCG 9330 | Interdisciplinary Research | 3 (Even Years) |
| GEN | Graduate level (See above) | 3 |
| HCG 9050 | Genomics, Ethics & Policy | <u>3</u> (Odd Years) |
| | | 9 |

Spring II

| | | |
|----------|--------------------------------------------------|----------|
| GEN | Course | 3 |
| HCG 9910 | Article I for Dissertation/Revise Grant Proposal | 3 |
| Elective | | <u>3</u> |
| | | 9 |

Fall III

| | | |
|----------------------|--------------------------------------------------|----------|
| HCG 9910 | Article I for Dissertation/Revise Grant Proposal | 3 |
| HCG 9890 | Selected Topic or 9100 Research Seminar | <u>3</u> |
| Qualitative Research | | <u>3</u> |
| | | 9 |

80% of 52 hours (41 hrs) = Eligible for Comprehensive Exams

Spring III

| | | |
|----------|-----------------------------------------|----------|
| HCG 9910 | Dissertation | 6 |
| HCG 9890 | Selected Topic or 9100 Research Seminar | <u>3</u> |
| | | 9 |

Fall IV

| | | | |
|----------|--------------|----------|---------------|
| HCG 9910 | Dissertation | 6 | 60 hrs |
|----------|--------------|----------|---------------|

NOTES:

This is only a suggested plan. Please meet with an advisor if you feel this plan will not be feasible for you.