Sample Genetics/Genomics Course in Nursing
Created and contributed by Rachel Choudhury MSN, MS, RN, CNE, OCN

Genetics and genomics are life-span issues with potential implications for individuals, from pre-conception through death. This seminar course provides an overview of genetics and genomics concepts with discussions on the nursing implications of the concepts in clinical practice. The course will prepare students to recognize the relationship of genetics and genomics in providing care in all health care settings.

Course Syllabus Recommendations

I. Course Information

Course Number and Title: NR3XX Genetics and Genomics for Nurses
Course Credit: 2 - 3 Credits (8-week course)
 Placement in Curriculum: Year 3, Semester 2 or later as an elective seminar course
Pre-requisites: Adult Health Nursing, Maternal/Newborn Nursing, Pediatric Nursing, and Mental Health Nursing

*** Rationale: Provides students the context to apply the genetics and genomics concepts based on clinical experiences; Allows students opportunity for much deeper and richer learning opportunities.

Course Description
This 8-week elective seminar course will prepare nursing students with basic competencies in genetics and genomics for providing care to individuals, families, and communities. Basic genetic/genomic concepts are reviewed and applied in the context of nursing clinical practice. Students will explore the role of caregiver, advocate, teacher, care manager, and researcher within the scope of legal and ethical nursing guidelines in a variety of healthcare settings. Case studies, debates, group activities, dialogue, and critical reflection about clinical practice will provide opportunities to integrate theory and practice.

Course Outcomes:
1. The student will demonstrate comprehension of the basic human patterns of biological inheritance and variation within families and within populations.
2. The student will utilize knowledge of disease-associated genetic variations to facilitate development of nursing interventions - independently and collaboratively - for the prevention, diagnosis, and treatment options for patients, families, and populations.
3. The student will be able to design a holistic approach to nursing care of patients with genetic disorders with consideration to legal and ethical issues, as well as the various factors that influence the patient’s ability to use genetic information and services.
4. The student will be able to use effective communication skills to process and provide genetics/ genomics information in nursing care of patients, families, and communities.

5. The student will evaluate own competence of practice, identifying areas of strength and areas where professional development related to genetics and genomics would be beneficial.

Course Competencies:
1. Demonstrate ability to generate a minimum of three-generation family health history information.
2. Conduct comprehensive assessments that incorporate knowledge about genetic, environmental, and genomic influences and risk factors.
3. Demonstrate understanding of the relationship of genetics and genomics to health, prevention, screening, diagnostics, selection of treatment, and monitoring of treatment effectiveness.
4. Appraise credible, accurate, appropriate, and current genetic and genomic information, resources, services, and/or technologies specific to given clients.
5. Demonstrate a culturally sensitive approach to nursing care of patient, families, and communities in providing genetic/genomic information and services.
6. Determine ethical and legal considerations, such as advocacy, autonomy, and confidentiality, related to genetic/genomic decision-making.
7. Examine one’s competence of practice, identifying areas of strength and areas where professional development related to genetics and genomics would be beneficial.

II. Course Instruction:

Instructional Methods:
Guest lectures via podcast or live in class.
Class Discussions, On-Line Discussion, Case Studies, Debates, Demonstration, and Guided Practice with Problem-based Learning.

Suggested Textbook(s) and Course Materials:
Suggested Web Resources:
- International Society of Nurses in Genetics: http://www.isong.org/
- National Institutes of Health, National Human Genome Research Institute (NHGRI): http://www.genome.gov/
- Cincinnati Children’s Hospital, Genetic Education Program for Nurses: http://www.cincinnatichildren.org/education/clinical/nursing/genetics/default/
- NHS, National Genetics Education and Development Center – Telling Stories: http://www.tellingstories.nhs.uk/ (please cut and paste link to your web browser)
- Genetic Alliance: http://www.geneticalliance.org/about
- The University of Utah, Genetic Science Learning Center: http://learn.genetics.utah.edu/

Other Resources:
- Essentials of Genetic and Genomic Nursing: Competencies, Curricula Guidelines, and Outcome Indicators (2nd ed.). http://www.genome.gov/Pages/Careers/HealthProfessionalEducation/geneticscompetency.pdf

III. Suggested Course Content Outline

A. Basic Concepts in Genetics and Genomics
   1. DNA Structure and Function
   2. Cell Growth, Cell Differentiation, and Gametogenesis
   3. Gene Expression
      a. Patterns of Inheritance
      b. Genetic and Genomic Variation
      c. Chromosomal and Mitochondrial Inheritance/Disorders
      d. Congenital Anomalies and Basic Dysmorphology
   4. Population Genetics and Genomics
   5. Genetic Risk Assessment: Family History and Pedigree Construction

B. Genomic Health
   1. Genetics and Genomics: Professional Nursing Practice Implications
   2. Lifespan Issues
      a. Common Adult-Onset Genetic Disorders
      b. Common Childhood-Onset Genetic Disorders
      c. Selected Complex Health Problems
         i. Cardiovascular Disorders
         ii. Cancer
         iii. Psychiatric and Behavioral Disorders

C. Genetic Disorders and Genomics: Management
   1. Genetics and Genomics Testing
2. Pharmacogenomics
3. Legal, Ethical, Sociocultural, and Financial Considerations
4. Advocacy

IV. Suggested Learning Evaluation Strategies
• Quizzes (Content Mastery; Knowledge/Comprehension)
• Discussions (Comprehension/Application/Analysis)
• Case Studies (Comprehension/Application/Analysis)
• Paper (Analysis/Synthesis/Evaluation)
• Debate (Analysis/Synthesis/Evaluation)

Quizzes (Content Mastery; Knowledge/Comprehension)
The quizzes are designed to evaluate students’ mastery of the content presented in the course lessons.
• The quizzes can comprise 15-20 multiple-choice, matching, and fill-in-the blank questions.
• Allow students ample time (1.5 – 2 minutes per question) to complete each quiz.
• Quiz administration will depend on the course format, i.e. face-to-face or online.

Discussions (Comprehension/Application/Analysis)
Threaded discussions are designed to promote dialogue between faculty and students, and students and their peers. In the discussions students:
• Demonstrate understanding of course concepts
• Integrate professional resources
• Engage in meaningful and respectful dialogue with classmates and faculty
• Express thoughts clearly and logically.

Participation Requirements (may vary depending on online requirements for the program): Students are required to post an initial response to the discussion topic and a minimum of two (2) responses to other students’ initial posts for each graded thread. Postings should be done on at least two (2) separate days within the week.

Sample Discussion Topic
1. Go to the Telling Stories website: http://www.tellingstories.nhs.uk/
2. Choose a story related to the theme Competencies: Utility and Limitations of Testing.
3. For your initial post, discuss the following areas in relation to the case study you chose:
   a. Result(s) of the genetic test
   b. Significance of the results
      i. Impact on the affected individual(s) and family
      ii. Clinical recommendations (eg. further testing, treatments, etc.)
   c. Nursing implications – How would you apply your knowledge of genetic testing used in this case study? Here are some considerations:
      i. Risk assessment
      ii. Patient education
iii. Referrals

4. Guidelines for your responses to other students’ initial posts:
   a. additional insights about the significance of the results.
   b. additional insights about nursing implications.
   c. present supporting information relevant to the topic.
   d. ask questions and/or respectfully debate your position.

**Discussion Rubric**

(Points may vary based on allocation of course grade distribution and requirements).

<table>
<thead>
<tr>
<th>Discussion Criteria</th>
<th>Exceeds minimum requirements</th>
<th>Meets minimum requirements</th>
<th>Does not meet minimum requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding and application of concepts</td>
<td>Postings apply concepts to professional practice, personal experience or examples from health care delivery system</td>
<td>Posting reflects full understanding of concepts but does not apply them</td>
<td>Posting does not fully reflect understanding of concepts</td>
</tr>
<tr>
<td>Application and analysis of professional resources</td>
<td>Postings integrate assigned readings, lessons, expert opinion and outside professional resources, articles or web sites. (sources are cited)</td>
<td>Postings integrate only assigned readings or lessons.</td>
<td>Postings demonstrate little or no integration of readings, lessons or professional sources.</td>
</tr>
<tr>
<td>Meaningful and respectful dialogue with classmates</td>
<td>Actively responds to peers and engages in meaningful and respectful dialogue with them.</td>
<td>Responds but does not engage in meaningful dialogue.</td>
<td>Does not actively engage or respond to peers. -OR- Reacts defensively or disrespectfully to feedback or questions</td>
</tr>
<tr>
<td>Clear and logical expression</td>
<td>Presents information using clear and logical language. Grammar, spelling and punctuation are accurate.</td>
<td>Presents information using clear and logical language. Grammar, spelling and punctuation have minimal errors.</td>
<td>Information is unclear and difficult to follow. Grammar, spelling and punctuation have errors.</td>
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<tr>
<td>Participation requirements</td>
<td>Initial post submitted by (day/time due) Responses/additional posts submitted by (day/time due)</td>
<td>Does not meet minimum requirements</td>
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**Case Studies (Comprehension/Application/Analysis)**

Case studies provide an opportunity for students to apply theoretical concepts to real-life situations. Each case study will have a scenario related to the course contents covered and will have specific tasks and questions to be completed. The case studies can be assigned as an in-class group assignment. Case scenarios with the required tasks/questions is provided in class. The assignment is submitted by the end of the class session if facilitated as an in-class activity.

Suggested general guidelines for case studies (will vary with class size):
- Groups will consist of 3-4 students.
- The groups will have 45 minutes to complete the assignment.
- The groups may use course materials for resources, but may not collaborate with other groups.
- Each group will submit ONE completed case study for grading.

**Sample Instructions for an In-Class Case Study Assignment/Learning Activity**

1. Refer to Case Study Guidelines described in the syllabus:
   - You will have 45 minutes to complete the assignment.
   - You may use course materials for resources, but may not collaborate with other groups.
   - Each group will submit ONE completed case study for grading.

2. Case Study Scenario: Choose ONE of the five (5) Case studies presented in your textbook:

3. Review the background information provided in the scenario and answer these questions related to your group case study.
Questions/Tasks

1. What other information would you like to have or ask the patient/family that may be helpful in your assessment of the patient situation/needs?

2. Identify the issues in this case study related to each of the following: Financial/Socioeconomics, Cultural, Religious, and Lifestyle

3. Describe strategies you would use to address the issues in Question #2.

4. Prioritize your nursing care management of this patient situation.

5. Identify ethical/legal concepts related to this case study. Include concepts from the ANA Scope & Standards of Genetics/Genomics Nursing Practice.

6. Describe how these ethical concepts influenced your approach to the case.

7. Identify two (2) challenges your team had with this case. Describe the reasons why you feel those items were challenging. How did this assignment help you recognize the challenges and to identify strategies to overcome those challenges?

Paper (Analysis, Evaluation, and Synthesis)

The purpose of this assignment is for the student to explore topic areas learned in the course, with the integration of knowledge-base, discussion experiences, personal perceptions, and nursing research, through writing a professional (APA formatted) paper.

Sample Paper: Reflective Analysis

The guidelines for this paper may include:

1. The student will choose a specific **genetic disorder** and incorporate the following concepts:
   - Professional Practice & Roles: Advocacy, Teaching, Researcher
   - Ethical & Legal Concepts: ANA Standards, Screening & Treatment Options, Counseling
   - Clinical Nursing Practice: ANA Competencies, Healthcare Settings, Management of Care

2. Nursing Research
   - Find at least three (3) peer-reviewed nursing research articles related to your topic.
   - Articles must be printed within the last 5 years.
   - Summarize relevant content from the articles to be presented (see #3).

3. **Explore** the topic based on the following:
   - Class lectures/readings
   - Experience(s) from course threaded discussions, case studies, and clinical practice (from other nursing courses)
     - Please make note to **keep patient confidentiality** when giving specific examples
   - Personal Perceptions –
     - What are your feelings, thoughts, and opinions about the topic before taking this course? And now? What changed your perceptions, if any?
   - Nursing research article
     - Does the article support or negate knowledge you have learned in class?
     - Does the article support or negate what you have experienced in the course discussions, case studies, and/or clinical practice?
     - Does the article support or negate your personal perceptions about the topic before/ now?

5. **Paper Length and Format using APA:**
   - 4-5 pages in length, not including the Title and Reference pages.
   - APA Format

6. **Papers are due no later than the beginning of class Week 7**

7. **Reflective Analysis Paper Grading Guidelines:** (Points may vary based on allocation of course grade distribution and requirements).

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>Excellent</th>
<th>Meets Expectations</th>
<th>Does not Meet Expectations</th>
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<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>• Introduction of topic with relevance to practice of nursing</td>
<td>• Introduction of topic not clear OR relevance to practice of nursing weakly presented.</td>
<td>• Introduction not clear and weakly presented in relevance to practice of nursing. Purpose or Focus of Paper NOT Clearly stated AND lacking conceptual key points to be discussed.</td>
</tr>
<tr>
<td></td>
<td>• Purpose or Focus of Paper Clearly stated with key concepts/points to be discussed</td>
<td>• Purpose or Focus of Paper Vaguely stated OR lacking conceptual key points to be discussed.</td>
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<tr>
<td><strong>Body of Paper</strong></td>
<td>• Complete/well-developed discussion of key points with appropriate citations (APA)</td>
<td>• Incomplete OR under-developed discussion of key points; OR lacking appropriate APA citations</td>
<td>• Incomplete/Under-developed discussion of key points AND lacking appropriate APA citations</td>
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<tr>
<th>Development of ideas with clear and accurate information, supported by at least 3 examples from experiences.</th>
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<tbody>
<tr>
<td>Analysis of topic area incorporates all the required elements of knowledge-base, experiences, perceptions, and research literature. Ideas are well-articulated and clearly presented.</td>
</tr>
<tr>
<td>Relevant literature cited and/or supported with evidence. Applicable research discussed thoroughly and included implications for nursing practice as appropriate.</td>
</tr>
<tr>
<td>Perception: Student provides own perspectives on the topic. Demonstrates perspectives that are deeply reflective and insightful. Relates to nursing practice.</td>
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<tr>
<th>Development of ideas lacking logic, clarity, OR accuracy of information; Used 2 examples from experiences.</th>
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<tbody>
<tr>
<td>Analysis of topic area incorporates 3 of the 4 required elements: knowledge-base, experiences, perceptions, and research literature. Ideas may be lacking clarity in presentation.</td>
</tr>
<tr>
<td>Relevant literature cited and/or supported with some evidence. Applicable research discussed adequately and included implications for nursing practice as appropriate.</td>
</tr>
<tr>
<td>Perception: Student provides own perspectives on the topic; Demonstrates adequate reflection and/or insightfulness. Lacks relation to nursing practice.</td>
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<table>
<thead>
<tr>
<th>Development of ideas lacking logic, clarity, and accuracy of information, One or NO example from experiences.</th>
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<tbody>
<tr>
<td>Analysis of topic area incorporates 0-2 of the 4 required elements: knowledge-base, experiences, perceptions, and research literature. Lacks clarity in presentation of ideas.</td>
</tr>
<tr>
<td>Relevant literature poorly cited and/or supported with minimal or no evidence. Applicable research not discussed adequately and did not include implications for nursing practice as appropriate.</td>
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<tr>
<td>Perception: Student provides own perspectives on the topic, BUT does not provide reflection and insightful perspectives. Does NOT relate to nursing practice.</td>
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## Conclusion

<table>
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<tr>
<th></th>
<th>Discusses implications and relevance to nursing practice, supported by more than 3 examples. Clearly presented.</th>
<th>Discusses implications and relevance to nursing practice, supported by more than 2-3 examples. Clearly presented.</th>
<th>No clear conclusion. Lacks or does not discuss implications and relevance to nursing practice.</th>
</tr>
</thead>
</table>

## Format/Style/References

| | APA format: **No abstract**, proper citation, style, referencing, and format; Proper spelling/grammar throughout paper. Less than 3 types of errors. ALL articles are from peer-reviewed nursing journals (minimum of 3) and within the last 5 years. Adherence to length guidelines: Actual content is at least 4 pages, no more than 5 full pages. | APA format: **No abstract**. Citation, style, referencing, format, and spelling/grammar - Contains 3-4 types errors throughout paper. Some articles are NOT from a peer-reviewed nursing journal **AND/OR** some references are older than 5 years. Actual content length is less than 4 full pages. | APA format: **No abstract**, Citation, style, referencing, format, and spelling/grammar - Contains more than 4 types of errors throughout paper. None of the references are from peer-reviewed nursing journals. References are older than 5 years. Actual content length is less than 3 full pages. |

## TOTAL POINTS EARNED (out of ###)

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*Instructor Comments/Feedback to Student:*
**Debates (Analysis, Synthesis, and Evaluation)**

Debates prompt students to seek out information and derive an explanation or decision related to the topic areas presented in this course. The debate exercises will facilitate students’ personal and professional development through reflection on their own decisions and conclusions made based on reliable evidence.

**Sample Debate Assignment**

The guidelines for the debate exercises may include:

1. Students will be assigned in groups of four (4). Each team will comprise of two (2) students, where one team will present arguments “for” and the other team will present arguments “against” the chosen debate topic.

2. Student groups will choose a debate topic by Week 3 of the course. Suggestions for debate topics include, but are not limited to the following:
   - Genetic screening requirements, testing procedures, and follow-up care
   - Research related to genetics/genomics in humans
   - Nursing scope of practice and competencies in genetics/genomics
   - Healthcare policies related to clinical applications of genetics/genomics

   *** It is recommended that groups present a comprehensive perspective genetics/genomics from the following areas:
   - Professional Practice & Roles: Advocacy, Teaching, Researcher
   - Ethical & Legal Concepts: ANA Standards, Screening & Treatment Options, Counseling
   - Clinical Nursing Practice: ANA Competencies, Healthcare Settings, Management of Care

3. **Research** Arguments and perspectives presented in the debates must be supported by research from peer-reviewed journals and/or credible resources (eg. National Human Genome Research Institute (NHGRI), NIH, etc.)
   - At least 5 (five) research references related to your topic per debate group.
   - Articles must be recently published (within the last 5 years).
   - Summarizes relevant content from the articles presented in arguments (see #2).

4. **Debate Guidelines - Debate Exercise to be held Week 8 of the Course Session.**

Each group will have 30 minutes to present/debate their topic of choice (see agenda below). Each team will have 5 minutes to present their argument, and another 5 minutes to present their counterarguments in response to the other team. The debate group will have 10 minutes to address questions from the audience. Teams may use notes during the debate exercise.

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>00-05</td>
<td>Arguments for selected topic (Team A)</td>
</tr>
<tr>
<td>05-10</td>
<td>Arguments against selected topic (Team B)</td>
</tr>
<tr>
<td>10-15</td>
<td>Counterargument/Rebuttal by Team A</td>
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</table>

5. Grading of the debates will comprise of faculty and audience scores: [## points] from the faculty and [## points] from the average of the audience scores – for a total of ### points.
(Points may vary based on allocation of course grade distribution and requirements).

**Debate Grading Criteria and Scoring Sheet** for Instructor and Audience

**Debate Topic:**

Team Member Names: Indicate **For or Against** (circle one)

(1) __________________________  (2) __________________________

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<thead>
<tr>
<th>Criteria</th>
<th>Rating</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td><strong>Opening statement</strong> was clear, well organized, factual, and relevant. (1-10 pts)</td>
<td></td>
<td>*Minus one point for each: clarity, organization, factual, and relevance.</td>
</tr>
<tr>
<td><strong>Arguments in support of its position</strong> (for or against) was stated clearly, was relevant, and well-informed. At least 3 (up to 5) arguments were presented. (1-20 pts)</td>
<td></td>
<td>*Very strong and persuasive arguments given throughout. * Tone of voice, clarity of expression, precision of arguments all contribute to keeping audience’s attention and persuading them of the team’s case.</td>
</tr>
<tr>
<td><strong>Rebuttal</strong> to opposing side’s arguments was clear, relevant, well informed, and effective. (1-20 pts)</td>
<td></td>
<td>*Identification of weakness in the other team’s arguments and/or ability to defend itself against the counterargument/rebuttal of the other team.</td>
</tr>
<tr>
<td><strong>Closing statement</strong> was stated clearly, was relevant, and effectively summarized the team's position. (1-10 pts.)</td>
<td></td>
<td>*Minus one point for each: clarity, organization, factual, and relevance.</td>
</tr>
<tr>
<td>Answers to audience questions were clear, well-informed, and relevant. Utilized information from evidence/research to support response. (1-20 pts)</td>
<td>* Addresses the question appropriately by providing reasons for/against the resolution, and well-supported by research literature.</td>
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<tr>
<td>Overall preparedness, organization, effectiveness, and professionalism in the debate. (1-10 pts)</td>
<td>*Minus one point for each: preparation, organization, effectiveness, and professionalism.</td>
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</tbody>
</table>

| TOTAL POINTS EARNED | (out of 100) |

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