York University
Non-Major Modification to Existing Programs

TEMPLATE

Program: Health Studies

Degree Designation: Honours, Double Major, Major/Minor

Type of Modification:
(Examples include changes to degree / admission requirements.)
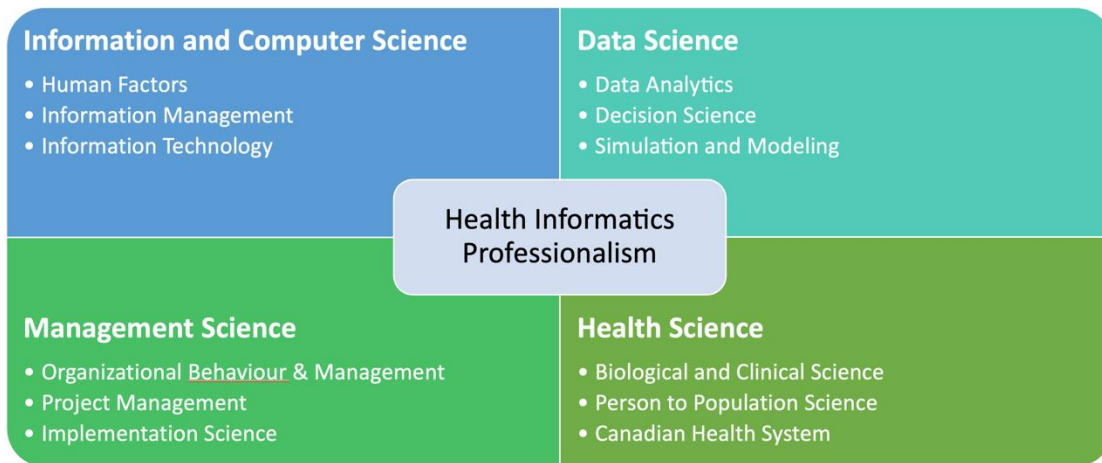
Changes to degree requirements

Effective Date: Fall 2024

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1. State what the changes are (Example: increase / decrease to the number of major credits)

    Replacing a core course for health informatics (HH/HLST 3341 3.00 Introduction to Health Informatics II) with another course that is currently an elective (HH/HLST 3350 3.00 Health Data Analytics, Machine Learning and AI)

2. Provide the rationale for the proposed changes that is rooted in the program learning outcomes.

    HH/HLST 3350 3.00: Machine learning became an essential skill in the market. It is becoming a necessity to have such skills for informaticians as substantiated by latest reports (report1, report 2). Recently, a group of researchers, educators and subject matter experts in health informatics (director, professor, advisor, and co-operative education coordinator) met to discuss changes in health informatics education and conducted also a scoping review about education in health informatics. Their findings were the basis of a new health informatics competency framework (see figure below).

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Information and Computer Science	Data Science
• Human Factors • Information Management • Information Technology	• Data Analytics • Decision Science • Simulation and Modeling

Health Informatics Professionalism

Management Science	Health Science
• Organizational Behaviour & Management • Project Management • Implementation Science	• Biological and Clinical Science • Person to Population Science • Canadian Health System

This emerging set of competencies includes the new field of Data Science that incorporates knowledge in data analytics: descriptive, diagnostics and predictive analytics; that are acquired through machine learning.

It is now clear that machine learning for health has become a must to have in today's informatics work and research environments, and that programs need to update their curriculum accordingly. Machine learning gives the student a new set of skills needed for the job market. It also prepares those students who plan to continue graduate studies for the growing field of research in the domain of AI and machine learning for Health, and other fields such as data sciences.

HLST 3350 (Analytics and machine learning) is the only course in analytics and machine learning that we offer and that was introduced recently as an elective course. On the other hand, and in terms of practical skills, HLST 3341 (Health Informatics II) does not provide new practical skills for students and might include a lab component (depending on the instructor) that covers practical skills enclosed in other courses particularly HLST 3320 (Databases).

In light of this, we are suggesting moving HLST 3341 (Informatics II) from the list of core courses to the list of electives and HLST 3350 (Analytics and machine learning) from the list of electives to the list of as a core/required course for health informatics students in the undergraduate degree. This switch will allow us to prepare our student better to be competitive in the job market and for future graduate studies in data science. The field is shifting, and we needed to keep up with it.

3. Provide an updated mapping of the program requirements to the program learning outcomes to illustrate how the proposed requirements will support the achievement of program learning objectives.

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Find below two components:

(1)   How do the Course Learning Outcomes (CLOs) for the new course (3350) enable students to better meet the Program Learning Outcomes (PLOs)?

(2)   How do the CLOs for the new course map onto the PLOs compared to the CLOs for the current course?

3.1 How do the Course Learning Outcomes (CLOs) for the new course (3350) enable students to better meet the Program Learning Outcomes (PLOs) for the BHS Hons and BHS Spec Hons compared to the current course (3341).

The course learning outcomes for HLST 3350 are defined as follows: After completion of the course students will be able to:

1- Apply theoretical and practical knowledge of Data Analytics application in Healthcare
2- Apply practical knowledge of Business Intelligence & Statistical tools available for Data analytics
3- Assess Health outcomes using data analytics
4- Choose appropriate Data Visualization tools
5- Compare the advantages and challenges of Health Data Analytics tools
6- Communicate orally effectively about a range of data analytics problems and solutions
7- Analyze, argue and communicate in writing rigorously about a range of data analytics problems and solutions

The program learning outcomes are
1- Systematically select, interpret, and synthesize available ...
2- Critically appraise evidence, perspectives and ...
3- Work collaboratively in teams to analyze issues...
4- Act responsibly and with integrity as expected ...
5- Plan and carry out quantitative and qualitative ...
6- Describe and apply health policy concepts ...
7- Describe and apply health management concepts ...
8- Describe and apply health informatics concepts ...

The table below shows maps the course learning outcomes to the Program Learning outcomes.

Course Learning Outcomes	Program Learning Outcomes
1- Apply theoretical and practical knowledge of Data Analytics application in Healthcare	1, 2, 3, 4, 5, 6, 7, 8
2- Apply practical knowledge of Business Intelligence & Statistical tools available for Data analytics	1, 2, 3, 5
3- Assess Health outcomes using data analytics	1, 2, 5, 6
4- Choose appropriate Data Visualization tools	3, 7, 8
5- Compare the advantages and challenges of Health Data Analytics tools	2, 6
6- Communicate orally effectively about a range of data analytics problems and solutions	1, 3, 4, 6, 7
7- Analyze, argue and communicate in writing rigorously about a range of data analytics problems and solutions	1, 2, 6, 7, 8

The following maps the course to the PLOs.

Level of Learning Outcome
Introductory (I): Teaching and learning activities focus on basic concepts and skills. Students recall/explain concepts.   Developed (D): Teaching and learning activities reinforce concepts and skills. Students apply procedures or analyze concepts.   Mastery (M): Teaching and learning activities focus on the use of concepts and skills. Students analyze concepts at multiple levels of complexity, evaluate decisions, or create new ideas. Students are assessed on graduation-level proficiency in the outcome.
Methods of Assessment

01 Multiple choice test questions 02 Written exams (short/long essay) 03 Online/Moodle quizzes 04 Online modules 05 Participation 06 Collage	07 Class discussions 08 Group presentation 09 Scholarly discussion papers 10 Group project or learning contract 11 Reflective writing or journaling 12 Problem-solving assignments	13 Project proposal or Team charter 14 Policy Brief or Briefing note 15 Policy analysis or recommendations 16 Research paper/essay 17 Reading Scholarly summaries 18 Annotated bibliography	19 Peer or self-evaluation 20 Case study 21 Financial analysis 22 Statistical analysis of data 23 Hands-on activities 24 Use of Electronic Health records	25 Database design and implementation 26 Database queries 27 Quality Management Report 28 Placements or observations 29 Literature review 30 Survey participation

Program Required Courses:

Courses (Program Requirement)		Program Learning Outcomes							
		1 Systematically select, interpret, and synthesize available ...	2 Critically appraise evidence, perspectives and ...	3 Work collaborativ ely in teams to analyze issues...	4 Act responsibly and with integrity as expected ...	5 Plan and carry out quantitative and qualitative ...	6 Describe and apply health policy concepts ...	7 Describe and apply health management concepts ...	8 Describe and apply health informatics concepts ...
HLST 3350 3.00	Level taught (assessed)								
		M (M)	M (M)	M (M)	M(M)	M(M)	(D)	(D)	M (M)
	Assessment methods	1, 5, 7, 10, 12, 13, 16, 19, 22, 23, 29	1, 3, 4, 5, 7, 17, 20	5, 7, 10, 12, 13, 19, 20, 23, 29	5, 7, 10, 13, 17, 19, 20, 23, 29	10, 12, 13, 18, 22, 23, 29	5, 7, 10, 17, 20, 29	5, 7, 10, 13, 20, 22, 29	1, 5, 7, 10, 12, 13, 20, 22, 23, 29

3.2 How do the CLOs for the new course map onto the PLOs compared to the CLOs for the current course.

The following table compares how the CLOs of the new course HLST 3350 compares to the current course HLST 3341. HLST 3350 focuses more on hands-on and "statistical analysis" (i.e., analytics and machine learning) experiences.

Courses (Program Requirement) * implies 'one of'		Program Learning Outcomes							
		1 Systematically select, interpret, and synthesize available ...	2 Critically appraise evidence, perspectives and ...	3 Work collaboratively in teams to analyze issues...	4 Act responsibly and with integrity as expected ...	5 Plan and carry out quantitative and qualitative ...	6 Describe and apply health policy concepts ...	7 Describe and apply health management concepts ...	8 Describe and apply health informatics concepts ...
HLST 3341 3.00 *	Level taught (assessed)	D (D)	D (D)	D (D)					D (D)
	Assessment methods	1, 3, 4, 5, 7, 8, 16, 29	1, 3, 4, 5, 8, 16, 29	1, 3, 4, 5, 7, 8, 16, 29					1, 3, 4, 5, 7, 8, 16, 29
HLST 3350 3.00	Level taught (assessed)	M (M)	M (M)	M (M)	M(M)	M(M)	(D)	(D)	M (M)
	Assessment methods	1, 5, 7, 10, 12, 13, 16, 19, 22, 23, 29	1, 3, 4, 5, 7, 17, 20	5, 7, 10, 12, 13, 19, 20, 23, 29	5, 7, 10, 13, 17, 19, 20, 23, 29	10, 12, 13, 18, 22, 23, 29	5, 7, 10, 17, 20, 29	5, 7, 10, 13, 20, 22, 29	1, 5, 7, 10, 12, 13, 20, 22, 23, 29

4.   If relevant, summarize the consultation undertaken with relevant academic units, including commentary on the impact of the proposed changes on other programs. Provide individual statements from the relevant program(s) confirming consultation and their support.

All health informatics professors (Dr. Serban Dinca, Dr. Farah Ahmed, Dr. Lora Appel, Dr. Vijay Mago, Dr. Elham Dolatabadi) were consulted in writing about this proposal and there was a unanimous agreement to make the switch.

5.   Describe any resource implications and how they are being addressed (e.g., through a reallocation of existing resources). If new/additional resources are required, provide a statement from the relevant Dean(s)/Principal confirming resources will be in place to implement the changes.

No additional resources are needed. The proposed course HLST 3350 is already offered as an elective in an existing lab setting. In fact, the only software needed is a browser as the machine learning software needed is freely available to students on the Cloud (i.e., Google Collaboratory).

6.   Provide a summary of how students currently enrolled in the program will be accommodated.

Students currently enrolled in the program will follow the rules for which they entered the program. Accommodation will not be required as HLST 3341 will continue to be offered.

7.   Provide as an appendix a side-by-side comparison of the existing and proposed program requirements as they will appear in the Undergraduate or Graduate Calendar.

Program: Health Studies

Degree Program:

- Honours
- Double Major
- Major/Minor

Effective Date: Fall 2024

Please note that only those fields applicable to the relevant program need to be completed.	
Current Calendar Copy (~~Strikethrough~~ items to be removed)	New Calendar Copy (<u>Underline</u> items to be added in revisions to existing programs)

Major Requirements – Required Credits: <mark>_42_</mark>
 	
• Complete all of the following
    o Passed the following:
        ▪ <u>HH/HLST1010</u> - Foundations of Health Studies I (3.00)
        ▪ <u>HH/HLST1011</u> - Foundations of Health Studies II (3.00)
        ▪ <u>HH/HLST2010</u> - Social Determinants of Health (3.00)
        ▪ <u>HH/HLST2020</u> - Health Policy: Power and Politics (3.00)
        ▪ <u>HH/HLST2030</u> - Health Management 1: Essentials of Health Care Management (3.00)
        ▪ <u>HH/HLST2040</u> - Health Informatics 1: Introduction to Health Informatics (3.00)
        ▪ <u>HH/HLST3120</u> - Health Policy II: Analyzing Processes of Power and Politics (3.00)
        ▪ <u>HH/HLST3230</u> - Integrated Health Systems in Canada (3.00)
        ▪ ~~HH/HLST3341 - Health Informatics II: Health Information Systems (3.00)~~
	Major Requirements – Required Credits: <mark>_42_</mark>
	
	• Complete all of the following
	    o Passed the following:
	        ▪ <u>HH/HLST1010</u> - Foundations of Health Studies I (3.00)
	        ▪ <u>HH/HLST1011</u> - Foundations of Health Studies II (3.00)
	        ▪ <u>HH/HLST2010</u> - Social Determinants of Health (3.00)
	        ▪ <u>HH/HLST2020</u> - Health Policy: Power and Politics (3.00)
	        ▪ <u>HH/HLST2030</u> - Health Management 1: Essentials of Health Care Management (3.00)
	        ▪ <u>HH/HLST2040</u> - Health Informatics 1: Introduction to Health Informatics (3.00)
	        ▪ <u>HH/HLST3120</u> - Health Policy II: Analyzing Processes of Power and Politics (3.00)
	        ▪ <u>HH/HLST3230</u> - Integrated Health Systems in Canada (3.00)
	        ▪ <u>HH/HLST3350 - Health Data Analytics, Machine Learning and AI (3.00)</u>

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- HH/HLST4010 - Health Care Ethics: Policy and Management Perspectives (3.00) - HH/HLST4200 - Applied Research Approaches in Health Studies: Advanced Seminar (6.00) o Complete 1 of the following - Passed the following: - HH/HLST2300 Cr=6.00 EN - Statistical Methods in Health Studies I and II (6.00) - Passed the following: - HH/HLST2301 - Statistical Methods in Health Studies I (3.00) - HH/HLST2302 - Statistical Methods in Health Studies II (3.00)	- HH/HLST4010 - Health Care Ethics: Policy and Management Perspectives (3.00) - HH/HLST4200 - Applied Research Approaches in Health Studies: Advanced Seminar (6.00) o Complete 1 of the following - Passed the following: - HH/HLST2300 Cr=6.00 EN - Statistical Methods in Health Studies I and II (6.00) - Passed the following: - HH/HLST2301 - Statistical Methods in Health Studies I (3.00) - HH/HLST2302 - Statistical Methods in Health Studies II (3.00)
Grand Total Credit Count	Grand Total Credit Count - 120

School/Department: School of Health Policy & Management

Course Information:

Faculty:	HH	**Rubric:**	HLST	**Course #:**	3350	**Weight:**	3.00
			(i.e. HLST)				(i.e. 3.00, 6.00 or 0.00)

Course Title: Health Data Analytics, Machine Learning and AI

Effective Session for Change: **Term:** Fall   **Year:** 2024

(i.e Fall, Fall/Winter, Winter)   (i.e 2020-21, 2020)

Type of Change ('x' all that apply):

	in course number/level			**in pre/co-requisite(s)**
	in credit value			**in calendar description**
	in cross-listing*			**retire/expire course**
	in course credit exclusion(s) †			

X	**in short title** (maximum 40 characters)

Proposed short title:	Intro to Analytics, AI, & Machine Learning for Health

X	**in full title** (maximum 60 characters)

Proposed full title:	Introduction to Analytics, AI, and Machine Learning for Health

Other (please specify)

Rationale for Change:

The SHPM Curriculum Committee has asked that the course name be changed to "Introduction to Analytics, AI, and Machine learning for Health" to reflect the introductory nature of these advanced concepts in this course. As this course is going to become a required course for Specialized Honours BHS students who may be eligible to enroll in our practicum course, the Committee noted it is important the title accurately reflect the level of proficiency students obtain so that prospective practicum organizations receive an accurate picture of students' competency level in machine learning.

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* Cross-listed courses are offered jointly by two or more teaching units (such as departments or divisions), or teaching units in two or more different Faculties. Regardless of the offering Faculty or discipline identified by the course prefix of a cross-listed course, every offered section of a cross-listed course is substantially the same as every other and all are therefore recognized as instances of the "same" course.

† "Course Exclusion" is a formal status accorded to pairs of courses that are recognized as having sufficient overlap in content to warrant specifically excluding students from obtaining credit for both. Course exclusion status requires the same curricular approval process required for establishing cross-listings. Course exclusions will be recognized by all Faculties and programs.

Learning Outcomes:

Will there be a change to the learning outcomes?	**YES**		**NO**	X

If yes, please describe the changes in a side by side comparison below. *Denote additions in **bold, underlining**, and ~~strikethrough~~ for deletions.*				
Existing Learning Outcomes (Change From):		**Proposed Learning Outcomes (Change To):**		
Will the change in learning outcomes require additional assessment? If yes, provide any resource implications. If there are no additional assessments, why not?	**YES**		**NO**	
N/A – no change in learning outcomes.				

Calendar Copy:

The Faculty of Health Curriculum Committee requires that the course description, as listed in the course repository be included below in its entirety.

Please adhere to the format and order below for course description submissions:

- **Course Number** (credit value should be taken to two decimal places (i.e. 6.00 and 3.00)
- **Course Title** (maximum 40 characters)
- **Course Description** (maximum 60 words. For editorial consistency, verbs should be in present tense.)
- **Integrated with** (list the graduate level courses that the course is integrated with. Do not include if the course is not integrated.)
- **Prerequisite** (list of prerequisite courses etc. Only include if there are prerequisites.)
- **Corequisite** (list of corequisite courses etc. Only include if there are corequisites.)
- **Pre/Corequisite** (list of courses etc. which can be taken as pre- or corequisites.)
- **Course Credit Exclusion(s)** (list of exclusions)
- **Open to** (should only be used if this course is limited to a specific group of students)
- **Not open to** (should only be used if the course is closed to a specific group of students)
- **Notes** (includes any other information which is necessary for students to know before enrolling in the course)
- **Previously offered as** (list any other version of the course)

*Denote additions in **bold, underlining**, and ~~strikethrough~~ for deletions.*

Existing Calendar Copy (Change From):	**Proposed Calendar Copy (Change To):**
• Course Number: HH/HLST 3350 3.00 • Course Title: ~~Health Data Analytics, Machine Learning and AI~~ • Course Description: ~~This course aims at providing a practical introduction to Health Data analytics to students from multiple disciplines. It permits students to understand data analytics including descriptive, predictive and prescriptive analytics, machine learning, artificial intelligence and the different tools that can be deployed to implement health data analytics. Students would be able to understand how and when healthcare analytics can be used to make better decisions; they will also be able to identify the opportunities and the challenges that analytics present to health and society.~~	• Course Number: HH/HLST 3350 3.00 • Course Title: <u>Introduction to Analytics, AI, and Machine learning for Health</u> • Course Description: <u>Provides</u> <u>a practical introduction to Health Data analytics including descriptive, predictive and prescriptive analytics, machine learning, artificial intelligence and different tools that can be deployed to implement health data analytics. Students will learn about how healthcare analytics can be used to make better decisions and opportunities and challenges analytics presents to health and society.</u> • Integrated with: N/A

• Integrated with: N/A • Prerequisite: Successful completion of 42 credits including HH/HLST 2300 6.00 upon enrollment and commencement of course • Corequisite: N/A • Pre/Corequisite: N/A • Course Credit Exclusion(s): N/A • Open to: N/A • Not open to: N/A • Notes: N/A • Previously offered as: N/A	• Prerequisite: Successful completion of 42 credits including HH/HLST 2300 6.00 upon enrollment and commencement of course • Corequisite: N/A • Pre/Corequisite: N/A • Course Credit Exclusion(s): N/A • Open to: N/A • Not open to: N/A • Notes: N/A • Previously offered as: N/A

Confirmation of Consultation/Approval:

If the proposed course is to be cross-listed, integrated, listed as a course credit exclusion with another course, or listed as a major/minor course option in an interdisciplinary program, the proposal must be accompanied by a statement from the collaborating unit signaling agreement to the proposal.

Indicate the consultation, approval, and additional documentation applicable to the proposal:	YES	NO
Approval by Department/School's Curriculum Committee	X	
Statement(s) from the collaborating unit		N/A