**Proposed Syllabus for MHST/NUR 602**

**Course Description**

This course focuses on the theoretical basis of healthcare informatics with an emphasis on management and processing of healthcare data, information, and knowledge. Healthcare vocabulary and language system, and basic database design concepts are addressed.

**Expected Individual Student Learning Outcomes**

The course outcomes are derived from COACH core competencies (COACH: Canada’s Health Informatics Association, 2012):



On completion of the course and its related activities, students will be able to:

1. Analyze the historical basis and conceptual and theoretical models for healthcare informatics.
2. Apply computer and information literacy skills to the healthcare setting.
3. Access a large dataset and use the data to answer a clinical question.
4. Examine selected taxonomies, vocabularies, and coding systems relevant to healthcare.
5. Evaluate the ways in which healthcare data, information, and knowledge influence the design of information and decision support systems to support administration, practice, education, and research in Canada.
6. Apply human factors and usability principles to healthcare information system design and use.
7. Articulate the health care informatics professional's role in planning for, implementing, upgrading, and evaluating health care information systems.
8. Assess the impact of health care information systems on individuals, organizations and society (social, legal, privacy, ergonomics).
9. Analyze current topics and global initiatives in the field of healthcare informatics.
10. Project the impact of emerging technology and proposed standards on the future of health care information systems.

**Course Content**

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| **Week(s)** | **Topic** | **Weekly Outcomes** |
| 1 | Introduction to healthcare informatics | Define healthcare informatics and distinguish it from medical and nursing informatics. Evaluate 3 current issues in healthcare informatics and how they relate to your experience/practice. Effectively navigate the course site, including the syllabus, assignments, discussion forums, and assignments. Identify at least one commonality and one difference with another student in the class |
| 2-3 | Theoretical foundations | Define data, information, knowledge, system and apply them to the information systems. Describe two models that have been proposed to conceptualize informatics. Analyze the relationship of key concepts from systems theory, information theory, cognitive learning theory, and change theory to selected current issues in informatics. Describe the theoretical underpinnings of key informatics skills related to communicating, structuring, questioning, searching, and making decisions. Discover the strengths of your team members and plan how to work together. |
| 4 | Information Management Systems | Describe the functional hardware and software components of information systems. Explain the components of a health care information management system.Identify at least three constraints on the use of health care information systems.Explain the relevance of standards for the implementation of health information systems.Use established appropriate criteria to evaluate a health website. |
| 5 | Applications to move data to information and knowledge | Describe health care professional needs for management and clinical data that can inform clinical and managerial decisions. Identify a clinical, administrative or educational application that might facilitate patient care in your own practice setting.Debate the key components needed in a health information system to support evidence-based practice.Compare and contrast clinician, patient, and informatics professionals' views about the desired features of an electronic health care record system.Critically evaluate the use of instructional technology for the education of students, staff and patients.Discuss the implications of using information technology, including the internet, to conduct health-related research.(Project 1 due by end of week 5) |
| 6 | Knowledge representation | Compare and contrast 4 of the most common healthcare terminologies (ICD, HL7, SNOMED CT, and LOINC). Examine your own professional discipline for a terminology (or interest in generating one). Explain the strengths and limitations of any specified terminology.Critique current national and international efforts to develop a unified nursing nomenclature. Assess the progress made and what has yet to be accomplished. Examine the structure of an online database or data set and use the data to answer a clinical question of interest. |
| 7 | Communication technologies & ehealth | Compare and contrast ehealth, telehealth, & telemedicine. Critically evaluate current trends in ehealth. Critically analyze the impact of ehealth on patients, providers, and funding agencies. Evaluate common communication technologies and applications, including personal health records. |
| 8 | Decision Support Systems | Compare and contrast analytic and intuitive theories of decision making. Evaluate contemporary clinical information systems in terms of their usefulness, usability, data retrievability, connectivity, and educational requirements. Assess the need for clinical decision support.Compare and contrast two clinical decision support systems.Evaluate the strengths and weaknesses of decision support for patients.(Project 2 due by end of week 8) |
| 9 | The health care professional role in designing, implementing and evaluating information systems | Describe the Systems Development Life Cycle. Demonstrate the role of the graduate prepared health care professional in planning for, selecting, implementing and evaluating an informatics innovation to improve some aspect of patient care or your practice.Critically evaluate strategies for system implementation.Compare and contrast methods and strategies for evaluating health information systems. |
| 10 | Human-technology interaction | Compare and contrast human factors, ergonomics, human-computer interaction and usability. Evaluate the goals of human-technology (or human-computer) interaction.Compare and contrast indicators and methods relevant to usability studies.Evaluate the usability of a healthcare technology of your choice. |
| 11 | People & organizational issues | Critically analyze three key organizational factors that affect technology diffusion and implementation in healthcare organizations. Apply organizational theory to understand people and organizational issues in healthcare informatics. Evaluate strategies that might be used to minimize negative people and organizational issues when implementing a healthcare information system.Critically evaluate the concept of "communication space" and how it can be used as a basis for system design.Critically assess the impacts of information systems on the level of trust in an organization. |
| 12 | Legal, ethical, & policy issues in healthcare informatics | Critically evaluate the pros and cons of giving patients access to their own health information. Compare and contrast privacy, confidentiality and security.Critically assess the ethical, legal and policy implications for the protection of health information.Evaluate the threats to protecting health information in a virtual health record and propose solutions.Compare and contrast patients', clinicians', and researchers’ perspectives on health information access.(Project 3 presentation due by end of week 12) |
| 13 | Into the future: Issues & answers | Describe three trends in technology and informatics and evaluate their potential impact. Propose an informatics solution to an identified problem.Evaluate the application of informatics for your own future work.(Project 3 due by end of week 13) |

**Teaching Philosophy and Methods**

**Teaching Philosophy:** Each of us has some prior knowledge that we bring to this course and on which we will attempt to build. Together, we constitute a small learning community as each of us has different levels of expertise in different areas. The larger projects will be done by groups so it will be important to assess what each member of your group can contribute early on in the course. The instructor’s primary role in our community is that of facilitator and coach. In that role, we will try to help you identify the major threads and essential principles, point you to useful information and help you gain the requisite skills to find and use the information. Because the available information is growing so fast, only by continuing to learn and using available technology can any of us hope to stay abreast with changes in our fields. In the end the primary responsibility for learning remains with you the learner. We believe that the best learning comes from doing; hence, the several projects, web exercises--and the lack of formal exams. Individual instructors may provide you with a number of online mini-lectures, but most of our learning will take place during our discussion of the mini-lectures, discovered or assigned readings and issues as we examine real-world examples. We believe that regular, honest student feedback is crucial for improving the course and ensuring that effective learning is taking place—so expect to be asked for your opinions about how the course is going at various times and please let your instructor know immediately if something is interfering with your learning.

**Teaching Methods**: Offline and online reading, online discussion, interactive web exercises, individual and group projects/papers, and online student presentations.

Each student will be assigned to a workgroup (for the group projects) and a discussion section (for the group discussions). Instructors have access to each discussion section and workgroup, but students have access only to their assigned discussion section and workgroup.

Workgroups. Each workgroup consists of 4 students.

Discussions. A separate discussion forum will be created for each discussion topic as move through the semester. Your discussion section typically consists of the students from 2 workgroups.

**Grade Policies:** Evaluation will be based on participation (20%) and the successful completion of 3 projects/papers (80%).

**Participation in Group Discussions (20%)**

You are expected to participate actively in all online group discussions by making at least two substantive postings each week. You may include as one of your postings your response to an interactive web activity. Your postings should make it clear that you are reading others’ responses. Simply posting an “I agree with Susan” or “I found the same thing” is not considered a substantive response.

Examples of substantive online discussion postings include:

* reporting on the results of a web exercise or what you have read and evaluating the usefulness of the activity or information or relating it to other informatics concepts or issues
* asking an excellent question that generates further group discussion or reflection
* posting a thoughtful, thorough response that builds on the ideas of other participants and digs deeper into questions or issues using evidence from assigned readings.

Grades will be given to each discussion group as a whole and to each group facilitator (one point added to that week's group grade for good facilitation).

Facilitating the Discussion: Each of you will have the opportunity be a facilitator for one discussion. Facilitators should develop questions that align with at least one of the objectives for that module and are of broad interest, requiring not only experience, but also knowledge from the assigned readings or activities. ***Facilitators are encouraged to submit questions ahead of time to your instructor for feedback prior to posting.***

The group grading rubric for the online discussions is as follows:

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| **Point Value**  | **Characterization of the Posting**  |
| 0  | No response from one or more of the group members (unless excused by the instructor).  |
| 1.5  | Single posting by one or more members of the group; or no interaction with other participants’ postings by one or more of the group; or postings predominately based on experience rather than readings.  |
| 3  | Postings predominately integrate assigned or discovered readings with personal experience (as appropriate) and build on the ideas of other participants to dig deeper into questions or issues  |
| 6  | Thoughtful, thorough responses or questions predominate that integrate multiple views and readings and/or serve as a seed for further reflection or discussion.  |

**Projects**

**Project 1. Healthcare Website Evaluation***.* **Individual Project (20%)**

Review one healthcare website. As a basisfor your evaluation, select a set of evaluation criteria from those available online. Share your evaluation with your discussion group. The paper is to be submitted for grading via **the Assignments Dropbox.**

The project grade will be based on:

Overall project quality (see rubric below) = 50%

Peer evaluation of group members' web site evaluation = 25% (see Peer Evaluation Form)

Faculty evaluation of individual contributions (based on Project Plan) = 25%

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| **Grading Rubric for Project 1** |  |
|  | **Levels of Achievement** |  |
| **Criteria**  | **Exemplary** **6**  | **Proficient**  **4**  | **Competent** **2**  | **Not yet** **Competent** **0**  |
| **Rationale for selection of website to review**  | Rationale is clear and concise.  | Rationale is generally clear and concise.  | Rationale is either unclear on rambling.  | Rationale is neither clear nor concise. Very hard to follow.  |
| **Rationale for selection of evaluation criteria.**  | Rationale is clear and concise.  | Rationale is generally clear and concise.  | Rationale is either unclear on rambling.  | Rationale is neither clear nor concise. Very hard to follow.  |
| **Quality of evaluation criteria**  | Excellent; widely accepted for health websites; valid and reliable.  | Excellent, but not generally used for health websites  | May be appropriate, although validity or reliability not established.  | Not appropriate for this type of website.  |
| **Application of evaluation criteria**  | Effective application of criteria.  | Criteria generally used appropriately.  | Criteria not always used appropriately.  | No criteria used.  |
| **Interpretation of results**  | Interpretation of evaluation is accurate, clear and concise.  | Your description of the results is clear, but your interpretation needs strengthening.  | Portions of your description or your interpretation of the results are unclear.  | Both your description and interpretation of the results are unclear or incorrect.  |
| **Presentation of evaluation**  | Well written with minimal grammar or spelling errors  | Mostly well written with some grammar or spelling errors.  | Some writing issues (comprehension) and a number of grammar or spelling errors.  | Poorly written with grammar and spelling errors throughout.  |

**Project 2. Answering Questions with Databases. Group Project (25**%)

Pose a clinical question that you can answer with data. That question may relate to a quality issue, and a patient population, obtain a dataset (these are usually numerical data) from the organization where you work or online. In a short paper (no more than 3 double-spaced pages), describe: (a) the problem to be solved (b) the dataset and source, (c) the structure of the data, (d) the question you posed, (e) the results, (f) your evaluation of the data's usefulness. (If you know how to do so, you may use Excel or SPSS to analyze the data. If not, you can use pencil and paper and graphic displays to answer your questions). Please contact your instructor if you have any questions about this.

The Project Grade will be based on:

Overall project quality (see rubric below) = 50%

Peer evaluation of group members' contributions = 25% (see Peer Evaluation Form)

Faculty evaluation of individual contributions (based on Project Plan) = 25%

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|  **Grading Rubric for Project 2 (Overall Project Quality)**  |
| **Levels of Achievement**  |
| **Criteria**  | **Exemplary** **6**  | **Proficient 4**  | **Competent** **2**  | **Not yet** **Competent** **0**  |
| **Formulation & scope of informatics problem**  | Your problem description is clear and well thought out, demonstrating effective integration of your prior clinical knowledge and competencies and information gained in other areas of the graduate program, and the problem scope is well defined.  | Your problem description is clear and demonstrates some integration of your prior clinical knowledge and competencies as well as some information gained in other areas of the program, but the scope is not well defined.  | Your problem description is unclear in some respects and not well thought-out. There is little evidence that you have integrated prior knowledge and competencies.  | Your problem description is unclear with little to no integration of prior knowledge and competencies. The reader is left wondering about the nature and scope of the problem.  |
| **Dataset and source**  | Your dataset comes from a reputable source and contains data that are appropriate for your problem and can answer your question.  | Your dataset comes from a reputable source and contains data that are appropriate for your problem and can provide a partial answer to your question.  | Your dataset comes from a reputable source and contains data that are appropriate for your problem but may not answer your question.  | Your dataset does not come from a reputable source and/or contains data that are not appropriate for your problem and won’t answer your question  |
| **Structure of the data**  | Your\description is clear and accurate. You have a good understanding of data structures.  | Your\description is mostly clear and accurate. You have a basic understanding of data structures.  | Your\description is sometimes unclear or inaccurate. You are beginning to understand data structures  | Your description is unclear and inaccurate. You’re not quite getting it.  |
| **Question posed**  | Your question is significant, has been thoughtfully chosen and can be answered by the data.  | Your question has some significance, and has been thoughtfully chosen and probably can be answered by the data.  | Your question has a rather narrow application so lacks significance, but can probably be answered by the data.  | Your question is unlikely to be answered by the data.  |
| **Results**  | Your description and interpretation of the results are clear and accurate.  | Your description of the results is clear, but your interpretation needs strengthening.  | Portions of your description or your interpretation of the results are unclear.  | Both your description and interpretation of the results are unclear or incorrect.  |
| **Evaluation of the data set’s usefulness**  | Your evaluation is clear, concise, and informative.  | Your evaluation is generally clear, concise, and informative. | Some of your evaluation is unclear or uninformative. | No evaluation is provided.  |

**Project 3. Proposing an Informatics Solution to Solve a Problem**. **Group Project (35%).**

Your team has been asked by your current (real or imagined) organization to identify, implement and evaluate an information technology solution to solve an identified problem.

Prepare a proposal and executive summary to be submitted to your employer that: a) describes the problem to be solved, b) describes the environment, and c) proposes an information systems solution and a rationale for that solution. Post the Executive Summary to Project 3 Discussion Forum so that the rest of the class can read it.

In your proposal, describe:

1. hardware components and your rationale for their selection
2. software and rationale for your choice
3. location and number of input-output devices (computers, printers, etc.) and your rationale
4. an implementation plan (timetable, committees, leaders, etc.)
5. proposed education plan for staff (including time and resources required)
6. evaluation plan (including cost-benefit analysis)
7. potential issues (e.g., privacy, security, legal, social, ergonomics) and proposed solutions

Please include, as an appendix, flow charts or design maps of: a) the current process,

1. your proposed solution, and
2. your work plan (tasks, due dates, responsible parties); include any changes made in the plan as well.

The Project Grade will be based on:

Overall project quality including presentation (see rubrics below) = 55%

Peer evaluation of group members' contributions = 25% (see Peer Evaluation Form for Project 2)

Faculty evaluation of individual contributions (based on Project Plan) = 20%

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| **Grading Rubric for Project 3 (Paper)** |
|  | **Levels of Achievement** |
| **Criteria** | **Exemplary** **7-8**  | **Proficient** **5-6**  | **Competent**  **3-4**  | **Not yet Competent****0-2**  |
| **Formulation & scope of informatics problem**  | Your problem description is clear and well thought out, demonstrating effective integration of your prior clinical knowledge and competencies and information gained in other areas of the graduate program, and the problem scope is well defined. | Your problem description is clear and demonstrates some integration of your prior clinical knowledge and competencies as well as some information gained in other areas of the program, but the scope is not well defined. | Your problem description is unclear in some respects and not well thought-out. There is little evidence that you have integrated prior knowledge and competencies.  | Your problem description is unclear with little to no integration of prior knowledge and competencies. The reader is left wondering about the nature and scope of the problem. |
| **Significance of informatics problem** | Your problem represents a current significant challenge in health care, and potential benefits from the solution are clearly identified.  | Your problem represents a current significant challenge in health care, but the potential benefits of solution are small, or not clearly identified. | Your problem does not represent a current significant challenge in health care. Therefore the potential benefits of solution are small or unclear. | Your problem does not represent a current significant challenge in health care. The reader is left wondering who would be interested in a solution.  |
| **Environmental risk analysis** | Your environmental description is clear, and aspects of the environment that present sources of risks for the problem/solution are identified at all stages of the process.  | Your environmental description is clear, but aspects of the environment that present sources of risks for the problem/solution are not always identified. | Your environmental description is clear, but aspects of the environment that present sources of risks for the problem/solution are not identified. | Your environmental description is unclear, and aspects of the environment that present sources of risks for the problem/solution are not identified. Readers who have some understanding of the risks themselves might be concerned that you are either naïve or trying to “put one over on them.”  |
| **System analysis** | Your analysis of the problem is systematic and detailed, demonstrating the accurate, appropriate use of systems analysis tools at all steps of the process. | Your analysis of the problem is detailed, but not all steps are supported by the accurate, appropriate use of systems analysis tools. | You provide some analysis of the problem, but it is not detailed and not supported by the accurate, appropriate use of systems analysis tools. | Your analysis of the problem is sporadic or missing; there is no evidence of the accurate, appropriate use of systems analysis tools. |
| **Feasibility of solution** | Your proposed solution is realistic and workable. Takes into account economic and environmental conditions and the constraints these place on design and implementation.  | Your proposed solution is realistic and workable for the most part. Takes into account economic and environmental conditions, but lacks attention to the constraints these place on design and implementation. | Your proposed solution is not unrealistic, but more consideration of economic and environmental conditions would require modification of the solution. As it stands, solution may not accomplish your goals. | Your proposed solution is not realistic, either because it does not conform to actual environmental or economic constraints or because it is too vaguely defined to allow the reader to understand its impact. |
| **Hardware/ software selection** | Your informatics solution is clearly defined and rationale for choice of software and hardware is clearly defined and supported by existing literature  | Your informatics solution is clearly defined and rationale for choice of software and hardware is clearly defined but not supported by existing literature | Your informatics solution is clearly defined but rationale for choices is not clearly defined. | Your informatics solution is not clearly defined; rationales for choices are unclear or missing. |
| **Implementation plan** | Your implementation plan is clearly defined and rationale supported by existing literature  | Your implementation plan is clearly defined but rationale is not always supported by existing literature | Your implementation plan is clearly defined but rationale is not supported by existing literature | Your implementation plan is not clearly defined. Readers are not certain what will actually happen. |
| **Education plan** | Your education plan is clearly defined and rationale supported by existing literature  | Your education plan is clearly defined but rationale is not always supported by existing literature | Your education plan is clearly defined but rationale is not supported by existing literature | Your education plan is not clearly defined, making implementation success less likely. |
| **Evaluation plan** | Your evaluation plan is clearly defined and rationale supported by existing literature  | Your evaluation plan is clearly defined but rationale is not always supported by existing literature | Your evaluation plan is clearly defined but rationale is not supported by existing literature | Your evaluation plan is not clearly defined; making it unlikely that the success of the innovation will be measured.  |
| **Potential issues (privacy, security, ethical, legal, social, ergonomics, economic impact) are identified and solutions proposed** | Your proposal identifies all relevant issues and you propose appropriate solutions, based on existing literature | Your proposal identifies most relevant issues and some appropriate solutions proposed, based on existing literature | Your proposal fails to identify some significant relevant issues; but does propose appropriate solutions for those issues identified, based on existing literature.  | Your proposal fails to identify many relevant issues and/or propose appropriate solutions based on existing literature, making successful implementation highly unlikely. |
| **Organization** | Your proposal is well organized, easy to understand, and written in a style appropriate for the target audience. Figures, tables, and appendices enhance the presentation.  | Your proposal is interesting, but some points are unclear or some parts seem out of place or inappropriate for the audience (e.g., use of jargon, level of formality). The introduction and/or conclusion are weak. Figures, tables and appendices are not always used effectively.  | Your proposal has some interesting points, but is hard to follow. The style of the proposal is frequently inappropriate for the audience (e.g., use of jargon, level of formality). Some of the figures, tables and appendices detract from the proposal or are difficult to follow.  | Your proposal is disorganized to the extent that it prevents understanding of its contents. The style is inappropriate for the audience (e.g., use of jargon, level of formality). There is no executive summary and no conclusion. Figures, tables and appendices have errors, are redundant with text, or are missing. . |
| **Use of appendices, tables, figures** | Information in your proposal is appropriately placed in the main text or an appendix, table or figure. Appendices, tables and figures are documented and referenced in the text.  | Information in your proposal is appropriately placed in the main text or an appendix, table or figure, but documentation and referencing in the text are somewhat incomplete. | Some information in your proposal is somewhat misplaced (text vs. appendix, table or figure). Appendices, tables, and figures are poorly documented and referenced in the text. | Considerable information in your proposal is somewhat misplaced (text vs. appendix, table or figure). Appendices, tables, and figures are not documented or referenced in the text. |
| **Grammar** | There is evidence that your proposal has been spell-checked and proof read.  | Your proposal has a few spelling and grammatical errors. | Your proposal has more than one spelling or grammatical error per page. | Your proposal has frequent misspelled words and serious grammatical errors.  |
| **Teamwork** | There is evidence of effective teamwork: a work plan with tasks assignments, due dates and responsible parties is included and has been followed or modified as needed.  | There is mostly evidence of effective teamwork: a work plan with tasks assignments, due dates and responsible parties is included and generally followed or modified as needed. | There is some evidence of ineffective teamwork: but no work plan with tasks assignments, due dates and responsible parties is included, but not followed.  | There is little evidence of effective teamwork; no work plan is included.  |

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| **Grading Rubric for Project 3 (PowerPoint Presentation)** |
|  | **Levels of Achievement** |
| **Criteria** | **Sophisticated** **3**  | **Competent** **2**  | **Not yet Competent**  **1**  |
| **Presentation level** | Appropriate for target audience. Presentation is a well-planned conversation (not just reading the poster) and paced to maximize audience understanding.  | Generally appropriate for target audience. Pacing at times may be too fast or slow. | Inappropriate for audience; aspects too elementary, too sophisticated, or too much jargon. Much information is read.  |
| **Content** | Presentation is clear, logical and organized. Relevant theory or literature used to illuminate proposed solution. Participants gain insights.  | Presentation generally clear and well organized; a few minor points may be confusing. Some attempt to use relevant literature to support proposed solution. | Presentation is difficult to follow; some arguments are not clear. No attempt to link relevant literature to proposed solution. Not well organized. |
| **Communication aids** | Communication aids enhance presentation. Fonts on visuals large enough; information organized to maximize understanding; details minimized. | Communication aids generally enhance presentation; Font size appropriate and appropriate information included, but some material not supported by visual aids. | Communication aids detract from presentation either because poorly prepared, small fonts, too much information, or unimportant information highlighted. |
| **Response to questions during online discussion session** | Responsive to audience comments, questions and needs. | Generally responsive to audience comments, questions and needs. | Inadequate response to audience questions or comments. |

COACH: Canada’s Health Informatics Association. (2012). *Health informatics professional core competencies*. Retrieved from http://coachorg.com/en/resourcecentre/resources/Health-Informatics-Core-Competencies.pdf