Bachelor of Digital Health (Honours)

Applying for Ministerial Consent
Under the Post-secondary Education Choice and Excellence Act, 2000

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SECTION 1: INTRODUCTION

1.1 College and Program Information

Name of the College: Mohawk College of Applied Arts and Technology
URL for the College Homepage: www.mohawkcollege.ca
Proposed Degree Nomenclature: Bachelor of Digital Health (Honours)
Location: Fennell Ave. & West 5th Street, Hamilton, ON L8N 3T2

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Introduction
Mohawk College is pleased to submit this proposal to offer the four-year Bachelor of Digital Health (Honours) degree. The program was developed in response to industry’s growing demand for technically skilled graduates with domain specific expertise, particularly in the fast-changing health sector. With over 8,000 students enrolled in Health and Technology programs at Mohawk, the College will build on its position as a provincial leader in Health and Technology training by offering this differentiated program.

Current industry innovation in the field of digital health is characterized by the ongoing movement towards developing synergistic relationships between the technology needs of healthcare providers and consumers. The high adoption rates by consumers of personalized health tools such as wearables, mobile phones and tablets, reflect the growth of a sustainable and integrated partnership between the patient and healthcare provider.

The impact of widespread digital health innovation and adoption is an increase in access to care and an extension of the reach of healthcare providers. The proliferation of these consumer health tools and the prioritization on integrating them with existing information systems supports the development of new virtual and out-of-home care models to better address wellness, disease prevention and self-management of chronic diseases. These models of care are focused on providing flexible healthcare solutions that move beyond physical, on-site consultations and can involve virtual care, telehealth, remote monitoring and video consultations.

Mohawk’s Digital Health program is designed to enable the successful adoption and integration of digital and consumer health tools into our healthcare model and to facilitate the development of new innovative models of care that improve access to care. Graduates of Mohawk’s Digital Health degree will be positioned as the primary drivers of a movement in the health care sector towards connected, comprehensive and value-based care. The program will provide public sector and private sector organizations with access to highly skilled graduates with experience in the implementation of mobile applications, integration and interoperability of enterprise applications that will enable the communication of personal health information between the patient, care providers and healthcare organizations.

Situated in the centre of the densely populated and industry-intensive golden horseshoe region, Mohawk’s catchment area includes 22% of Canada’s population and employment market. Supplying the region with graduates who are trained to work in key industries such as healthcare, information technology, clean energy, and advanced manufacturing is a priority for the College. Maintaining relevancy for these industries
involves the development of new and distinctive programs that meet their evolving employment needs.

Just over a decade ago, Mohawk and McMaster built the first institute in Canada to bring college and university health science education and research together under one roof. The Institute for Applied Health Sciences houses students in the joint Medical Radiation Sciences program, preparing graduates for work that combines multiple disciplines within the health field. Likewise, Mohawk and McMaster launched Canada’s first Bachelor of Technology Program. The program, which has been recognized with a national Yves Landry Award, develops both technical skills and leadership abilities in students and working professionals.

In 2007, when Mohawk partnered with Canada Health Infoway to build a reference implementation for electronic health records, the College began earning a reputation for producing graduates with cutting edge skills acquired through applied research projects. Collaborating with some of the most innovative companies in the area, students learned first-hand how to apply their knowledge in a dynamic, fast-paced environment. Today, the Mohawk eHealth Development and Innovation Centre (MEDIC) acts as a hub for small and medium sized Enterprises SMEs to develop, launch and commercialize new healthcare IT products and services. Students compete for co-op positions to work alongside tech entrepreneurs in developing the next healthcare solution.

Mohawk’s Strategic Mandate Agreement (Appendix 15) commits the college to become Ontario’s first specialized Institute of Health and Technology. Mohawk intends to deliver a number of four-year degrees aligned with health and technology, including the Bachelor of Digital Health (Honours). The creation of this new, interdisciplinary program to serve the market where health and technology intersect is aligned with Mohawk’s plans for the future and with its history. Additionally, the uniqueness this program is poised to see an increase in application from females, thereby increasing the number of female graduates involved in Science Technology Engineering and Mathematics (STEM) fields.

Program Overview

The intention of the Bachelor of Digital Health (Honours) degree is to develop well-rounded, multidisciplinary graduates qualified to deliver information technology services to the health sector.

Digital Health is the convergence of digital technology with the world of healthcare. Rapid advances in digital technology are creating new opportunities for improvements in individual health and in the healthcare system. The Digital Health program addresses this evolution with specific exploration of the following themes:
  - Use of digital devices in the provision of care
  - Patient self-management
  - Efficiency improvements to the health system
  - Privacy and security issues specific to health data
The main themes of the Digital Health courses are: health informatics, software development, cloud computing, legal, privacy and security issues, health administration, social computing, healthcare devices, and standards and interoperability. The generic skills courses focus on critical thinking, ethical reasoning, personal and self-awareness, interpersonal and group dynamics, and interpersonal conflict management and the free electives in humanities and liberal studies provide the necessary breadth to the program.

Upon successful completion of the program, graduates will be able to:

1. Create Digital Health applications that make use of current database query technologies, social computing and effective user interfaces for a variety of devices.
2. Evaluate the architecture and principles of operation of computer systems and networks including cloud, distributed computing and network services in Digital Health.
3. Analyze current practices in health and patient care and methods of behaviour modification.
4. Evaluate the role of Digital Health applications in health, patient care and clinical care and design and develop Digital Health solutions for patient self-management.
5. Evaluate Digital Health devices for usability for tracking and improvement of health and select appropriate technologies for telehealth and remote patient care.
6. Evaluate the options for Cloud, distributed computing and network services in Digital Health.
7. Examine interoperability and integration issues related to Health systems including security issues.
8. Evaluate healthcare organizations using current organizational behaviour theories.
9. Integrate knowledge of ethical and legal frameworks with effective Digital Health solutions.
10. Manage the development of software systems through a variety of development processes and methodologies including project planning principles.
11. Synthesize new knowledge in Digital Health solutions using appropriate research methodologies.
The Bachelor of Digital Health (Honours) program supports Mohawk College’s mission – “Creating new realities by opening endless opportunities” - and as a result widens the range of choices offered to prospective students and places the College in a better competitive position in this geographic region. Additionally, the new program contributes significantly to the long-term viability and attractiveness of all of its graduates through new skills inclusions which enhances the reputation of the institution as a whole.

The proposed Digital Health program is differentiated from other programs at Mohawk College and from the offerings of the other area colleges and universities in terms of focus and content, target markets, exposure to applied research and flexibility in modes and scheduling of delivery. The program explores digital health sub-topics such as mobile health (mHealth), telehealth and telemedicine. Consumer health and fitness applications will allow people to collect more health data about themselves than ever before. Having a connected electronic health records system will create a wealth of electronic data about patients. The real potential for that data will be evidenced when it can be combined with other data and integrated into several new applications and platforms. The program is conceived as a timely e-Health education product that responds to an underserved market space and builds on our leadership in applied research.

Program Delivery
The program will be delivered in a blended mode, in the classroom and laboratories as well as online, with coursework, project work and co-operative work experiences to enhance deep learning. As part of the coursework, a range of advanced technology tools will be employed to demonstrate concepts and apply theoretical learning. Wearable and mobile consumer health devices, tablets, and the cloud computing environment will be used in the delivery of the program. Students will have access to one of the most advanced eHealth clouds in the country and will receive instruction from faculty and staff with over eight years of direct applied research in electronic health records and the interoperability of systems.

The program is built on the Constructivist approach to teaching and learning that proposes that learning environments should support multiple perspectives or interpretations of reality, knowledge construction, and context-rich, experience-based activities. Hands-on practice is essential for students to successfully complete the program outcomes and function effectively as graduates. The program offers tools for creativity and development, and various environments and forums for communication. An environment of discovery has been created to enable active learning such that learners play an active role in the process of learning, instead of passively receiving information.

To ensure a holistic approach to the curriculum design, the broad themes of study were translated into unit learning outcomes over eight semesters. Many academic goals cut across all themes of study and will therefore be reinforced throughout the curriculum.
These include emphases on communications skills – oral and written – ethics, teamwork, leadership studies, critical thinking, problem solving, applied theory, and extensive work-term experiences in the industry. The curriculum design team employed an integrated curriculum design approach by exploring educational, economic and workplace expectations to determine the most important knowledge, skills and professional values required in this field for graduate success.

A heavy emphasis is placed on real-world projects including a capstone course where students will consolidate the theory and skills specified in course outcomes for that year. The capstone course will ensure adequate coverage of all content areas in the program. Students will work individually and in teams on practicum of increasing complexity chosen to require them to integrate into the competitive market place and apply their theoretical training in a practical context. Experiential learning opportunities will be woven throughout the four year program so that students can gain 21st century skills required of the workforce. The co-op work term experiences will enable students to apply and synthesize the knowledge and skills of digital health in a variety of health settings. Positions will be made available for top students to work with industry practitioners on real-world projects in the MEDIC facility, where leading edge applied research is conducted.

Teaching and learning activities planned include lecture, tutorial, self-directed learning, case study, workshop, and workplace learning. Students will engage with the subject matter starting with basic facts, relating them to new knowledge, moving forward to what students already know, with built-in interaction encouraging passion and enthusiasm in their field of study. The underlying philosophy of the human element will ensure that students, while engaging in a highly technical field of study, continually bear in mind the industry and the client group they will be servicing by integrating the “human factor” in all their applications.

Students will engage in formative and summative assessments, with appropriate constructive feedback at pivotal points during the semester. Challenging and fun assessment tasks, embedded in project work, that are aligned with the knowledge, skills and professional values of the program, have the capacity to become cross disciplinary with other degrees being developed in parallel with this degree. Projects that include business and industry partnerships will be encouraged and challenging and interesting formative assessments from these varied areas will build the culminating activity. A blended mode of delivery caters to different learning needs and creates high impact learning by combining face to face and online resources. The design of the curriculum provides for recovery learning and ample faculty support.

Program Support
Mohawk will support this program with the physical and learning resources, student services, and qualified faculty required to deliver the education necessary for students to attain the stated learning outcomes.
Five years ago, Mohawk broke ground on a $30 million Fennell Campus Renewal Project. It is the largest renewal project in Mohawk’s history, encompassing major renovations throughout the Fennell campus to enhance the learning and overall college experience for students. More recently, Mohawk secured $1.6 million in federal and provincial funding to open the Mohawk eHealth Development and Innovation Centre (MeDIC) for students to develop and test digital health solutions.

Students and faculty at Mohawk have access to a wide range of physical and electronic resources, information services and technical support through the library, including collaborative spaces, digital sandboxes and a number of SMART classrooms. Library resources support college curriculum and are enhanced with the introduction of new programs. The curriculum-based learning needs of the Bachelor of Digital Health (Honours) program will be supported with resources including print and ebooks; print and online journals, magazines and newspapers; DVDs and online videos. In the case of online resources, materials will be chosen with consideration to usability, AODA compliancy and access across multiple browsers and devices whenever possible. The library curates relevant web content for students and faculty, and will prepare a customized subject guide for the program.

A majority of Mohawk’s lecture-based courses moved to blended learning in 2012-13, offering students the best of in-class and online learning and greater choice and control over how and when they learn. eLearn@Mohawk is Mohawk College’s platform for online learning. Based on the Desire2Learn integrated learning platform, eLearn@Mohawk offers a powerful suite of flexible teaching and learning tools for course development, delivery, assessment, and management. Mohawk will introduce a Bring Your Own Device (BYOD) policy for students in the Bachelor of Digital Health (Honours) program for academic work. The technical requirements will be specified prior to registration based on industry standards at the time.

College policies and procedures have been designed to provide and support an enriching and rewarding learning experience in which the rights of individuals are respected. Mohawk’s 17,000 square foot student services hub is a one-stop shop offering support in the areas of admissions, registration, financial aid, counselling, new Canadian and international advising, accessible learning and employment. Students can book an appointment with a Student Success Advisor, Academic or Career Counsellor.

Existing Mohawk faculty who will teach in the Bachelor of Digital Health (Honours) program will be complemented with part time staff drawn from industry. The part time staff will be specialists working in the field who would bring real life applications and industry knowledge to the classroom. All faculty teaching in the program will have a minimum qualification of a Master’s degree in the field of study or a related field. Included in the number of faculty to teach are four (4) with terminal degrees, who will teach core courses and another eight (8) with terminal degrees who are able to teach
non-core and breadth courses. Hiring projections include a minimum of one new FTE hire for the first year and a second FTE in the second year, both qualified to the PhD level.

**Economic Need**
To make Canada’s healthcare system sustainable, innovations to increase productivity and improve healthcare outcomes are needed. Of mention driving these developments are the aging population across the country, and the increased demand for healthcare services, resulting in the development of remote patient care and monitoring. But the success of investments in platforms and digital tools will depend on workers having the right skills.

Labour market forecasts show that the information and communications technology sector will face skills and labour shortages in the next five years and that those trained in a transdisciplinary program that integrates the applied knowledge and skills of information technology in specific context will be in greatest demand. In Hamilton and the surrounding areas, it is reported that new skills sets and a greater number of workers with higher education credentials have been in demand. Mohawk’s new Bachelor of Digital Health (Honours) program delivers a balanced, holistic curriculum that will produce the kind of skilled workers needed in the coming years.

Upon graduation from the program, candidates will be qualified to seek positions such as Clinical Systems Analyst, Information Systems Analyst, Business Process Analyst, Data Integrity Analyst, Database Architect, Mobile Device Technologist, Integration Architect, Information Privacy Coordinator, Health Records Technician, Health Systems Specialist, Project Manager, Mobile Applications Developer, Software Applications Developer, Remote Service Engineers, and Health IT Consultant.

### 1.4. Program Abstract

The application of digital technology to the health sector is the best option for sustainability of Canada’s healthcare system. Having lagged consumer-centric sectors such as finance and retail in its adoption of digital technology, the health sector is beginning to catch up. As it undergoes significant change, the demand for technically skilled graduates of multidisciplinary postsecondary programs is growing. Employers are seeking professionals with a combination of technical and domain specific expertise to be effective in the new environment. The introduction of Mohawk’s proposed 4-year Bachelor of Digital Health (Honours) degree is an important addition to the current offerings at Ontario’s postsecondary institutions. Students in Mohawk’s proposed program will develop complementary competencies in digital health solutions, the analysis and processing of health-related datasets, the operability of health devices, and an understanding of the Canadian healthcare system. Graduates will be qualified to deliver IT services in various healthcare and home care settings.
SECTION 2: DEGREE LEVEL

The process of developing a new and innovative educational program in response to the changing needs of a dynamic market must parallel the process by which the industry leaders develop new and innovative products to satisfy the rapidly changing needs of their customers. This is especially true when the program in question is explicitly designed to educate and cultivate decision makers who will be responsible for the growing digital health industry so vital for our health and allied fields. The College developed this degree program and its overview of curriculum in the following phases:

1. A Program Advisory Committee was formed that included industry partners, health practitioners, academics, University partners, researchers and members of professional bodies (see PAC meeting minutes in Section 4).

2. The College consulted with the PAC for review and validation of the content, breadth, and depth of the domain learning outcomes and the corresponding course segments to ensure the overall intent and objectives of the program were met.

3. A curriculum committee was formed pulling together Subject Matter Experts (SMES), faculty, and Curriculum Advisors and met extensively throughout the curriculum development process to cross-reference and ensure all content was pedagogically sound and the curriculum design had a balanced mix of courses promoting research and practice in the field.

Academic goals were integrated into the program and course outcomes. These include the development of essential employability skills with a particular emphasis on critical thinking, problem solving, self-motivation, creativity, teamwork, conflict management and proficiency in communication.

Partnerships that developed between the College and the community leaders during this process will be further utilized to refine and make adjustments to curricula as necessary.

2.1 Depth and Breadth of Knowledge

The Bachelor of Digital Health program provides a project-based approach to teaching and learning so that students apply theory to practice right from the beginning of the program. These projects gradually increase in scope and complexity over the four years of the program and reflect realistic and practical real-world applications, culminating in a capstone project proposal and development of the project.

Mohawk College currently collaborates with McMaster University in offering a Bachelor of Technology. Access to courses in the program will also create cross-fertilization of
ideas and give a wider scope to the topics covered in the curriculum. Students will develop the ability to gather, review, evaluate, and interpret information through many Year One and Two courses, including Statistics, Critical thinking, and Technical writing for Technology, Information Management and Database Fundamentals.

Knowledge and understanding are acquired through lectures, seminars, hands-on projects, group discussions, guest speakers, and teamwork. Core courses provide students with a solid theoretical foundation in digital health studies and its related disciplines as well as applied skills in the subsidiary fields with an overview of clinical and patient care, and devices and decision support systems in use in industry today.

Students expand their knowledge of and experience in research across the digital health discipline by pursuing courses such as Health, Legal, Ethical Privacy Administration;, Health, Medicine and Patient Care; Behavior Change for Health, and also through active participation in the capstone project.

Critical analysis skills are emphasized from Year One as students are required to present material using skills developed from the critical thinking course, along with access to other liberal studies options. As students’ progress, they develop a greater understanding of the fields across the discipline by pursuing both core and non-core courses in the Years two to four. Topics are clustered around the themes of health informatics and software development, with supporting themes of standards and interoperability, healthcare devices, cloud computing, social computing, health administration and legal, ethical, privacy and security issues. Other themes include the patient experience, patient safety and risk management and mobile health (mHealth), telehealth, and telemedicine.

Students also study and learn from fields outside the discipline as the program provides students with an opportunity to take eight (8) breadth courses, with content drawn from the social sciences, arts, humanities, and sciences. Through a combination of elective and required liberal studies courses from outside the discipline, with at least two breadth courses at an advanced level, students are involved in learning from outside the digital health field. These courses ensure students continue to develop and reinforce communication, critical thinking, and analytical skills.

2.2 Conceptual & Methodological Awareness/Research and Scholarship

All the courses are designed so that students develop and employ critical thinking skills as they acquire knowledge and skills associated with the content areas of the courses. Courses incorporate current research, disciplinary and multidisciplinary debates, and modes of analysis in the field and the use of creativity in all areas.
The **Network Fundamentals** course provides a solid foundation in network technologies. Students get an introduction to network architectures and protocols, including application layer protocols, network programming, transport protocols, routing, multicast, data link layer issues, multimedia networking, network security, and network management.

**Social Computing and Social Media Platforms** will introduce the student to social computing and social media platforms and their usefulness in health care. The course will cover a variety of platforms, tools and uses of social media. Topics include influencer and social outreach, the formation of social networks and the communication and behaviour within them, social marketing, community management, and social analytics.

**Mobile Development** focuses on the development of software for mobile and wireless computing platforms. Emphasis will be placed on the processes, tools, and frameworks required to develop native, mobile web and hybrid applications. Students will develop software with considerations including limited processing, memory, and interfaces for users with special needs.

The purpose of **Advanced Software Development** is to introduce students to systems analysis and design of health information systems. Students will learn how to assess user requirements, develop specifications, and determine the feasibility of software products, and estimate system costs and considerations for implementation. In the health context, additional topics include conceptual modeling techniques for systems analysis (ER, DFD, and UML), and special considerations for designing healthcare software and devices.

After students have been exposed to most of the methodological concepts, they will be required to learn about systems integration in the **Systems Integration Fundamentals** course. The course involves combining disparate systems to work together as one complex system. Exposure to the design processes and testing of complex systems through the use of UML with use cases, class diagrams, data models and activity diagrams to describe complex systems will provide application to the methods covered in earlier semesters. Additional topics to be covered will include management and control, integration and interoperability testing and management issues relating to integration product teams, vendors and suppliers.

Students get to demonstrate their research scholarship through qualitative and quantitative research methods and research design. They will be introduced to the research process including development of a researchable question, data gathering and analysis, communicating research results and qualities of well-designed research and critically evaluating evidence with reference to methodology and source of data. Both **Research and Evaluation Methods and Design** and **Statistics** will promote the ability to critically analyze and interpret data and to appraise its strengths and weaknesses. These skills will cumulatively lead to projects for the Capstone course.
Throughout the program, courses will stimulate the development of an inquiring, analytical and creative approach to digital health and encourage the acquisition of independent judgement and critical self-awareness. The use of active learning through case analysis and project-based inquiry will encourage the development of both students’ capacities for independent learning and their ability to work with others. It will not only develop students’ abilities to solve problems in a creative way, but also to identify and redefine problems and to raise and address appropriate issues and make decisions. Students will be required to present and evaluate relevant recent research findings and to sustain persuasive and logical arguments that challenge underlying assumptions from a number of informed perspectives in their discussions, research papers and case analyses.

2.3 Communications Skills

The ability to communicate effectively in a variety of forms and to a variety of audiences is critical to success in any career today. The proposed program addresses the critical need for communication skills in diverse settings. Students are required to take communication courses including Critical Thinking, Technical Writing for Technology, and Business Communications. All communication courses have a significant practical component. Students will practice and demonstrate the concepts. The communication skills acquired will enhance critical thinking and modes of reasoning. Verbal, written and presentation skills will be developed throughout the program as students are asked to interact with peers, faculty and industry representatives. Students will be preparing case studies, reports, proposals, essays and presentations. There is a significant focus on team work in this program, reflective of the importance of the ability to work in cross-functional teams in the workplace. These skills allow for the articulation and synthesis of knowledge and understanding. Extensive written assignments, oral presentations and case analyses provide valuable experiences in the formulation and presentation of concepts and arguments.

In preparing their analyses and recommendations and other written material, students are encouraged to give appropriate attention to the intended audience. The differing characteristics of audiences ranging from senior administrators to other stakeholders and clients are emphasized in the context of presenting the information and data in a desired format. A movement in the latter semesters to the higher levels of Bloom’s Taxonomy of Learning will move students from lower levels of thinking to higher levels of performance. Students in this degree program will benefit from the opportunity to select from general education courses which will provide understanding of human behaviour that will enhance their ability to work in a global marketplace.

Throughout the program students will be required to assemble data from a variety of sources, discern and establish connections, and synthesize that information in order to gain a coherent understanding of theory and practice. Tasks and assignments will be designed to provide students with opportunities to research issues and problems,
evaluate findings, prepare conceptual arguments, draw conclusions and prepare papers and presentations. Case studies and/or research reports built into the professional courses provide opportunities for students to develop and demonstrate their mastery of these skills. In early courses, students will be expected to communicate information, arguments and results of analyses and to begin to apply the concepts outside the context in which they were studied.

By the third year, they will be required to critically evaluate evidence and arguments in support of conclusions and recommendations.

2.4 Application of Knowledge

The focus of this program is on the application of knowledge. This is reinforced in all courses through self-directed activity, projects, case studies, and supervised co-op work terms. Students are required to integrate theories and concepts from a variety of courses and disciplines, demonstrate application of content and concepts, reflect on their practice and adjust their application to workplace realities. A focus on strategic management theories and practices for health care organizations will have students working on strategic planning process, perspectives of executive, management, support and health care workers, the role of governance, strategic leadership, and barriers to strategy implementation, Human Resources, financial and budget management, accountability, risk analysis, customer and vendor relationships and IT technology procurement.

Furthermore, Semester 8 students will have an opportunity to engage in the steps required to start and grow a technology business. In the Technology Entrepreneurship course, students will be introduced to evaluating market opportunities, designing a profitable business model, creating a business plan, raising capital, developing a product, and team building. In the Capstone Research Proposal course in Semester 7 students have the opportunity to develop an applied research project proposal to be used as the specifications for the subsequent development of an applied research project. The project proposal will include the problem statement, project objective, background, literature review, specifications, test plan, anticipated benefits, and the development timeline.

The program culminates with an Integrative Capstone project in which students will be asked to apply all that they have learned to a real-life situation, and to develop and justify their recommendations as they complete the research project, under the direction of a supervisor. The applied research project must follow the specifications outlined in the approved applied research project proposal.
2.5 Professional Capacity / Autonomy

In all courses and work terms in this program, students develop the transferrable skills that are necessary for further study, employment, community involvement, as well as develop their capacity for independent learning. The overall constructivist teaching and learning approach of the digital health program will utilize inquiry, case, and problem-based learning strengthening students’ initiative, personal responsibility and accountability in both personal and group contexts. This approach helps students develop autonomy and decision making in complex contexts, promotes students ability to use inquiry skills, respectful and ethical thinking and self-directed learning. The Research and Evaluation Methods and Design course and the Capstone project will allow students the autonomy to include contemporary issues in healthcare and industry to provide creative and innovative opportunities for independent learning.

In the Advance Software Design and Development Processes course, students must identify functional and performance requirements, prototyping, principles of design, and software improvement processes. Additional topics include current trends in digital health software, devices and development processes. These skills set will provide them with the requisite knowledge, skills and professional values required for further study, employment, community involvement and other areas requiring these competencies.

Collaborative projects will have students working in teams on projects incorporating human resources, financial and budget management, accountability, risk analysis, customer and vendor relationships in IT technology procurements. These projects will inculcate personal responsibility and accountability in both personal and group contexts. Students will not only learn how to effectively work with others but practice decision making in complex situations.

The Capstone Applied Research Project Proposal and final Capstone Applied Research Project courses will give students the ability to manage their own learning in changing circumstances. Working through co-op terms and managing these projects will further enhance their self-directed learning capacities.

Through co-op experiences, students develop and apply professional and self-leadership attributes in their work. Exposure to professional associations and accreditation bodies in the finance sector will assist students in further career identification. In later semesters, students also cover legal, ethical and security issues involved in working with health data (Legal, Ethical, Privacy and Security in Digital Health). Students will examine the policies and assessments of the Canadian Institute for Health Information (CIHI) for privacy and security of personal health information and records. Combining both academic integrity and social responsibility this course will also provide an overview of laws governing health data include the Personal Health Information Protection Act (PHIPA) and The Personal Information Protection and Electronic Documents Act (PIPEDA).
Additionally, students will have a thorough understanding of the impact of legal, ethical, privacy and security issues in handling health data with respect to software development and device handling and will gain an understanding of project management best practices.

2.6 Awareness of Limits of Knowledge

Both the Health and Technology disciplines have established rules, practices and legislative requirements. Students become very familiar with both the limits of their knowledge in these fields and the necessity to turn to colleagues for assistance and cooperate with other experts throughout their professional practice. They become well acquainted with the ambiguity inherent in business, health, and technology through both course work and their co-op integrated work experience.

Students will be exposed to the ambiguities of knowledge and confront these ambiguities through projects in which they will be required to take alternative viewpoints of an argument. Through courses that lead the student through progressively more complex business, technology and healthcare situations, students develop the professional judgment needed to make decisions in ever-changing business, technology and healthcare environments, through courses such as Mobile Development, User Interface and Experience and Epidemiology and Health Care Statistics. Throughout the program students will be challenged to delineate both the limitations and the practical application of information, devices and data as well as areas that need to be investigated further. The program provides methods, tools and frameworks that will help students appreciate the ambiguity and dynamics of the healthcare and technology worlds. The dynamics of the healthcare and technology worlds require that, in order to be successful in the field, the professional must remain constantly engaged in life-long learning in their own particular specialization and in the field of digital health as a whole.
Mohawk assesses applicants based on the principles of effectiveness, equity, transparency, and clarity in support of student success and retention. The Admission Policy (SS-3101-1980 – Appendix 11) addresses requirements for direct entry and mature students.

### 3.1 Admission Requirements for Direct Entry

Direct entry applicants are applicants applying directly from high school who have completed the requirements identified below.

<table>
<thead>
<tr>
<th>Academic</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Grade 12 English (U-level) – mandatory</td>
<td>o It is recommended that the applicant has basic computer literacy</td>
</tr>
<tr>
<td>o Any grade 12 math (U-level) – mandatory</td>
<td>o If the program is oversubscribed, applicants who are residents of Ontario will</td>
</tr>
<tr>
<td>o Any grade 12 science (U-level) – mandatory</td>
<td>o be given priority</td>
</tr>
<tr>
<td>o Three additional high school elective credits (U or M)</td>
<td></td>
</tr>
<tr>
<td>o The grade in each of the three core courses must be above 70% and the AVERAGE of all six required must not be below 70%</td>
<td></td>
</tr>
</tbody>
</table>

For the purposes of eligibility and ranking for admission, Mohawk calculates the GPA as the sum of the grades of the required courses divided by the number of required courses. GPA is calculated electronically for all applicants based on grade files downloaded from the Ontario College Application Service.

### 3.2 Admission Policies and Procedures for Mature Students

Mohawk welcomes students from many backgrounds and considers adult learners an important part of our community. A mature applicant is defined as:
- anyone who is 19 years of age or over who is planning to attend a full or part-time program
- applicants who have been away from school for one year or more
- applicants who have not completed the Ontario Secondary School Diploma (OSSD) or its equivalent

In order to meet academic entrance requirements for degree programs, mature students must demonstrate the ability to handle degree level academic work through successful completion of Mohawk’s Academic Upgrading program, including any prerequisite courses at a minimum overall GPA of 70% as established by the academic area.
3.3 Promotion and Graduation Requirements

Mohawk College’s policy for promotion and graduation (SS-3103-2009) sets out requirements that are consistent with the learning outcomes of the program and the degree level standards. Students are allowed to progress from one semester to the next in Good Standing with attainment of a minimum weighted GPA greater than or equal to 60% with no failures.

An overall minimum GPA of 60% is required to graduate. Mohawk College calculates GPA thusly:
Sum of percentage grades multiplied by the Credit Value divided by the sum of the Credits for the courses taken as defined by the Program of Studies.

E.g. 82 x 3 = 246; 65 x 4 = 260; 73 x 2 = 146; 94 x 3 = 282
A total of 934 divided by 12 credits = 77% weighted GPA

Students who are not in good standing fall into three categories:

**Promotion with Advice** - This situation applies to students who achieve a weighted GPA greater than or equal to 50%, with no more than one failure. Provided that prerequisites are met, students in this situation may continue into the next term, but are strongly encouraged to seek academic advice from a program coordinator, student Success Advisor and/or Counsellor to help them enhance their academic performance.

**Probation** - Students who achieve a weighted GPA greater than or equal to 50% with more than one failure will not be promoted. These students may be allowed to progress to the next term with special authorization through the mandatory academic advisement process. Students in this category must meet with a program coordinator or Student Success Advisor to discuss their academic future.

**Compulsory Withdrawal** - Students with a weighted GPA less than 50% will be required to leave the program. It is strongly recommended that students in this situation seek advisement to explore opportunities for continuing study at the College.

3.4 Advanced Standing Policies and Requirements

Advanced standing in applied technology degree programs provides pathways for college graduates. An advanced diploma (or equivalent) in a related field with a minimum cumulative average of 70% is required.

Applicants with educational backgrounds equivalent to those completing advance level college diplomas, including internationally educated applicants, will be considered on an individual basis and are encouraged to apply.
Applicants who hold an advanced diploma (or equivalent) in a related field but have a cumulative average of 65% - 69.9% are encouraged to contact the college to discuss alternate pathways that may be available.

Applicants who have been educated outside of Canada who wish to use foreign credentials for the purposes of admission must provide assessment and authentication of their documents by a recognized credential assessment service as determined by the college.

The policies for Prior Learning Assessment and Recognition (SS-3100-2008) and Credit Transfer (AS-2002-2013) are provided in Section 16.
SECTION 4: PROGRAM CONTENT

The proposed program in Digital Health focuses on the requirements for the convergence of digital technology to interface with the world of healthcare and incorporates the use of digital devices in the provision of care for patient self-management. In this regard, the program seeks to provide participants with a solid understanding of efficiency improvements to the health system and the privacy and security issues specific to health data management. In addition, the use of social media in healthcare, cloud computing and the processing of large health-related datasets provides the knowledge, skills and professional values required for measurement, tracking and improvement of health through devices, sensors and wearable computing devices. Graduates will have a strong sense of personalized health delivery and patient safety that will serve them well throughout their careers.

The intention of the Bachelor of Digital Health (Honours) degree is to close the gap for qualified graduates in digital health. By applying the integrated knowledge and applied skills of health, information technology, and interoperability, graduates from the proposed program will contribute to effective patient care and quality health care delivery. This new program supports Mohawk College’s mission – “Creating new realities by opening endless opportunities” - and as a result widens the range of choices offered to prospective students and places the department in a better competitive posture in this geographic region. Additionally, the new program contributes in significant measure to the long-term viability and attractiveness of all of its graduates through new skills inclusions and enhances the economies of scale and scope of the institution as a whole.

The proposed program in Digital Health is differentiated from other programs at Mohawk College and from the offerings of the other post-secondary institutions in the area in terms of focus and content, target markets, and flexibility in modes and scheduling of delivery. In addition the program will explore Digital Health sub-topics such as mobile health (mHealth), telehealth and telemedicine. It is conceived as a timely e-health education product that responds to an underserved market space.

The program brings together the complementary areas of mobile health (mHealth), telehealth and telemedicine. Telehealth focuses on the broad spectrum of remote delivery of health-related services and the provision of information. A subset of telehealth focuses on the curative aspect of remote delivery of health services. Telehealth and telemedicine rely on a variety of communication and information technology systems and will cover a variety of platforms, tools and uses of social media. Topics include influencer and social outreach, the formation of social networks and the communication and behaviour within them, social marketing, community management, and social analytics. Students learn and apply the acquired knowledge through a capstone applied research project. This is further strengthened by co-op work terms.
This design of this program is based on research and discussions with experts, members of the Program Advisory Committee that include discussions with local, provincial and federal health agencies and professionals. The program was approached as a balance of skills in two ways: first, the program will provide students with an overview of clinical and patient care and current devices and decision support systems in digital health; second, the curriculum is intended to provide a balance between theory and application, with an integration of the partner disciplines.

Graduates will have developed competencies in the processing of health-related datasets, the operability of health devices and an understanding of health care, as well as an understanding of the interrelationship between all three areas. Applying these skills, graduates will be able to manage patient care and information systems ensuring the ongoing efficient operation and evolution of core social media functions and networks, and establish clear goals and priorities to meet the health information technology needs of health professionals; they will have the skills needed to positively impact patient care.

4.1 Program Advisory Committee

A Program Advisory Committee was established to review and validate the content, breadth, and depth of the proposed degree program. Experts in the field external to the college, employers and representatives from industry and professional associations confirmed the relevancy of the program content to the needs of industry. Letters of support from PAC members are provided in Section 7. Meeting minutes of the first Digital Health PAC, with results from the motion to approve are provided in Appendix 1.

4.2 Professional Accreditation
Not applicable to this new program.

4.3 Learning Outcomes
The following chart provides an overview of the entire program.
<table>
<thead>
<tr>
<th>SEMESTER 1</th>
<th>SEMESTER 2</th>
<th>SEMESTER 3</th>
<th>SEMESTER 4</th>
<th>SEMESTER 5</th>
<th>SEMESTER 6</th>
<th>SEMESTER 7</th>
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<td>Enterprise</td>
<td>Advanced</td>
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<td>Devices</td>
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<td>Modelling and</td>
<td>Processes</td>
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<td>and Decision</td>
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<td>Distributed and</td>
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<td>Patient Safety</td>
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</table>

**Breadth Courses**

- Business Communications 3 hours
- Technical Writing for Technology 3 hours
- Medical Terminology 4 hours
- Project Management 3 hours
- Research Project Proposal 3 hours
- Technology Entrepreneurship 3 hours
Degree level standards
The following chart aligns the degree standards with corresponding courses:

<table>
<thead>
<tr>
<th>Course Name/Code</th>
<th>Depth and breadth of knowledge</th>
<th>Conceptual / methodological / research &amp;</th>
<th>Communications skills</th>
<th>Application of knowledge</th>
<th>Professional capacity and autonomy</th>
<th>Awareness of the limits of knowledge</th>
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<tbody>
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<td>Information Management &amp; Database Fundamentals</td>
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<td>Physiology, Pathology, and Medical Terminology</td>
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<td>Application of knowledge</td>
<td>Professional capacity and autonomy</td>
<td>Awareness of the limits of knowledge</td>
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Program level outcomes
Program outcomes state the knowledge and skill competencies required by the graduate of the program. There is a direct relationship between the courses, course outcomes and the program outcomes. The program outcomes identify the broad range of knowledge and skills in the program while the course outcomes provide the detailed specific knowledge and skills that need to be achieved to meet the overall program outcomes. The program begins with a foundations year to introduce the student to the program,
teamwork and generic skills. Each successive year of the program includes courses that are more complex in nature and take the learners to higher levels of cognitions and experiential learning. These would include program-specific content area competencies, critical and analytical thinking, as well as essential employability skills.

1. Create Digital Health applications that make use of current database query technologies, social computing and effective user interfaces for a variety of devices.

2. Evaluate the architecture and principles of operation of computer systems and networks including Cloud, distributed computing and network services in Digital Health.

3. Analyze current practices in health and patient care and methods of behaviour modification.

4. Evaluate the role of Digital Health applications in health, patient care and clinical care and design and develop Digital Health solutions for patient self-management.

5. Evaluate Digital Health devices for usability for tracking and improvement of health and select appropriate technologies for telehealth and remote patient care.

6. Evaluate the options for Cloud, distributed computing and network services in Digital Health.

7. Examine interoperability and integration issues related to Health systems including security issues.

8. Evaluate healthcare organizations using current organizational behaviour theories.

9. Integrate knowledge of ethical and legal frameworks with effective Digital Health solutions.

10. Manage the development of software systems through a variety of development processes and methodologies including project planning principles.

11. Synthesize new knowledge in Digital Health solutions using appropriate research methodologies.

The following alignment is made to the program level learning outcomes:
## Program Outcomes Map

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### Breadth Requirements Map

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<th>The development of critical thinking, quantitative reasoning, written, and oral communication.</th>
<th>Provision of Knowledge in different areas: Humanities, Sciences, Social Sciences, Global Cultures, Mathematics</th>
<th>Knowledge of society and culture, and skills relevant to civic engagement.</th>
<th>More than introductory knowledge of the distinctive assumptions and modes of analysis of a discipline outside the core field(s) of study.</th>
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### 4.4 Course Descriptions

#### Core Courses

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<th><strong>Course Description</strong></th>
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<td><strong>Programming Fundamentals</strong></td>
<td>This course introduces the student to software development using the C++ programming language. Topics include control structures (decision, looping), arrays, file I/O, debugging and software development methods.</td>
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<td><strong>Operating Systems Fundamentals</strong></td>
<td>This course provides an overview of current operating systems and the architecture of general purpose computers. Students will be introduced to the theory and implementation of processes including concurrent activities, resource control, memory management, synchronization, threads, scheduling, file systems and virtualization.</td>
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<td><strong>Math 1</strong></td>
<td>This course introduces the student to the mathematics required to solve engineering problems. Topics focus on Boolean algebra, linear algebra, number theory, combinatorics, trigonometric functions, and some discrete structures such as integers, bits, strings and trees.</td>
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<td><strong>Electrical Fundamentals</strong></td>
<td>The aim of this course is to introduce students to fundamental concepts including electrostatics, magnetic fields, DC circuits, AC circuit components, resistors, sources, capacitors, inductors, and operational amplifiers.</td>
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<td><strong>Semester 2</strong></td>
<td><strong>Web Programming Fundamentals</strong></td>
<td>This course will focus on the technologies required to develop a Web application. Students will be introduced to the client-server model, and will use HTML, CSS and PHP to generate dynamic Web pages. Additionally, MySQL will be used with PHP to store and retrieve data from a database.</td>
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<td><strong>Network Fundamentals</strong></td>
<td>This course is an overview of network technologies. It provides an introduction to network architectures and protocols, including application layer protocols, network programming, transport protocols, routing, multicast, data link layer issues, multimedia networking, network security, and network management.</td>
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<td><strong>Calculus 1</strong></td>
<td>This introductory calculus course covers differentiation and integration of functions of one variable, building on previous experience with polynomials, exponential, logarithmic, and</td>
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<td>Course</td>
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<tr>
<td>Digital Health Fundamentals and the Canadian Health Care System</td>
<td>The aim of this course is to provide the student with an overview of Digital Health and its technologies, and the Canadian Health Care System. Topics include hospital and primary care information systems including electronic health records (EHR) systems, how health professionals use data, human/cognitive factors in development and implementation of Digital Health applications and devices, technology standards, aggregation of health information, patient information systems, and consumer Digital Health applications. Other topics include The Canada Health Act, public and private healthcare payment models, and the Ontario Health Insurance Plan (OHIP).</td>
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<td>Year 2 Semester 3</td>
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<tr>
<td>Information Management and Database Fundamentals</td>
<td>This course introduces students to relational database design and information management. Students will be introduced to conceptual database design using Entity Relationship modeling and normalization to develop a database schema. Subsequently, students will use SQL (Structured Query Language) to create and query a database. Data security and privacy will also be introduced.</td>
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<tr>
<td>Social Computing and Social Media Platforms</td>
<td>This course will introduce the student to social computing and social media platforms and their usefulness in healthcare. The course will cover a variety of platforms, tools and uses of social media. Topics include influencer and social outreach, the formation of social networks and the communication and behaviour within them, social marketing, community management, and social analytics.</td>
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<tr>
<td>Mobile Development</td>
<td>This course focuses on the development of software for mobile and wireless computing platforms. Emphasis will be placed on the processes, tools, and frameworks required to develop native, mobile web and hybrid applications. Students will develop software with considerations including limited processing, memory, and interfaces for users with special needs.</td>
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<tr>
<td>Statistics</td>
<td>The focus of this course is an introduction to concepts of probability and sampling including binomial and normal distributions. Other topics include hypothesis testing, estimation, confidence intervals, t-tests chi-square tests, linear regression theory and the analysis of variance.</td>
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<td>Course</td>
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<tr>
<td>Physiology, Pathology, and Medical Terminology</td>
<td>The focus of this course is an overview of the physiology of major organ systems of the human body and some common diseases. Topics include neurophysiology and peripheral nervous system, muscle, the cardiovascular system, the components of blood, respiratory system and immune system. Medical vocabularies, coding systems and ontologies will be discussed in the context of health information management.</td>
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<tr>
<td>User Interface and Experience</td>
<td>Human Computer Interaction (HCI) focuses on how humans interact with computers and computing devices. This course examines methods for user-centered software design for interactive systems, including understanding user needs, designing and prototyping user interfaces for web-based and mobile applications, and evaluating their suitability. Additional topics include human cognitive and physical ergonomics and interaction techniques including voice, gesture and eye movements.</td>
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<td>Semester 4</td>
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<tr>
<td>Digital Health Devices</td>
<td>The aim of this course is to provide students with an overview of current devices used in clinical and patient self-care management settings and consumer devices. Topics include patient assessment, physical and psychological needs of the patient, patient care devices, treatment devices, simulation techniques and documentation.</td>
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<tr>
<td>Data Structures and Algorithms</td>
<td>Students in this course will be introduced to selecting and designing data structures and algorithms that are efficient for the task at hand. Topics include the analysis of algorithms, including sorting and searching, and data structures including stacks, queues, trees, and graphs.</td>
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<tr>
<td>Software Quality Assurance and Testing/Verification and Validation</td>
<td>The focus of this course is the systematic testing of software running on computer systems and devices. Topics include automated testing, unit testing, system integration and testing, prediction of software reliability, verification against requirements and design, safety analysis, and limitations of tools and testing.</td>
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<tr>
<td>Computer Architecture and Digital Principles</td>
<td>This course examines current computer design and systems architecture including compiler technology, operating system functionality, finite state machines, and instruction set architectures and measurement of performance and the impact of parallelism, efficiency, latency and resource utilization. This course will also examine digital principles for devices including logic circuits, digital memory and storage devices.</td>
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<td>Course</td>
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<tr>
<td>Epidemiology and Health Care Statistics</td>
<td>Epidemiology is the study of patterns of diseases in populations. This course will focus on epidemiology and statistics that are useful in healthcare. Topics will include population health and disease conditions, collection, calculation, analysis and presentation of healthcare data including mortality and morbidity rates, measures of central tendency, and descriptions of the patterns of illness in populations. Other topics include clinical research studies and clinical trials, outbreak surveillance and bio monitoring.</td>
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<tr>
<td>Patient Safety and Risk Management</td>
<td>In this course students will be introduced to patient safety and patient risk management in healthcare with a focus on the impact of technology on patient safety. A case study approach will be used to discuss topics that include human factors design principles, patient safety practices, and the use of technology to prevent human error that can cause harm to patients. Patient risk management content will include medical errors, quality medical record keeping, professional conduct and ethics, event reporting, legal issues, risk mitigation and strategies for quality improvement.</td>
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<td>Year 3</td>
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<td>Semester 5</td>
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<tr>
<td>Advanced Software Development</td>
<td>The purpose of this course is to introduce students to systems analysis and design of health information systems. Topics include assessing user requirements, developing specifications, determining the feasibility of software products, estimating system costs, and considerations for implementation. Additional topics include systems analysis and design life cycle, software development methodologies, conceptual modeling techniques for systems analysis (ER, DFD, and UML), and special considerations for designing healthcare software and devices.</td>
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<tr>
<td>Health, Medicine and Patient Care</td>
<td>The focus on this course is on health and wellness, causes and consequences of illness and modern patient care in Canada. Other topics include family and community health and chronic and infectious diseases.</td>
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<tr>
<td>Digital Health Architectures, Standards and Interoperability</td>
<td>Systems architectures for Digital Health applications differ from business and scientific applications in the standards that are used for data transmission, security, and content. This course provides an overview of the National and Provincial health information systems, regional and hospital health information systems and international standards for data representation and exchange including HL7, DICOM. Interoperability of healthcare systems will be explored by</td>
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<tr>
<td>Systems Administration and Device Management</td>
<td>The aim of this course is to introduce the students to systems administration and device management with an emphasis on healthcare devices. Students will be introduced to system configuration, device configuration, process management, capacity requirements, user accounts and privileges, performance and resource use, device data and backup and recovery. Additional topics include mobile device management, IT procurement fundamentals, firewalls, device security, risk management and intrusion detection and prevention.</td>
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<td>Semester 6</td>
<td>Systems integration involves combining disparate systems to work together as one complex system. The focus of this course is an overview of the design processes, requirements gathering in distributed systems and testing of complex systems. Students will use UML with use cases, class diagrams, data models and activity diagrams to describe complex systems. Additional topics include management and control, common interchange standards, systems interface design, testability, integration and interoperability testing and management issues relating to integration product teams, vendors and suppliers.</td>
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<tr>
<td>Research and Evaluation Methods and Design</td>
<td>This course will introduce students to qualitative and quantitative research methods and research design. Students will be introduced to the research process including development of a researchable question, data gathering and analysis, communicating research results and qualities of well-designed research. Additional topics include data analysis methods for qualitative and quantitative data, and contrasting applied research and scholarly research.</td>
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<tr>
<td>Health, Legal, Ethical, Privacy Administration</td>
<td>Health administration is the convergence of business administration with healthcare. This course focuses on strategic management theories and practices for healthcare organizations including the legal, ethical, privacy and security issues involved in working with health data and their impact. Topics include organizational behaviour, change management, the strategic planning process, perspectives of executive, management, support and healthcare workers, the role of governance, strategic leadership, and barriers to</td>
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</table>
strategy implementation, Human Resources, financial and budget management, accountability, risk analysis, customer and vendor relationships and IT technology procurement. Students will examine the policies and assessments of the Canadian Institute for Health Information (CIHI) for privacy and security of personal health information and records and will review the Personal Health Information Protection Act (PHIPA) and The Personal Information Protection and Electronic Documents Act (PIPEDA). Additional topics include human behaviour in organizations and its effects on productivity, organizational effectiveness and efficiency, decision-making, leadership, motivation, conflict, organizational design, quality of work life and organizational culture. Data encryption techniques, de-identification and anonymization approaches will be studied in relation to software development and device handling.

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<tr>
<th>Year 4</th>
<th>Semester 7</th>
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<tbody>
<tr>
<td>Telehealth, Virtual Hospitals and Remote Patient Monitoring</td>
<td>Telehealth focuses on the broad spectrum of remote delivery of health related services and provision of information. Telemedicine is a subset of telehealth and focuses on the curative aspect of remote delivery of health services. The focus of this course is an exploration of telehealth and telemedicine applications and the services provided. Topics include drivers for alternative models of care, telecare devices and systems, virtual hospitals, and remote patient monitoring. Additional topics include teleradiology, telesurgery, telepathology, telecardiology, teleconsultation and telehomecare. Reliability and availability, usability, security and confidentiality, interoperability, efficiency, portability, capacity and scalability and maintainability of these systems will also be covered.</td>
</tr>
<tr>
<td>Enterprise Architectures, Systems Modelling and Analysis</td>
<td>This in-depth course focuses on the analysis of complex computer systems and processes. Topics include advanced techniques of computer design, measurement of computer system performance, multi-computers and networks, analytic and simulation models of computer systems, process scheduling and resource allocation. Additional topics include modeling frameworks, modeling artifacts, and model driven engineering and automation.</td>
</tr>
<tr>
<td>Data Security Fundamentals</td>
<td>This course is an overview of security for data and applications. Students will be introduced to access control mechanisms, cryptography, common data security threats including malicious code and malware, and security breach prevention.</td>
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<td>Course</td>
<td>Description</td>
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<tr>
<td>Cloud, Distributed and Service Computing</td>
<td>Cloud computing is a large-scale distributed computing system that manages data, platforms or services, often delivered on demand. The focus of this course is on cloud computing and other scalable distributed systems, that provide on demand services. Topics include economic models for cloud computing, design principles for building large scalable systems, including parallel and distributed computing systems, resource management, datacenters, Infrastructure as a Service (IaaS), and Software as a Service (SaaS).</td>
</tr>
<tr>
<td>Digital Imaging for Health</td>
<td>The focus of this course is the usage and characteristics of digital medical images and the factors that affect image acquisition display. Topics include the exchange of images between medical devices and computers, radiology acquisition devices such as CT scanners, MRI systems, and ultrasound units. Additional topics include radiology information systems, virtual network archives, image processing, display, and archiving.</td>
</tr>
<tr>
<td>Capstone Applied Research Project Proposal</td>
<td>The focus of this course is to provide the student an opportunity to develop an applied research project proposal to be used as the specifications for the subsequent development of an applied research project. The project proposal will include the problem statement, project objective, background, literature review, specifications, test plan, anticipated benefits, and the development timeline.</td>
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<tr>
<td>Semester 8</td>
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<tr>
<td>Advanced Software Design and Development Processes</td>
<td>This advanced course focuses on identification of functional and performance requirements, prototyping, principles of design, software design tools and artifacts, software lifecycle management, and software improvement processes. Additional topics include current trends in Digital Health software, devices and development processes.</td>
</tr>
<tr>
<td>Data Analytics and Reporting and Decision Support Systems</td>
<td>The focus of this course is to provide an overview of tools and issues with respect to data analysis for data collected online, from devices and data warehouses. Emphasis will be placed on tools that perform analytical tasks including data mining techniques, cluster analysis, classification, and association rules, reporting and statistics. Additional topics include Big Data technologies, visualization machine learning and artificial intelligence.</td>
</tr>
<tr>
<td>Behaviour Change for Health</td>
<td>The focus of this course is an examination of psychology and human behaviour and behaviour modification. Topics include user engagement, game theory and gaming mechanics, modelling, simulation and gamification for health applications. Students will be</td>
</tr>
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</table>
introduced to analytical modeling techniques for biomedical systems, simulations, and gamification for behavioural modification and education.

| Capstone Applied Research Project | The focus of this course is to provide the student with an opportunity to develop the applied research project, under the direction of a supervisor. The applied research project must follow the specifications outlined in the approved applied research project proposal. |

<table>
<thead>
<tr>
<th>Course Name</th>
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<tbody>
<tr>
<td>Liberal Studies Option: Business Communications</td>
<td>The focus of this course is to develop the professional communication writing, speaking, and presentation skills required in any business environment. Course content includes writing for purpose with the audience in mind, delivering effective presentations and persuasive writing. Students will also be introduced to communication theory, and will plan, organize and create effective business documents.</td>
</tr>
<tr>
<td>Liberal Studies Option: Critical Thinking</td>
<td>Students in this course will be introduced to techniques aimed at increasing critical and innovative thinking skills. Topics will include reasoning, structure of arguments, critical assessment of information and sources, and issues with clarity and meaning.</td>
</tr>
<tr>
<td>Liberal Studies Option: Technical Writing for Technology</td>
<td>This course will focus on the precise, succinct nature of technical writing. Emphasis will be on creating reports, instruction sheets, and technical documentation. Other topics include audience analysis and writing for precision, and writing succinctly.</td>
</tr>
<tr>
<td>Liberal Studies Option: Project Management</td>
<td>This course will focus on project management processes for IT projects, based on the Project Management Body of Knowledge Framework, from the PMP. Students will be introduced to the nine key knowledge areas: scope, time, cost, quality, human resources, communication, risk, procurement and integration. Additional topics include best practices in navigating complex organizations, LEAN methodologies and diverse stakeholder requirements.</td>
</tr>
<tr>
<td>Liberal Studies Option: Technology Entrepreneurship</td>
<td>The focus of this course is to provide an introduction to the steps required to start and grow a technology business. Students will be introduced to evaluating market opportunities, designing a profitable business model, creating a business plan, raising capital, developing a product, and team building.</td>
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<tr>
<td>Liberal Studies Option: Elective Course Pool</td>
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<tr>
<td><strong>Creativity, Innovation and Technology</strong></td>
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</table>
| Pressures have increased significantly on organizations to develop new products/services, organization processes and business models. Innovation starts with creativity, but requires extensive support for marketplace success. With this support, organizations can repeatedly create/capitalize-on opportunities to achieve their goals. In this course, we will explore:  
  - **Creativity**: how individuals/groups become more creative in their work/decisions  
  - **Innovation**: what necessary internal/external supports innovative organizations need  
  - **Decision-Making**: how to make the critical decisions in an innovation process  
Learning is enabled through a combination of in-class and online discussion, case analysis, independent study, group study, and lectures. |
| **Human Behaviour in Technology Settings**   |
| This course provides students with an understanding of how to use various human behaviour concepts and techniques in the workplace. The focus of the course is on individual behaviour and processes in the workplace as well as on the team processes in the workplace. Organizational processes such as organizational structure, organizational culture and organizational change, as well as leadership in organizational settings, will be covered in subsequent courses in the program. |
| **Technology Inquiry**                       |
| The course introduces the process of inquiry, asking the right questions and seeking their answer, for analyzing and investigating an underlying issue. Through inquiry, students learn how to use library and internet research tools, are introduced to proper research practices, and build critical reading and thinking skills. They also practice reporting their findings on formal long-form reports. Sustainability awareness is also built as all inquiry topics deal with sustainability issues. |
| **Professional Workplace Practices**         |
| The purpose of this course is to equip students with vital knowledge and tools necessary to obtain and retain workplace coop placements and achieve successful employment after graduation. Emphasize will be placed on the importance of understanding workplace dynamics; effective interaction with colleagues and superiors; working in a professional environment; maintaining corporate image and performing professionally. Students will produce a competitive career marketing package (cover letter & |
resume), and learn to prepare and engage in successful interview and workplace behaviour. The course will use an experiential approach to apply career advancement techniques and methods to learn how to excel as a technology professional.

| Technology and Culture | This course will examine the origin of culture and technology, the emergence of complex socio-cultural systems, the relationship of the parts of these systems (the individual, society, organizations, etc.) to the whole of culture, and the relationship between socio-cultural systems and the development of technology and the choice to implement technology. How technology impacts on culture and how culture impacts upon technology shall be examined and discussed, within the context of past, current, and speculative future impacts. Issues of sustainability within complex systems, the limitations due to uncertainty, ethics and equity, and other non-technical challenges shall also be discussed. Students will work both independently and collaboratively to develop solutions to hypothetical engineering problems presented within scenario assignments. |
| Technology and Ethics | This course will examine the major ethical positions, ethical issues and choices, ethical challenges that underpin technological development and implementation, and the new ethical dilemmas by our ability to reshape all aspects of our social and physical environment. The responsibilities of technological professionals to society as a whole, to public safety, general human health and welfare, and to the environment shall be examined and discussed. |
| Technology and Labour | The interplay of labour, management and government is critically examined within the context of technology as a driver of change within organizations. |
| Communications Skills 1 | Communication skills are critical to a successful career in engineering and technology. This course introduces students to the unique and varied communication challenges of their profession. Through a combination of lectures, readings, active learning activities and assignments, students are exposed to the types of communication they will engage in as professionals and are given the opportunity to develop their oral and written communication skills, as well as their analytical and teamwork skills. Throughout this course students will study and apply oral and written communication principles specific to modern technical workplaces and environments. |
## 4.5 Course Schedule 1 (omitted)

## 4.6 Course Schedule 2

<table>
<thead>
<tr>
<th>COURSE TITLE</th>
<th>TOTAL CORE COURSE SEMESTER HOURS</th>
<th>TOTAL NON-CORE COURSE SEMESTER HOURS</th>
<th>COURSE PREREQUISITES AND CO-REQUISITIES</th>
<th>HIGHEST QUALIFICATION EARNED AND DISCIPLINE OF STUDY</th>
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<tbody>
<tr>
<td><strong>Year 1</strong></td>
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<td><strong>Semester 1</strong></td>
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<tr>
<td>Programming Fundamentals</td>
<td>56</td>
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<td>PhD Computer Science</td>
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<tr>
<td>Operating Systems Fundamentals</td>
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<td>PhD Computing and Software</td>
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<tr>
<td>Math 1</td>
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<td>PhD Materials Science</td>
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<tr>
<td>Electrical Fundamentals</td>
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<td>None</td>
<td>PhD Electrical Engineering</td>
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<tr>
<td>Liberal Studies Option: Business Communications</td>
<td>42</td>
<td>None</td>
<td>MEd</td>
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<tr>
<td>Liberal Studies Option: Critical Thinking</td>
<td>42</td>
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<td><strong>Semester 2</strong></td>
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<tr>
<td>Web Programming Fundamentals</td>
<td>56</td>
<td>Programming Fundamentals</td>
<td>PhD Computer Science</td>
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<tr>
<td>Network Fundamentals</td>
<td>42</td>
<td>Operating Systems Fundamentals</td>
<td>M.ASc. Computer Science</td>
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<tr>
<td>Calculus 1</td>
<td>56</td>
<td>Math 1</td>
<td>PhD Materials Science</td>
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<tr>
<td>Digital Health Fundamentals and the Canadian Health Care System</td>
<td>42</td>
<td>None</td>
<td>Masters of Engineering</td>
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<tr>
<td>Liberal Studies Option: Technical Writing for Technology</td>
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<td>None</td>
<td>PhD Electrical Engineering</td>
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<tr>
<td>COURSE TITLE</td>
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<td><strong>Semester 3</strong></td>
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<tr>
<td>Information Management and Database Fundamentals</td>
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<td>Programming Fundamentals</td>
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<td>Social Computing and Social Media Platforms</td>
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<td>Mobile Development</td>
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<td>Programming Fundamentals</td>
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<td><strong>Semester 4</strong></td>
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<td>Digital Health Devices</td>
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<td>Masters of Engineering</td>
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<tr>
<td>Data Structures and Algorithms</td>
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<td></td>
<td>Programming Fundamentals</td>
<td>PhD Electrical Engineering</td>
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<tr>
<td>Computer Architecture and Digital Principles</td>
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<td>Web Programming Fundamentals</td>
<td>M.ASc. Computer Science</td>
</tr>
<tr>
<td>Health, Medicine and Patient Care</td>
<td>56</td>
<td></td>
<td>Physiology, Pathology and Medical Terminology</td>
<td></td>
</tr>
<tr>
<td>Digital Health Architectures, Standards and Interoperability</td>
<td>42</td>
<td></td>
<td>Computer Architecture and Digital Principles</td>
<td>Masters of Engineering</td>
</tr>
<tr>
<td>Systems Administration and Device Management</td>
<td>42</td>
<td></td>
<td>Network Fundamentals</td>
<td>PhD Electrical Engineering</td>
</tr>
<tr>
<td>Liberal Studies Option: Project Management</td>
<td>42</td>
<td></td>
<td>None</td>
<td>MBA</td>
</tr>
<tr>
<td>Liberal Studies Option</td>
<td>42</td>
<td></td>
<td>None</td>
<td>PhD</td>
</tr>
<tr>
<td><strong>Semester 6</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systems Integration Fundamentals</td>
<td>42</td>
<td></td>
<td>Digital Health Architectures, Standards and Interoperability</td>
<td>PhD Computing and Software</td>
</tr>
<tr>
<td>Research and Evaluation Methods and Design</td>
<td>42</td>
<td></td>
<td>Statistics</td>
<td>PhD Materials Science</td>
</tr>
<tr>
<td>COURSE TITLE</td>
<td>TOTAL CORE COURSE SEMESTER HOURS</td>
<td>TOTAL NON-CORE COURSE SEMESTER HOURS</td>
<td>COURSE PREREQUISITES AND CO-REQUISITIES</td>
<td>HIGHEST QUALIFICATION EARNED AND DISCIPLINE OF STUDY</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
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<td>------------------------------------------</td>
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<tr>
<td>Health, Legal, Ethical, Privacy Administration</td>
<td>98</td>
<td></td>
<td>Digital Health Fundamentals and the Canadian Health Care System</td>
<td></td>
</tr>
<tr>
<td>Telehealth, Virtual Hospitals and Remote Patient Monitoring</td>
<td>42</td>
<td></td>
<td>Physiology, Pathology and Medical Terminology</td>
<td></td>
</tr>
<tr>
<td>Liberal Studies Option</td>
<td>42</td>
<td>None</td>
<td>PhD</td>
<td></td>
</tr>
<tr>
<td>Liberal Studies Option</td>
<td>42</td>
<td>None</td>
<td>PhD</td>
<td></td>
</tr>
<tr>
<td>Year 4</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semester 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enterprise Architectures, Systems Modelling and Analysis</td>
<td>42</td>
<td></td>
<td>Digital Health Architectures, Standards and Interoperability</td>
<td>PhD Computer Science</td>
</tr>
<tr>
<td>Data Security Fundamentals</td>
<td>42</td>
<td></td>
<td>Network Fundamentals</td>
<td>PhD Electrical Engineering</td>
</tr>
<tr>
<td>Cloud, Distributed and Service Computing</td>
<td>56</td>
<td></td>
<td>Network Fundamentals</td>
<td>Masters of Engineering</td>
</tr>
<tr>
<td>Digital Imaging for Health</td>
<td>56</td>
<td></td>
<td>Digital Health Devices, Web Programming Fundamentals</td>
<td></td>
</tr>
<tr>
<td>COURSE TITLE</td>
<td>TOTAL CORE COURSE SEMESTER HOURS</td>
<td>TOTAL NON-CORE COURSE SEMESTER HOURS</td>
<td>COURSE PREREQUISITES AND CO-REQUISITIES</td>
<td>HIGHEST QUALIFICATION EARNED AND DISCIPLINE OF STUDY</td>
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<tr>
<td>--------------</td>
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<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Liberal Studies Option</td>
<td></td>
<td>42</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td><strong>Semester 8</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Analytics and Reporting and Decision Support Systems</td>
<td>42</td>
<td></td>
<td>Epidemiology and Health Care Statistics, Statistics, Information Management and Database Fundamentals</td>
<td></td>
</tr>
<tr>
<td>Behaviour Change for Health</td>
<td>42</td>
<td></td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>COURSE TITLE</td>
<td>TOTAL CORE COURSE SEMESTER HOURS</td>
<td>TOTAL NON-CORE COURSE SEMESTER HOURS</td>
<td>COURSE PREREQUISITES AND CO-REQUISITIES</td>
<td>HIGHEST QUALIFICATION EARNED AND DISCIPLINE OF STUDY</td>
</tr>
<tr>
<td>--------------</td>
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<td>----------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Liberal Studies Option: Technology Entrepreneurship</td>
<td>42</td>
<td>None</td>
<td></td>
<td>M.ASc. Computer Science</td>
</tr>
<tr>
<td>Liberal Studies Option</td>
<td>42</td>
<td>None</td>
<td></td>
<td>PhD</td>
</tr>
</tbody>
</table>

Summary of Program Hours

<table>
<thead>
<tr>
<th></th>
<th>Total Program Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>1,778</td>
<td>79.4%</td>
</tr>
<tr>
<td>Non-Core</td>
<td>462</td>
<td>20.6%</td>
</tr>
<tr>
<td>Total</td>
<td>2,240</td>
<td>100%</td>
</tr>
</tbody>
</table>

4.7 Work Experience

Mohawk College’s full-time, semester-long work-integrated learning experiences are supported through the Department of Co-operative (Co-op) Education. This experience combines preparatory classroom-based education with full-time four month work experiences (or equivalent), which gives the student credit for this structured job experience. The work terms provides an opportunity to apply theoretical knowledge and consolidate learning in an applied setting and will be positioned between their academic semesters. In today’s marketplace, work-integrated learning is important in helping students successfully make the school-to-work transition.

A Mohawk College Co-op Coordinator works closely with each student to ensure a high degree of support throughout the co-op process. The Co-operative Education program has three major components, which take place before, during and after a work term experience.

Students receive periodic feedback on their work term experience from multiple sources. Student-defined learning objectives are set for the work term and reflected upon at its conclusion. Students conduct a self-evaluation of their achievement of the work experience outcomes and employers complete an evaluation in consultation with the
student, using a standardized form. Students will do present a presentation about their work experience, or present experiences in an eportfolio, which they then share with their Co-op Coordinator and peers.

How Work Experience Puts into Practice the Program Outcomes

The work-integrated learning experience is a highly valuable central component of the Bachelor of Digital Health degree program as it enables the student to integrate the academic curriculum with actual experience in the field. Students have the opportunity to work with professionals who are applying the knowledge and skills which the students have acquired from their experiences in the degree program. It is also an opportunity for students to integrate and practice their own knowledge and skills as well as gain an understanding of the role and the demands and rewards of the profession in general.

The integrated learning experience has been designed in collaboration with the Department of Co-operative Education with an aim to strengthen and complete the program outcomes. Individual College departments and divisions work together to ensure that students meet the co-op outcomes and the program learning outcomes while on their co-op work term. Thus the student’s placement is a partnership between the student, co-op provider and the College.

The work-integrated learning experience allows students to develop their related workplace skills, gain essential work experience and understand the real-world expectations of employment positions. It hones their professionalism and interpersonal skills. The table below illustrates how students will experience this approach to learning.

<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>Semester 1</td>
<td>Semester 2</td>
<td>Off</td>
</tr>
<tr>
<td>Year 2</td>
<td>Semester 3</td>
<td>Semester 4</td>
<td>Off</td>
</tr>
<tr>
<td>Year 3</td>
<td>Semester 5</td>
<td>Semester 6</td>
<td>Work Term</td>
</tr>
<tr>
<td>Year 4</td>
<td>Work Term</td>
<td>Semester 7</td>
<td>Semester 8</td>
</tr>
</tbody>
</table>
**8 month Co-op Work Term (Co-op course)**

The student co-operative work term is designed to integrate related, practical experience with academic studies. The work term will be based on a partnership between Mohawk and the healthcare community and will involve the participation of the student, professor, employers and employees. Co-operative education will afford students with an opportunity to enhance their in-school learning at Mohawk while developing a greater awareness and understanding of the world in which they choose to work. Employers will include healthcare suppliers, software suppliers, health insurance companies, hospitals, clinics and independent healthcare service providers. Students will participate in producing quality data to help provide better outcomes for patients, creating greater overall efficiencies and improvements in services, reducing paper-based systems in healthcare with dynamic electronic systems and reducing risk through better healthcare planning through IT support. The Student will develop skills, knowledge and attitudes that are necessary to become productive team players in the healthcare industry. Through this valuable work experience, Students will experience, firsthand, the issues facing a healthcare industry as it moves towards a fully integrated service using current and powerful business intelligence systems while increasing the level of service and support towards the well-being and care of the patients. As they return to Mohawk for their final year, Students will have valuable experience to share and to draw on during their studies and with their cohort.

**Method of Evaluating the Student during Placement**

The components of the work-integrated learning experience are evaluated as Satisfactory or Unsatisfactory and, therefore, are not included in the calculation of the student’s Grade Point Average (GPA). Although they are not categorized as either core or non-core courses, they are considered requirements for graduation. Their evaluation is discussed with and, ultimately, decided on by the academic faculty (including the Program Coordinator and Chair). The program Co-op Coordinator evaluates the learning outcomes and satisfactory course completion. The full-time work term experience (or equivalent) assessment is completed with information from three sources: Co-op Coordinator, supervising (workplace) Manager and student. Co-op Coordinators perform a midterm site visit to assess the relationships between the employee/employer, workload, working conditions, and to provide/receive feedback and support. The supervising Manager is asked to complete a performance evaluation form at five weeks and upon completion of the placement. Students complete an end-of-term self-
assessment. Based on these three evaluations, the Co-op Coordinator provides a recommendation to be discussed with academic faculty at the end-of-semester promotion committee meetings regarding whether the student has successfully met the learning outcomes.

Support for Co-op Students

The diversity and quantity of organizations involved in digital health activities that draw upon the knowledge and skills from this degree directly addresses a regional priority and provides for a wide array of work experience opportunities. Students in the Bachelor of Digital Health program could potentially obtain co-op placements in positions such as ICT Service Desk Lead, Clinical Coding Specialists, Health Records Technicians and Data Integrity Supervisors.

Support for co-op work experiences from local employers is high, with a variety of organizations already pledging a willingness to offer co-op experiences to students enrolled in the program (see letters of support in Section 7: Credential Recognition). Employer development will expand beyond the Hamilton area to create new opportunities for students across the province.

The College currently has existing relationships with employers including, eHealth Ontario, Hamilton Health Sciences, Experis, Blackberry, Innovation Factory, COACH, Canada Health Informatics Association.

The Co-op Education Department’s business development team will work closely with the Technology and Health Divisions to identify opportunities for Mohawk College’s expansion into new areas of employment related to the proposed Bachelor of Digital Health degree program. Given the multi-faceted nature of the Hamilton and Golden Horseshoe labour market, it is expected that a broad variety of work experiences will be available, through organizations that the college is associated with.

The Co-operative Education Department at Mohawk College consists of 11 staff members across all campuses and provides comprehensive support to all co-op students. The Department strives to develop long-term relationships with employers to generate a steady stream of relevant work term opportunities for our students. Students receive a wide range of supports to help them achieve success, including

- Independent Career Advising and Mentoring
- Resume and Cover Letter workshops
- Interview Skills Development and Individual Practice Sessions
- Success on the Job workshops
- Workplace Health and Safety workshops
The Co-op Coordinators are career professionals with industry connections who are available for personal mentoring with students. They conduct a site visit to each student on a work term, thus supporting both the student and the employer. They often act as skilled and knowledgeable mediators in workplace misunderstandings and can advocate on behalf of the student if needed.

The Mohawk Co-op Department’s business development team plays a key role in supporting the development of new work-integrated learning opportunities. The Business Developers generate new work term opportunities through activities such as creating and delivering outreach initiatives, maximizing social media, connecting with association/organizations, attending industry-specific trade shows/events and calling employers directly.

4.8 Course Outlines
Course outlines are developed for each course, in accordance with the college’s program curriculum policy (AS-2004-2007). See copy of policy in Appendix 11. All course outlines are managed by the college’s electronic course outline mapping and management system (COMMS). COMMS is a cloud based web application system designed and managed by Algonquin College, and access through a service agreement, to facilitate the standardized creation, management and archiving of course outlines. See Appendix 2 for course outlines.

4.9 Bridging Course Descriptions
There will be a one semester bridge for students who have earned a three year Ontario College Advanced Diploma in an Information Technology program. Upon completion of the bridging semester, students will move into Year 3, Semester five of the degree program. The bridging semester includes the following courses:

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Health Fundamentals and the Canadian Health Care System</td>
<td>The aim of this course is to provide the student with an overview of Digital Health and its technologies, and the Canadian Health Care System. Topics include hospital and primary care information systems including electronic health records (EHR) systems, how health professionals use data, human/cognitive factors in development and implementation of Digital Health applications and devices, technology standards, aggregation of health information, patient information systems, and consumer Digital Health applications. Other topics include The Canada Health Act, public and private healthcare payment models, and the Ontario Health Insurance Plan (OHIP).</td>
</tr>
<tr>
<td>Course</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
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</tr>
<tr>
<td>Social Computing and Social Media Platforms</td>
<td>This course will introduce the student to social computing and social media platforms and their usefulness in healthcare. The course will cover a variety of platforms, tools and uses of social media. Topics include influencer and social outreach, the formation of social networks and the communication and behaviour within them, social marketing, community management, and social analytics.</td>
</tr>
<tr>
<td>Physiology, Pathology, and Medical Terminology</td>
<td>The focus of this course is an overview of the physiology of major organ systems of the human body and some common diseases. Topics include neurophysiology and peripheral nervous system, muscle, the cardiovascular system, the components of blood, respiratory system and immune system. Medical vocabularies, coding systems and ontologies will be discussed in the context of health information management.</td>
</tr>
<tr>
<td>Epidemiology and Health Care Statistics</td>
<td>Epidemiology is the study of patterns of diseases in populations. This course will focus on epidemiology and statistics that are useful in healthcare. Topics will include population health and disease conditions, collection, calculation, analysis and presentation of healthcare data including mortality and morbidity rates, measures of central tendency, and descriptions of the patterns of illness in populations. Other topics include clinical research studies and clinical trials, outbreak surveillance and bio monitoring.</td>
</tr>
<tr>
<td>Patient Safety and Risk Management</td>
<td>In this course students will be introduced to patient safety and patient risk management in healthcare with a focus on the impact of technology on patient safety. A case study approach will be used to discuss topics that include human factors design principles, patient safety practices, and the use of technology to prevent human error that can cause harm to patients. Patient risk management content will include medical errors, quality medical record keeping, professional conduct and ethics, event reporting, legal issues, risk mitigation and strategies for quality improvement.</td>
</tr>
<tr>
<td>Option: Choose one of the following:</td>
<td></td>
</tr>
<tr>
<td>Web Programming Fundamentals</td>
<td>This course will focus on the technologies required to develop a Web application. Students will be introduced to the client-server model, and will use HTML, CSS and PHP to generate dynamic Web pages. Additionally, MySQL will be used with PHP to store and retrieve data from a database.</td>
</tr>
<tr>
<td>Network Fundamentals</td>
<td>This course is an overview of network technologies. It provides an introduction to network architectures and protocols, including application layer protocols, network programming, transport protocols, routing, multicast, data link layer issues, multimedia networking, network security, and network management.</td>
</tr>
</tbody>
</table>

4.10 Bridging Course Outlines
The courses offered in the bridging semester are the same as the courses offered in the first two years of the degree program. Please see Appendix 2 for the course outlines.

4.11 Gap Analysis for Degree Completion Arrangements
There will be no degree completion arrangements.
SECTION 5: PROGRAM DELIVERY

Mohawk College assures the delivery of quality academic programming through a variety of means: new program development and program review processes; an effective employee recruitment process; faculty development programs (CEDP) for new faculty; on-going professional development for employees; the collection and utilization of student feedback; and quality assurance processes.

Additional information related to the assurance of the delivery of quality academic programming can be found in the Program Evaluation Standard in Section 10. The Program Quality Policy (AS-2000-2013) can be found in Section 16.

5.1 Quality Assurance of Delivery

Mohawk College conducts sustained, evidence-based and participatory inquiry to ensure that courses and programs (whether delivered using traditional, web facilitated, blended, hybrid, or online methods) are achieving the intended learning outcomes. Furthermore, the results of the quality assurance practices and processes are used to guide curriculum design and delivery, pedagogy, and educational processes. Curriculum design and delivery are assessed throughout the program life cycle, with more in-depth analysis taking place during the implementation phase. At each stage of the process, Mohawk ensures that its policies and procedures are aligned to those of the appropriate Ministries, approving agencies and professional bodies, where appropriate and relevant.

In addition, once every five years, Mohawk College participates in a provincially legislated Program Quality Assurance Process Audit (PQAPA). The PQAPA involves the regular and cyclical external review of the college’s program quality assurance processes at an institutional level, culminating with a report that documents the degree to which those processes conform to the quality criteria defining exemplary quality assurance processes. The final report also results in recommendations aimed at improvement and enhanced consistency with the quality criteria.

A number of college committees and councils are involved in program approvals and quality assurance measures. These include:

- Program Development Team
- Administrative Management Team
- Program Advisory Committees
- Program Curriculum Committees
- Mohawk Executive Group
- Board of Governors

Contained in the “Policies” section of this submission is the College’s policy and handbook on Quality Assurance – program review, which describes the College’s
commitment to regular academic program review and the College’s capacity to provide college-wide infrastructure and student support services such as libraries, learning centres, computer labs, appropriately equipped classrooms, student services and student work space.

**New Program Development**

All programs developed and delivered by Mohawk College maintain consistency with Ministry of Training, Colleges and Universities (MTCU) standards where applicable. Regular review, restructuring, reorganization and enhancement of programs is an essential strategy for keeping pace with demographic shifts, changing employment trends, global competition and student and employer needs.

Clear links to the College’s Strategic Plan, Academic Plan and brand must be demonstrated and opportunities to leverage assets such as blended learning and applied research infrastructure are stressed. New program development is grounded in market research and assessed against financial benchmarks. Guided by principles outlined in the Academic Plan, new programs will be designed to:

- Employ cross-disciplinary learning
- Include experiential learning opportunities
- Embed institutional learning outcomes
- Embrace internationalization
- Utilize new learning technologies and emphasize leading technology being employed in the field
- Offer multiple entrance and exit pathways for students

The development of any new program is a collaborative effort involving faculty in the department, curriculum design specialists, subject matter experts, industry representatives, and a team of supporters from Institutional Research, Program Quality, Admissions and the periphery areas that support program development.

Mohawk’s revised and approved policies for both program review and the development of new programs comply with the requirements of the newly instituted Ontario Universities Council on Quality Assurance (the Quality Council). The policies reinforce the university degree-level expectations (DLEs) requirements for degree programs.

Stakeholders were made aware of the intent to develop the Bachelor of Digital Health (Honours) degree program and brought in for discussions, input, identification of gaps, and advice on trends and issues in the field. An environmental scan was done through the Institutional Research (IR) office to examine the industrial and educational context for the proposed program, its competition, and industry trends. Input solicited from industry through interviews and the creation of an ad hoc Program Advisory Committee (PAC), a
survey, and sharing of the program structure elicited the desired information required to make pedagogical and structural decisions about the program.

Upon completion of the above stages, when the appropriate context for the program was set, a curriculum specialist from Program Quality in the Centre for Teaching and Learning (CTL) worked closely with the subject matter experts from the School of Engineering Technology to ensure degree level standards were met in articulating the program learning outcomes (PLOs), courses were aligned to the program PLOs, courses were aligned to degree level expectations, the program of studies (POS) represented a realistic course of studies for the target student population, and the program presented a pedagogic holistic approach based on the current theories of practice. Considerations were also made for functional viability of the program as it adds to the culture and context of the institution. New ventures such as program alignment to Institutional Learning Outcomes (ILOs), and portfolio expectations in capstone courses were considered to incorporate current strategic strategies in its formative stages. An effort was made to incorporate globalization issues to address the need to be able to compare and contrast the variety of qualifications granted by academic institutions for credit transfer, graduate study preparation and professional qualification. Courses were developed with the notion that there is a need to measure academic equivalencies, create pathways and opportunities into other areas of higher education.

Faculty Hiring
Mohawk strives to be an employer of choice with a high performing, diverse workforce and quality work environment. Recruitment and hiring is designed to attract the most qualified individuals through a transparent, impartial and consistently applied process. Both academic and professional credentials are required.

Over 120 faculty, technologists and staff teach and support the delivery of programs in the School of Engineering Technology. Faculty teaching in the Bachelor of Digital Health (Honours) program will have a minimum qualification of a Master’s degree in the field of study or a related field, complemented by faculty holding a PhD in the technical areas, fulfilling the college’s capacity to deliver criteria. It is projected that existing full-time faculty will be complemented with new full-time hires when the program is launched with incremental additions each year (see hiring plan below). The college will target candidates with PhD qualifications as vacancies arise, either through board approval for new positions or through natural attrition. Specialists from industry, with exceptional skills and experience, will also be encouraged to support the program in part time roles, thereby also providing a diverse pool for potential full time faculty.
## Hiring Plan for Program Implementation

<table>
<thead>
<tr>
<th>HIRING PERIOD</th>
<th>CREDENTIAL SOUGHT</th>
<th>COURSES TO TEACH</th>
</tr>
</thead>
</table>
| First Year of Program Launch   | PhD Healthcare Management / Health Informatics, with a minimum of a Bachelors in Computer Science **or** PhD in Health Policy, Management and Evaluation | o Physiology, Pathology and Medical Terminology  
                                    |                                                                                  | o Epidemiology and Health Care Statistics  
                                    |                                                                                  | o Patient Safety and Risk Management |
| Second Year of Program Offering| PhD Healthcare Management / Health Informatics, with a minimum of a Bachelors in Computer Science **or** PhD in Health Policy, Management and Evaluation | o Health, Medicine and Patient Care  
                                    |                                                                                  | o Telehealth, Virtual Hospitals and Remote Patient Monitoring  
                                    |                                                                                  | o Health, Legal, Ethical, Privacy Administration |
| Third Year of Program Offering | PhD Healthcare Management / Health Informatics, with a minimum of a Bachelors in Computer Science **or** PhD in Health Policy, Management and Evaluation | o Digital Imaging for Health  
                                    |                                                                                  | o Data Analytics and Reporting and Decision Support Systems  
                                    |                                                                                  | o Behaviour Change for Health |

The hiring process takes at least three steps: team interviews, thorough checking of credentials and references, and a teaching demonstration.

New hires at Mohawk are expected to take the residential faculty development program put together by six community colleges in the Western Region - The College Educator Development Program (CEDP). This program was designed to introduce new faculty (either new to the college system and/or new to teaching) to the Ontario college system. Even though the majority of new teachers are brimming with extensive content expertise, they may have little or no formal teacher training or teaching experience. CEDP assists new faculty to reflect on their practice and in learning how to engage their students, how to foster learning and where to seek support during their initial 3 years in the classroom. CEDP works by raising the bar on the quality of education at the source, the instructor level. By building teamwork, trust and resources for new employees, CEDP builds a strong foundation that translates to quality education. Additionally, new and existing
faculty have the ability to learn through formal interactions in the colleges Faculty Peer Mentoring Program. Managed through the Centre for Teaching and Learning, the program is among other things, intending to allow for cross-disciplinary approach in the community of teaching; develop positive peer partnerships and provide continuous professional development for both mentors and mentees.

**Ongoing Professional Development**

On-going professional development is encouraged at Mohawk to continually improve competencies, skills, knowledge and performance. It is valued as a means to improve job satisfaction, career potential, and to maximize employee contribution to the College’s strategic direction. The Professional Development for Staff Policy (CS-1312-2005) can be found in Section 16.

The Centre for Teaching and Learning contributes, develops and delivers expertise, resources and education to engage the college community in initiatives that enhance the quality of the learning experience. Several workshops are offered through e-learn, face to face and by visiting presenters throughout the year.

The Staff Tuition Assistance Program has been developed to foster a learning environment for full-time staff by providing financial assistance for certificate, diploma or degree programs taken outside Mohawk College. Educational goals and outcomes must complement the college’s strategic direction. Mohawk College will reimburse 50% for eligible courses and/or programs. There is a PD Policy & Procedures for details about eligibility that faculty can consult to determine if they are eligible.

A professional development leave provides the opportunity for faculty to pursue professional development activities outside the College through further academic or technical studies, or in industry, which will enhance their ability to fulfill professional responsibilities. Faculty will have to complete six years of service with the College in order to be eligible for a professional development leave.

**Online Delivery**

Through its strategic plan and priorities, Mohawk College is committed to growing online delivery options for students and faculty. Online course development at Mohawk College is a collaborative approach between the various academic and administrative units and departments to achieve a quality product. The team is always cognizant of the need to ensure student success.

Courses therefore must:

- Adhere to the program standards/policies/guidelines as articulated by the MTCU
- Align to standards/codes of practice as outlined by professional and industry bodies
- Align to the program quality standards, specifically as it relates to alignment of learning outcomes, assessment and delivery methods
- Reflect universal instructional design principles and comply with the AODA regulations
- Meet the essential elements criteria as established by the Centre for Teaching and Learning
- Provide information on the necessary supports available for students during the teaching learning process
- Provide information to students on access to the necessary resources, including textbooks, journals, applicable software and hardware
- Provide information to the learner on technology requirements

Additionally, the college provides high level support to the academic units in the development and delivery of courses for online offering.

Online course development will be guided by the Community of Inquiry approach to design and development which ensures that all three spheres of the educational experience – cognitive, teaching, and social – and their intersections combine to represent a rich, interactive, and challenging online learning environment.

Social-constructivist principles of learning are also integral. Students’ cultures and contexts are honoured in the social process of learning and knowledge creation. There are multiple springboards to share former experiences as well as to collaborate and construct new knowledge frameworks or ways of knowing.

See Section 6 for more information about the physical and learning resources available to faculty and students, the plan for upgrading resources and policies related to blended, hybrid and online delivery.

CVs of online learning professionals and technical staff can be found in Appendix 12.

5.2 Student Feedback
Student feedback helps faculty to improve teaching effectiveness and assists academic areas in monitoring the quality of programs.

At Mohawk, students have the opportunity to provide feedback on teaching for courses in which they are enrolled. During a pre-determined period each term, faculty must provide at least ten minutes for students to complete an internal, college wide survey which is then collected and analyzed. Student identities are kept confidential and results are released to faculty and Associate Deans after the release of final grades. Survey results are posted in aggregate form (see Feedback form in Appendix 3).

In addition, Mohawk collects performance data for the annual Colleges Ontario Key Performance Indicators (KPIs) survey. Indicators on graduate satisfaction, student satisfaction, employer satisfaction, employment rate, and graduation rate can be valuable in helping improve and refine teaching and learning practices.
In 2015, for the fifth consecutive year, Mohawk was ranked number one among all colleges in the Greater Toronto and Hamilton Area for overall student satisfaction. Mohawk also finished first in quality of programs, services and facilities.

The College’s Student Feedback Policy (Policy Number: AS-2003-2013) is in place to ensure consistency in student feedback principles. It can be found in Section 16.
SECTION 6: CAPACITY TO DELIVER

Mohawk College has the needed capacity to deliver the Bachelor of Digital Health (Honours) degree program. In terms of physical and learning resources, student support, and faculty credentials, the College is well-prepared to provide the education necessary for students to attain the stated learning outcomes.

In 2009, Mohawk launched its Fennell Campus Renewal Project, the largest in its 47-year history. The project, which is still on-going, has at its foundation the strategic priorities of Quality, Innovation and Sustainability; the goal is to enhance services to students, ensure barrier-free access, increase wireless capacity and foster a climate of learning excellence and student commitment. For the last three years, since the impact of the project has been felt, Mohawk scored #1 in the greater Toronto and Hamilton area in the College’s Ontario Key Performance Indicator (KPI) surveys for Student Satisfaction.

The College’s mission of “creating new realities by opening endless opportunities” is key to the development of any new program at Mohawk. The Bachelor of Digital Health (Honours) program will generate opportunities for students in industry sectors where digital technology converges with healthcare. In-demand skills will be gained by students as they study and train at a College well-known for its leadership in Health and Technology. The alignment of the program with Mohawk’s proposal to become Ontario’s first Institute of Health and Technology confirms the appropriateness of its introduction.

6.1 Learning and Physical Resources

As part of the Fennell Renewal Project, Mohawk designed a 17,000 square foot hub as a one-stop shop for student services. The Square serves 7,000 full-time students at the Fennell campus as well as 42,000 Continuing Education students while offering support for the services provided at other campuses. The range of services offered includes recruitment, admissions, registration, financial aid, counselling, New Canadian and International advising, accessible learning and employment. Students can also book an appointment with a Student Success Advisor, Academic or Career Counsellor or monitor their progress through the college’s web-based academic advising My Academic Progress (MAP), access to which is provided for all students through the college’s intranet. MAP displays a student’s entire academic record including completed, in-progress, and remaining course work. The primary purpose of MAP is to be a self-advisement tool for students but it is not a substitution for consultation with a Student Success Advisor or Academic Coordinator.
The table below provides highlights of services offered.

<table>
<thead>
<tr>
<th>Support Service</th>
<th>Provides Access To/ Information About:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Square</strong></td>
<td>• Request a ONE card student ID</td>
</tr>
<tr>
<td></td>
<td>• Pay fees</td>
</tr>
<tr>
<td></td>
<td>• Register for courses</td>
</tr>
<tr>
<td></td>
<td>• Request a transcript or letter verifying enrolment</td>
</tr>
<tr>
<td></td>
<td>• Drop off completed forms</td>
</tr>
<tr>
<td><strong>Student Success Advisors</strong></td>
<td>• Specialized program and campus knowledge</td>
</tr>
<tr>
<td></td>
<td>• Adjusting to college life</td>
</tr>
<tr>
<td></td>
<td>• Questions re: academic probation</td>
</tr>
<tr>
<td></td>
<td>• Questions re: repeating failed subjects</td>
</tr>
<tr>
<td></td>
<td>• Procedures for dropping a course</td>
</tr>
<tr>
<td></td>
<td>• Deciding about program withdrawal</td>
</tr>
<tr>
<td></td>
<td>• Advice on college policies and procedures</td>
</tr>
<tr>
<td></td>
<td>• Articulation of other post-secondary programs</td>
</tr>
<tr>
<td></td>
<td>• Helping to eliminate barriers to success</td>
</tr>
<tr>
<td><strong>Counselling Services</strong></td>
<td>• Academic issues, including strategies and techniques for effective learning</td>
</tr>
<tr>
<td></td>
<td>• Career &amp; education options</td>
</tr>
<tr>
<td></td>
<td>• Personal issues that are getting in the way of academic success (all services are provided confidentially)</td>
</tr>
<tr>
<td><strong>Accessibility Services</strong></td>
<td>• Services to ensure all students have an equal opportunity to achieve their educational goals</td>
</tr>
<tr>
<td><strong>Resolution Services</strong></td>
<td>• Issues related to Student Behaviour, Human Rights, Academic Appeals and Student Complaints</td>
</tr>
</tbody>
</table>

**Library Resources**
Students and faculty at Mohawk have access to a wide range of physical and electronic resources, information services and technical support through the library. Library resources support College curriculum and are enhanced with the introduction of new programs. Service is maintained at three physical locations (the campuses of Fennell, IAHS and Stoney Creek) and 24/7 access to online resources via the website at [www.library.mohawkcollege.ca](http://www.library.mohawkcollege.ca). Additional resources are also available through access to various subject discipline sites and recently acquired [www.lynda.com](http://www.lynda.com), a privately held online education company offering thousands of video courses in software, creative, and business skills.
### Campus Library Locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
<th>Total Library area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fennell Campus</strong></td>
<td>135 Fennell Avenue West</td>
<td>Cummings Library = 594.0 m²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collaboratory = 574.1 m²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>bizHUB = 270.4 m²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TECHBAR = 23.9 m²</td>
</tr>
<tr>
<td><strong>Total number of seats:</strong></td>
<td>559 (all Fennell locations)</td>
<td>Classroom (Study Hall): 50 seats, 4 projectors, whiteboards</td>
</tr>
<tr>
<td></td>
<td>including</td>
<td>Silent Study: 52 seats (15 study carrels; 3 tables with 30 seats in total; 7 tub chairs)</td>
</tr>
<tr>
<td><strong>Bookable space:</strong></td>
<td></td>
<td>8 tables: 50 seats</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 sandboxes: 64 seats, 9 monitors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 room: 6 seats</td>
</tr>
<tr>
<td><strong>Computers available for student use:</strong></td>
<td></td>
<td>118 PCs, 10 Macs, 8 ALS stations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60 laptops (circulation: 10,865)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 machines</td>
</tr>
<tr>
<td><strong>Hours of Operation (may vary slightly between semesters):</strong></td>
<td></td>
<td>Monday-Thursday: 8:00 am to 9:00 pm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Friday: 8:00 am to 4:30 pm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Saturday: 8:30 am to 4:30 pm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sunday: 11:00 am to 3:00 pm</td>
</tr>
<tr>
<td><strong>IAHS Library @ McMaster Campus</strong></td>
<td>1400 Main Street West,</td>
<td>Total Library area: 706.0 m²</td>
</tr>
<tr>
<td></td>
<td>Hamilton, ON L8S 1C7</td>
<td><strong>Total number of seats:</strong> 189 including</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Silent study: 57 seats (51 study carrels, 6 tub chairs)</td>
</tr>
<tr>
<td><strong>Bookable space:</strong></td>
<td></td>
<td>1 room: 12 seats (includes TV, VCR/DVD player / White Board)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 sandbox: 5 seats, 1 monitor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 tables: 12 seats</td>
</tr>
<tr>
<td><strong>Computers available for student use:</strong></td>
<td></td>
<td>46 PCs, 1 ALS station</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 laptops (circulation: 124)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clinical Practice Collaboratory (6 beds, 6 iPad, digital screen)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Printer/copier/scanner: 2 machines</td>
</tr>
<tr>
<td><strong>Hours of Operation (may vary slightly between semesters):</strong></td>
<td></td>
<td>Monday-Thursday: 8:00 am to 9:00 pm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Friday: 8:00 am to 4:30 pm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Saturday: 10:00 am to 2:00 pm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sunday: 10:00 am to 2:00 pm</td>
</tr>
</tbody>
</table>
Mohawk College Library Collections and Services

The curriculum-based learning needs of the program will be supported with resources including print and ebooks; print and online journals, magazines and newspapers; DVDs and online videos. In the case of online resources, materials will be chosen with consideration to usability, AODA compliancy and access across multiple browsers and devices whenever possible. The library curates relevant web content for students and faculty, and will prepare a customized subject guide for the program.

Mohawk College Library has a direct, reciprocal borrowing agreement with every Community College library in Ontario. Upon receipt of a valid student/staff card, borrowers may be issued a card at any Ontario Community College library. Direct Borrowing Agreement. The library also offers an Inter-Library Loan service to borrow from other institutions.

Number of Titles (print and ebooks, ejournals, DVDs, sheet music, models, etc.) in the Library Catalogue: 19 050 (Dec 2014).

Online Videos: 18,000+ Titles (Films on Demand, National Film Board, CommonCraft, individually licenced)

Number of eBooks, by Collection:
  o Ovid: 55
  o eBrary: 24,500
  o History Reference Center: 2000
Existing resources to support the Bachelor of Digital Health (Honours) degree program:

Databases:

Computers and Applied Sciences Complete
This database provides full text for more than 500 periodicals. Subject areas include engineering disciplines, computers (theory and systems) and new technologies. Relevant titles include (but not limited to):
- Health management technology
- IEEE Software
- IEEE Transactions on Software Engineering
- IEEE Internet Computing

Academic Search Premier
This database indexes over 8500 academic journals with more than 4600 in full text. It covers nearly every area of academic study including biology, chemistry, engineering, physics, psychology and religion. Relevant titles incl. (but not limited to):
- Health Services Research
- Technology & Healthcare
- Biomedical Engineering Online

Proquest Science Journals:
Subject coverage in this database includes computers, engineering, physics, telecommunications, and transportation. Relevant titles incl. (but not limited to):
- Journal of medical systems
- Health Data Management
- Health Information Technology
- Computer Technology Journal
- Access on the library website to open access resources:
- Directory of Open Access Journals
- Relevant Titles include (but not limited to):
- Health information science and systems
- Open medical informatics journal
Canadian Newsstand Major Dailies:
This database provides full text access to a collection of many of Canada’s major daily newspapers, including the Globe and Mail, National Post, Toronto Star, Ottawa Citizen, etc.

Access Science:
This online resource provides full-text access to McGraw-Hill Encyclopedia of Science and Technology and covers: recent scientific research topics and developments, biographies of scientists, dictionary of scientific terminology, late-breaking science and technology news headlines, etc.

Number of Online Journals and Magazines by Topic (linked to title lists):
- Medical and Biomedical Informatics: 34 Titles
- Medical Technology: 15 Titles
- Computer Science: 444 Titles

Stand Alone Subscription:
- Science

Examples of Desirable Resources:


Library Usage Statistics (Jan 2014-December 2014)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitors</td>
<td>927,630</td>
</tr>
<tr>
<td>Visits to library website</td>
<td>267,975</td>
</tr>
<tr>
<td>Information questions (in person / phone)</td>
<td>6,411</td>
</tr>
<tr>
<td>Chats answered (not including eLearn)</td>
<td>2,656</td>
</tr>
<tr>
<td>Database Searches</td>
<td>1,986,793</td>
</tr>
<tr>
<td>#1 Database</td>
<td>Academic Search Premier</td>
</tr>
<tr>
<td>eBook searches</td>
<td>44,600</td>
</tr>
<tr>
<td>Subject Guide Hits</td>
<td>276,204</td>
</tr>
<tr>
<td>#1 Subject Guide</td>
<td>APA Help</td>
</tr>
<tr>
<td>Occupied Group Space</td>
<td>4,143</td>
</tr>
<tr>
<td>Participants in library instruction sessions</td>
<td>3,514</td>
</tr>
<tr>
<td>Online videos</td>
<td>22,074</td>
</tr>
<tr>
<td>Laptops Loaned</td>
<td>10,865</td>
</tr>
<tr>
<td>Information &amp; Digital Literacy sessions</td>
<td>148 Sessions, 3,759 participants</td>
</tr>
</tbody>
</table>

Technical Resources

eLearn@Mohawk is Mohawk College’s platform for online learning. Based on the Desire2Learn integrated learning platform, eLearn@Mohawk offers a powerful suite of flexible teaching and learning tools for course development, delivery, assessment, and management.

The heart of the platform is the Learning Environment (LE), which provides a rich set of core tools typical to learning management systems. The ability to extend the core functionality of the LE through the integration of other applications and platforms is a key feature of Desire2Learn, and Mohawk has deployed several such integrations with other Desire2Learn and third-party applications, including:

- Desire2Learn ePortfolio, for the sharing of achievements, knowledge and reflections with instructors, advisors, employers and peers, and to demonstrate competency achievements over time;
- Desire2Learn Insights, for predictive analytics for retention strategies, quality assurance, and compliance requirements;
- Panopto, for the creation and publishing of rich video-based learning objects;
- Kaltura, for seamless rich media hosting and streaming;
- Turnitin, for fully-integrated text matching plagiarism detection for assignment submission;
- Respondus LockDown Browser, to securely lock-down the Desire2Learn quizzing platform;
- Voicethread, for the development and sharing of media-rich presentations and discussions;
- Blue, for institutional surveying;
- Several integrations with content publishers including McGraw Hill, Pearson, and Nelson, providing single sign-on to custom learning content and environments.

Computer Resources and Web Access
Mohawk will introduce a Bring Your Own Device (BYOD) policy for students in the Bachelor of Digital Health (Honours) program for academic work. The technical requirements will be specified prior to registration based on industry standards at the time. A current example would be a laptop such as a MacBook Pro able to support both OS X (Mac) and Windows operating systems; 8 GB of memory; 500 GB hard drive; and 512 MB video card.

All College campuses offer Smart Rooms for teaching instruction (100 Smart Rooms are located at Fennell, 25 at IAHS and 29 at Stoney Creek). The rooms each contain a Dell Optiplex 9010 AIO Touch Screen Computer with an i7, 8 mb of Ram and a 1TB hard drive. There is also a data projector, document camera, sound system, wireless microphone and iClicker system in each room.

In general purpose labs and study areas, there are currently 2,196 computers for use by students (Dell Optiplex 790s or 7010s) with 8 MB of ram and 500 GB hard drives. Three CAD labs are also available (Dell Optiplex 790s loaded with advanced software including Solidworks and Catia) for the exclusive use of students in Technology programs.

<table>
<thead>
<tr>
<th>CAD TERMINALS AVAILABLE ONLY FOR TECHNOLOGY STUDENTS</th>
<th>COMPUTERS AVAILABLE FOR ALL STUDENTS (WITH WEB ACCESS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fennell A026</td>
<td>Fennell IAHS</td>
</tr>
<tr>
<td>Fennell E128</td>
<td>Stoney Creek</td>
</tr>
<tr>
<td>Fennell E203</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>1834</td>
</tr>
<tr>
<td>40</td>
<td>141</td>
</tr>
<tr>
<td>40</td>
<td>221</td>
</tr>
</tbody>
</table>

Currently computers operate on the Windows 7 64 bit platform. Over 200 software packages support all areas of academia including Office, AutoCad, Solidworks,
MasterCam, ArcGIS, Adobe Creative Suite and many more. Students enrolled at the College enjoy the benefit of free software on popular packages including MS Office, AutoCAD, and Solidworks through deals negotiated with software suppliers.

Classroom Space and Seating Capacity
Courses in the Bachelor of Digital Health (Honours) program will take place at Mohawk’s Fennell campus. Though the E-Wing of the main building is the focus area for delivery of Technology programs, Mohawk does not allocate specific rooms for the programs; rooms will be allocated by the Academic Scheduling Department (Office of the Registrar) to optimize utilization.

<table>
<thead>
<tr>
<th>CLASSROOMS AVAILABLE</th>
<th>SEATING CAPACITY</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>2627</td>
<td>Fennell</td>
</tr>
</tbody>
</table>

Specialized Equipment, Workstations and Laboratory Space
Students in the program will have access to labs and equipment at main Fennell campus.

The current lab has equipment to support the Bachelor of Digital Health (Honours) program. The lab provides a mix of current Windows and Mac based computers (laptops and workstations), mobile devices, cloud servers, and network storage.

| List of Specialized Equipment in Laboratory Space in E103 at Fennell Campus |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
| Desktop / Laptop               | Mobile          | Cloud Infrastructure | Cloud Storage |
| • 9 - Dell E6530 Laptops        | • 2 – Mac Mini  | • 3 Dell 2950 Servers | • 1 QNAP NAS – storage |
| • 20 - MacBook Pro (15")       | • 6 – iPad      | • 4 Poweredge 710 Servers | • 2 Powervault 4100 |
| • 10 – iMac computers          | • 1 – iPad Mini | • 2 Poweredge 810 Servers | • 1 Powervault 6100 |
| • 20 - Windows Desktop Computers | • 4 – iPod     | • 6 Poweredge 820 Servers | • 1 Powervault 6510 |
|                                  | • 1 – iPhone 4S | • 1 Poweredge 720 Server |                |
|                                  | • 2 – iPhone 5  |                              |                |
|                                  | • 2 – Nexus 4 Android Phone |                  |                |
|                                  | • 1 – Nexus 7 tablet |                  |                |
|                                  | • 1 – Blackberry Playbook |                |                |

Mohawk's mHealth & eHealth Development and Innovation Centre (MEDIC):
“MEDIC helps Canadian businesses, especially small- to medium-sized enterprises (SMEs) develop and commercialize innovative healthcare IT products and provides a centre of excellence for organizations undertaking interconnected healthcare projects. Through MEDIC, clients can access a working eHealth ecosystem, including the technology, know-how and industry contacts that are necessary in the development and commercialization of new health IT innovations. As an online "living-lab" environment,
MEDIC allows stakeholders to work through a significant part of their development in a cost-effective, secure, efficient manner.”

MEDIC provides:
- A collaborative environment for stakeholders to work together
- Access to expert design and implementation assistance for stakeholders
- Access to specifications, system documentation repositories and best practice guidance and tooling
- Access to an online, sandboxed version of the eHealth ecosystem where health care providers and software vendors begin their interface work safely and cost-efficiently
- Interface compliance testing process based on regulatory standards and guidelines
- Just-in-time training for health system personnel requiring assistance with new concepts

6.2 Resource Renewal and Upgrading

Mohawk College is committed to creating sustainable campuses with high quality spaces and cohesive designs that foster academic excellence and integrate the learning environment into the community.

As part of the ongoing Fennell Campus Renewal Project, the main corridor of the School of Engineering Technology has undergone significant renovations, creating a clear sense of place and better reflecting the identity of the School. The project includes a new lounge space for students to socialize or collaborate on projects, and locker removal has opened up the hallway to make room for new seating areas and display cases to highlight the work of our students.

In addition to major renovation projects, Mohawk commits funds regularly to ensure resources are renewed and upgraded across faculties and campuses.

<table>
<thead>
<tr>
<th>Year</th>
<th>Approximate Cost</th>
<th>Equipment Purchased</th>
<th>Campus</th>
<th>Related Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008/09</td>
<td>52,470</td>
<td>Welding equipment; multi-process converters</td>
<td>Stoney Creek</td>
<td>Manufacturing Engineering</td>
</tr>
<tr>
<td>Year</td>
<td>Amount</td>
<td>Description</td>
<td>Location</td>
<td>Field</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>2009/10</td>
<td>15,700</td>
<td>Simulation software</td>
<td>Fennell</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>2009/10</td>
<td>11,917</td>
<td>PLCs &amp; Easyports; network printer</td>
<td>Fennell</td>
<td>All engineering programs</td>
</tr>
<tr>
<td>2009/10</td>
<td>56,000</td>
<td>DC drives</td>
<td>Fennell</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>2010/11</td>
<td>34,245</td>
<td>Standard hydraulic components</td>
<td>Stoney Creek</td>
<td>All engineering programs</td>
</tr>
<tr>
<td>2012/13</td>
<td>47,000</td>
<td>Ancillary instruments for Festo equipment</td>
<td>Fennell</td>
<td>All engineering programs</td>
</tr>
<tr>
<td>2013/14</td>
<td>64,600</td>
<td>Fluids apparatus and dynamometer instruments</td>
<td>Fennell / Stoney Creek</td>
<td>All engineering programs</td>
</tr>
<tr>
<td>2014/15</td>
<td>600,000</td>
<td>Instrumentation Lab Equipment</td>
<td>Fennell</td>
<td>All engineering programs</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$998,735</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 6.3 Support Services

Support services related to learning and physical resources are described below. For support services related to Student Protection, please see Section 12.

Support for learning and physical resources is provided to students and faculty through the Centre for Teaching and Learning (CTL) and the Mohawk College Library. CTL staff
dedicate three Instructional Designers, and one Helpdesk technician, Educational Designer, Curriculum Development Specialist, and Learning & Development Consultant. In addition to academic support, Social Inc., a place where human rights are protected also provides support to the college community.

Technical support, group study space, computers and laptops can be reserved or accessed online, by phone or chat, or by visiting any campus Library or Library Tech Bar. Personal one-on-one or small group appointments with trained librarians and technicians are also available for individual support.

Support for Students

The Library Tech Bar at Fennell, the Institute for Applied Health Sciences (IAHS) at McMaster and Stoney Creek Campus libraries help students in the following areas:

- Setting up Wireless access on your laptop or mobile device
- Troubleshooting Library computers (PC and Mac)
- How to navigate MoCoMotion
- Using eLearn and creating ePortfolios
- Printing, copying and scanning
- Suggestions and guidance for using tools for collaboration and creativity

The eLearn helpdesk is available by phone and in-person from 8:30 – 4:30 to answer questions related to Mohawk’s Learning Management System eLearn@Mohawk; in the evenings, Library staff can be contacted by email and chat

A StartSmart Orientation session is provided to give students an overview of eLearn@Mohawk and to outline options for support.

Student Commons is a course site in eLearn@Mohawk which contains Self Help written and video tutorials to guide students in using eLearn@Mohawk, a discussion forum for questions, FAQ and terminology guides. This online space is monitored by the Helpdesk Technician to answer questions and ensure information is current and relevant.

Support for Faculty

eLearn@Mohawk tutorial videos and InfoSheets offer 24/7 self-help options to instructors. The following workshops are offered on an ongoing basis to support faculty:

- **0-100% Course Management:** This workshop focuses on meeting the Essential Elements related to course management. Join us to review the use of some of the core features of eLearn as you import and configure the template pages, create Modules and Topics in the Content tool, configure your Course homepage, Navigation bar and Widgets, and experience the new and improved HTML Editor.
Bring your own course and develop it with the help of an Instructional Technologist and other Mohawk faculty.

- **0-100% Communication:** This workshop focuses on meeting the Essential Elements related to communication. Join us to review how to update your class via the News tool, promote conversation via Discussions, and communicate vital information to students using Course and Instructor Information pages. Bring your own course and develop it with the help of an Instructional Technologist and other Mohawk faculty.

- **0-100% Assessment:** This workshop focuses on meeting the Essential Elements related to assessment. Join us to review how to set up your gradebook in the Grades tool, configure your Dropbox for online submissions, and assign due dates. We will also provide an overview of the rubrics tool and discuss the benefits of assignment scoring criteria. Bring your own course and develop it with the help of an Instructional Technologist and other Mohawk faculty.

Customized training is available by request to meet the unique needs of individuals from small groups to all instructors in a program of study.

Curriculum Development Specialists facilitate faculty development offerings (Teaching for Success, for example) and provide individual instruction on a range of topics including lesson planning, assessment, learning styles and outcome based education.

Multimedia sound booths located at each campus provide a dedicated space for faculty to create personalized multimedia content for their courses. Each sound booth is equipped with a range of hardware and software to support the creation of quality audio and video resources.

The following software and programs are available on PCs and Macs at all library locations:

- Adobe Acrobat Pro
- Adobe Digital Editions
- Adobe Master Collection CS6
- ArcGIS
- AutoCAD 2014
- Blender
- Communications Software (Essay Punch, etc.)
- CSAIT Software pckg (incl Microsoft SQL Server, Microsoft Visual Studio, NetBeans IDE, Notepad++, Putty, Oracle Database Express, Oracle VM VirtualBox, VMWare Player, ZOOMIT)
- Digital Fire Insight
- Dragon Naturally Speaking
- Express Scribe
6.4 Faculty

All faculty teaching in the Bachelor of Digital Health program meet the Board requirements. All faculty have relevant professional credentials and related work experience. They hold at least a Master’s degree in a closely related field or discipline and engage in a level of scholarship, research, or creative activity sufficient to ensure their currency in the field. Fifty (50) percent of faculty teaching in the core courses, as well as those teaching in non-core courses, hold the terminal academic credential in the field or in a closely related field of study. Faculty credentials are verified and documentation is maintained by the college as per the Recruitment and Selection Policy (CS-1305-2006). See copy of policy in Appendix 11.

The College is committed to helping each faculty member to develop, achieve, and realize his/her professional and personal potential in order to continually improve performance and to optimize each individual’s professional contributions to quality learning experiences for our students. Development plans and performance appraisals
of faculty are conducted annually to ensure that student needs are being adequately met as well as to discuss the ongoing needs and professional development of faculty. The performance plans focus on: Teaching Effectiveness, Expertise and Curriculum Development, Student Success, Evaluation and Assessment, Use of Technology and Behaviours along with development needs. Classroom observations are performed every three years to evaluate and guide development. See copies of policies and templates in Appendix 11.

New professors are subject to a one-year probationary period as per Article 27.02A of the Academic Collective Agreement, September 1, 2014 to September 30, 2017. This probationary period may be extended for up to one additional year where the College determines that the employee’s performance has not met expectations. The College shall provide a performance improvement plan to the employee. The plan shall specify the areas where improvement is needed and the supports and resources that the College will provide to the employee. The Union Local will be notified if an employee’s probationary period is extended. Probation of faculty is conducted using the Probationary Faculty Development and Performance Management Template.

The College is committed to creating an engaging workplace which values employee development and growth by encouraging and supporting the continuous improvement of competencies, skills, and knowledge to enhance the faculty member’s contribution to student success. The College provides faculty a variety of formal and informal opportunities to develop their skills and competencies, including attendance and participation at internal and external conferences. Some of these conferences includes: Great Ideas for Teaching (GIFT) Conference and Inspiring Minds, hosted by the Centre for Teaching and Learning and providing faculty and staff with the opportunities to share innovative practices and ideas they are using in the teaching learning environment. External conferences includes: e-Health (run by Canada’s Health Informatics Association – COACH; Wireless and Wearable Health Tech Symposium, Canada Health Infoway, Global Health Forum and 11th Mobile Healthcare. Financial supports for Graduate and Undergraduate education are offered through the Tuition Assistance program and through a Professional Development Leave (sabbatical). (See copy of policy in Appendix 11)

Orientation is provided for new faculty as a residency program of three days for the first three years of their full-time status through the College Educators Development Program. New full and part-time faculty are also provided a two-day Teaching for Success session at the beginning of the Fall semester. As of Fall 2015, a formal mentoring program will be launched to provide support to new full-time faculty.

Faculty teaching and supervision loads are assigned in accordance with the Academic Employees Collective Agreement’s Standard Workload Formula (SWF) as per Article 11.
Existing Mohawk faculty will be complemented with part time staff drawn from industry. The part time staff will be specialists working in the field who would bring real life applications and industrial knowledge to the classroom.

Four year Enrolment and Staffing Projections

<table>
<thead>
<tr>
<th>Year</th>
<th>CUMULATIVE FT ENROLMENT</th>
<th>CUMULATIVE FT FACULTY</th>
<th>CUMULATIVE PT FACULTY</th>
<th>TECHNICAL OR OTHER STAFF</th>
<th>PROJECTEDHIRING PLAN</th>
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<tr>
<td>Year 3</td>
<td>131</td>
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<td>2</td>
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<tr>
<td>Year 4</td>
<td>165</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

6.5 Curriculum Vitae Release

The College has on file and available for inspection, from all faculty and staff whose curriculum vitae (CVs) are included in this submission, signatures that attest to the truthfulness and completeness of the information contained in their CV and agreeing to the inclusion of their CV in any documents/websites associated with the submission, review and final status of the program application.

6.6 Curriculum Vitae of Faculty Assigned to the Program

The CVs of faculty assigned to the program are provided in Appendix 4.
SECTION 7: CREDENTIAL RECOGNITION

The Bachelor of Digital Health (Honours) degree program is intended to equip graduates with a balance of theoretical and applied skills that enhance those taught in traditional technology programs. Using both specific program related employer surveys to solicit feedback from industry and the data obtained from a year of consultations with over 500 community stakeholders to develop the Mohawk College Academic Plan (2012), the proposed program has been designed to respond to the needs of employers and to be recognized by others in the community including postsecondary institutions, relevant occupational groups and professional associations.

7.1 Program Recognition for the Purposes of Employment

A key message that emerged from Mohawk’s stakeholder consultations was that employers need graduates with soft skills, even in technical positions. As such, the Bachelor of Digital Health (Honours) will integrate the development of 21st century learning skills. The graduate profile is that of a professional who seeks knowledge and understanding, thinks critically and solves problems, listens and communicates effectively, and interacts well with others. Courses include Critical Thinking in Semester 1, Quantitative Reasoning in Semester 2, and Business Management in Semester 6.

The need for soft skills, however, does not diminish the rigorous technical requirements. The skills gap faced by organizations adopting information technology in the health sector is set to widen without post-secondary programs that incorporate courses to make graduates ready to work from the date of hire. Potential employers in the target sector responded to a Mohawk survey with enthusiasm towards the planned program.

77% of employers believed that the curriculum reflected the needs of industry very well or extremely well.

<table>
<thead>
<tr>
<th>Response</th>
<th>%</th>
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<tbody>
<tr>
<td>Extremely well</td>
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<tr>
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</tr>
<tr>
<td>Not at all</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>31</strong></td>
</tr>
</tbody>
</table>

All employers who responded believed a co-op placement was either a very important or extremely important component of the program.
Nearly 80% of employers felt likely to extremely likely to consider candidate from the program for employment.

Included in Appendix 5 are letters of support from the following employers who have agreed in writing to recognize the Bachelor of Digital Health (Honours) degree for the purposes of employment.

### 7.2 Program Recognition for the Purposes of Further Study

It’s imperative for graduates of the proposed program that other postsecondary institutions recognize the credential earned at Mohawk College for the purposes of further study. As indicated in Section 3 (Admission, Promotion and Graduation), many pathways are intended to lead to and from the program to give students as many options as possible to plot a career and shape their future. Review of the program of study by other colleges and universities in Ontario and elsewhere returned positive results.

Attached in Appendix 6 are letters of support for the Bachelor of Digital Health (Honours) degree program from other postsecondary institutions in Ontario that have reviewed the program of study.
SECTION 8: REGULATION AND ACCREDITATION

There are no external regulatory or licensing bodies with jurisdiction over the Bachelor of Digital Health (Honours) degree program.

Consultation with industry suggests that program content leading to accreditation by an external body is valued in the workplace. 45% of respondents in a targeted survey of health and technology employers indicated that eligibility for credentials such as PMP or Six Sigma Black Belt were very important to extremely important for advancement at their firm.

<table>
<thead>
<tr>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely important</td>
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</tr>
<tr>
<td>Very important</td>
<td>13</td>
</tr>
<tr>
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<tr>
<td>Not at all important</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>31</strong></td>
</tr>
</tbody>
</table>

Upon review of the materials provided by Mohawk, support for the program has been offered from the following professional associations: the American Society for Quality (ASQ), Project Management Institute (PMI), and COACH, an association in Canada for healthcare information and management professionals.

American Society for Quality (ASQ)
Lean Six Sigma is a prominent tool in the healthcare industry, used to bring down costs and improve patient care. The underlying principle is to apply Lean techniques to eliminate non-value-adding activities and waste from organizations. ASQ is pleased that Mohawk College will include a Statistics course in its Bachelor of Digital Health (Honours) degree program that lays the foundations for understanding Lean Six Sigma techniques and that graduates will be encouraged to pursue formal accreditation as Lean Six Sigma practitioners.

A letter of support from the local ASQ chapter is provided in Appendix 7.

Project Management Institute (PMI)
In a world of increasingly project-based work, employers recognize the value of a competent Project Manager. Certification demonstrates that a person has the experience, education, and competency to lead and direct projects. The body of knowledge covered in the Project Management course of the proposed degree program will provide graduates with a solid foundation for further study in the area of Project Management.
COACH
Upon completion of the Bachelor of Digital Health (Honours) degree, graduates may wish to pursue the designation “Certified Professional in Healthcare and Information Management Systems (CPHIMS)” from COACH, an association in Canada for healthcare information and management professionals. The requirements for accreditation include a Baccalaureate degree plus five years of associated experience including three years in Health Informatics. COACH supports the proposed Mohawk program and has agreed to recognize the degree by candidates who pursue CPHIMS accreditation.

A letter of support from COACH is included in Appendix 7.
SECTION 9: NOMENCLATURE

Consistent with the nomenclature standard for designating college degrees, Mohawk’s proposed degree is called Bachelor of Digital Health (Honours). The name reflects the typical approach of Bachelor of (Subject) available to colleges and was selected to reflect the postsecondary education achieved and to ensure that students, employers, other postsecondary institutions and the general public would understand the qualification and what it represents in terms of the degree level, the nature of the degree and the discipline of study. Research was conducted with respect to terms understood by the Canadian public, terms used in industry, terms used by other postsecondary institutions, trends associated with the term “digital health”, and other terms considered by the College.

9.1 Degree Level

The expression Bachelor of Digital Health (Honours) reflects the degree level standard in terms of knowledge and skills expected of graduates of Bachelor degree programs in Ontario.

As a college, Mohawk is applying for Ministerial consent to offer the degree in an applied area of study and has selected the name to indicate that intention. A project-based approach to learning in this program combined with mandatory co-op terms enables students to apply theory to practice throughout their studies and directly upon graduation in the workplace.

9.2 Nature of the Degree

The degree indicates the nature of study and shows the College’s commitment to high levels of applied principles. The term Digital Health highlights the specific field to which the learning outcomes will be applied. Together, they express the nature of the degree in an understandable term that balances the generic aspects of the degree level with the specific context of an industry.

The lexicon of digital health is inclusive of sub-topics including many covered in program courses: mHealth, eHealth, telehealth, virtual hospitals, big data, personalized medicine, wearable computing, decision support systems and cloud computing.

Google searches of terms used by other postsecondary institutions, by industry, and by governments returned words that were considered and debated. Terms that were deemed too broad, too narrow and or in some way inaccurate are listed below:

Too broad
• Information Technology (can be applied in any context)
• Information and Communications Technology (can be applied in any context)
• Information Science (can be applied in any context)
• Software Engineering (can be applied in any context)
• Healthcare (in Canada, refers to the publicly funded healthcare ecosystem)

Too narrow
• mHealth (limits digital health to mobile applications)
• eHealth (believed by many to refer mainly to electronic health records, especially in Ontario)

Inaccurate
• Life Sciences (aligns to pharmaceuticals and biomedical technologies)
• Biotechnology (involves the use of living organisms to develop products)

9.3 Discipline and/or Subject of Study

The differentiation of Mohawk’s program lies in its application of information technology in a health context. The use of the term “digital health” is key to conveying an accurate description of the subject of study to potential candidates, employers and other postsecondary institutions.

A survey distributed online by Mohawk to the target demographic of employers found that most respondents (65%) believed the program name conveyed the nature of the degree and discipline of study very well or extremely well.

<table>
<thead>
<tr>
<th>Response</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Extremely well</td>
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<td>Very well</td>
<td>18</td>
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<tr>
<td>Somewhat</td>
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<tr>
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<tr>
<td>Not at all</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
</tr>
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</table>

When reporting on the results of their 2013 survey, Canada Health Infoway stated that Ninety-six per cent of Canadians think it’s important that the healthcare system make use of digital health tools and capabilities and 89 per cent feel it is important that they personally have full advantage of digital health tools and capabilities. (Canada Health Infoway, 2013)

The language used implies an understanding of the term by the general public.

Industry trade shows such as the Digital Health Summit, the International Consumer Electronics Show and the JP Morgan Healthcare Conference also use the term digital
health to describe the topic. The Toronto innovation centre MaRS pairs the term with “consumer” to describe solutions and services that use digital communication technology and are designed to meet the needs of consumers through health education, wellness and disease management. (MaRS, 2014)

At the postsecondary level, there are few programs that align directly with Mohawk’s proposed program, but similar programs at Centennial and the University of Waterloo make use of the term Health Informatics. Mohawk College considered the term Health Informatics, but found that the trend no longer supported the name and the term was becoming outdated.

The College has a well-established policy regarding program evaluation and assessment (see Appendix 11 for Program Quality Policy AS-2013-2000). Numerous factors impact the measurement and assessment of student learning such as the integration of innovative learning models, KPI data, and a revised grading policy. Faculty can access a step-by-step approach to analyzing current assessment methods according to principles of best practice through the “Re-Thinking Assessment” and “Constructing Rubrics”, two on-line workshops prepared for faculty development.
SECTION 10: PROGRAM EVALUATION

10.1 Program Review

Regular review of academic programs is a key strategy in addressing innovation and excellence. The program review process at Mohawk College is informed and guided by the New Charter for the Colleges (OCAAT Act 2002), quality assurance principles established by the Committee of Presidents of the Colleges of Applied Arts and Technology of Ontario in June 2003, and the Minister’s Binding Policy Directive – Framework for Programs of Instruction and Credentials Framework 2003. Program review is a pivotal continuous improvement strategy, enabling the College to ensure that the content and delivery of programs continues to be responsive, current and relevant. The program review process is detailed in the Program Review Handbook which is attached in Appendix 8.

The process is intended to be meaningful and relevant, with a focus on continuous quality improvement. The review is intended to determine that:

- The program continues to be aligned with the mission, vision, and values of the college, Ministry of Training, Colleges and Universities standards and directives, as appropriate and industry standards, where applicable.
- Program content continues to be relevant for market demands, and where appropriate, supports transition to further study.
- Program delivery and assessment integrates innovation, best practices, and alternative approaches to teaching and learning as appropriate to enhance accessibility and student success and satisfaction.

The process must integrate clear and consistent approaches and methodologies college-wide. The Associate Dean and his/her supervisor are responsible for implementation of the formal review and addressing the recommendations that result from the review. The goals and recommendations that result from this formal review will guide the Annual Operational Plan, Strategic Enrolment Management Plan and Budget Plan undertaken by the College. As part of the Annual Operational Plan, progress related to recommendations arising from the program review will be considered and adjusted as necessary.

Program Reviews are managed by the Program Quality Unit, who engages a program review team that conducts the review and includes a Curriculum Design Specialist, an Institutional Researcher, Curriculum Committees, an Academic Lead and Program Faculty. The process includes assessment of curricula (course design and outlines); focus group consultations with faculty, students, graduates, employers and program advisory committee members. The process also involves an external team. The main purpose of this team to verify the process and information collected through the self-study process. The use of the external team is the process by which the college assures itself that the academic standards of its programs are comparable with similar programs and systems.
offered and implemented elsewhere and that the assessment process has been conducted fairly, in accordance with the approved standards, structure, content and regulations. The external team will conduct a site visit, where they will interview stakeholders and carry out physical checks onsite. The process allows the College to see which programs are functioning to meet the needs of diverse learners in the global society. Once completed, a report is generated and presented to the Senior Academic Officer of the college (Vice President, Academic), who meets with the review team to discuss the process, recommendations and action steps. Educational decisions are made based on the analysis of many areas of program review and evaluation, which are documented in a full report and includes a detailed Action Plan for quality enhancements over the ensuing 5 years.

Some of these include:
- ideas gleaned from program specific student focus groups
- advice from program review committees (PACS)
- environmental scans
- program mapping of the course learning outcomes
- alignment of program learning outcomes to institutional learning outcomes
- alignment to the institutional strategic plan

### 10.2 Assessment Schedule

To ensure continuous quality improvement, all programs at Mohawk College undergo an annual review.

Annually, the following components of every program are reviewed:
- Program scorecard data
- Curriculum and recommendations for changes to the program of studies, including an updated curriculum mapping matrix
- Admission standards and recommendations for changes
- Blended learning metrics and recommendations for changes
- Student pathways and recommendations for changes

A comprehensive, formal review must be completed for each program at least every five years, or more frequently, according to an established set of criteria. The comprehensive review includes a full assessment of course outlines and program learning outcomes and analyses of the following: curriculum map, program delivery, enrolment and student success data, labour market data and KPI data.

Where program reviews determine that programs do not meet minimum criteria determined prior to the review starting, programs may be modified, suspended, cancelled, or consolidated with other programs. The recommendation for such action is made by the Mohawk Executive Group (MEG) to the College Board of Governors, which is responsible for the final decision.
SECTION 11: ACADEMIC FREEDOM AND INTEGRITY

All policies addressing Academic Freedom and Integrity at Mohawk College are provided in Section 16.

11.1 Academic Freedom

Academic Freedom is a condition at universities that has been considered foundational for the pursuit of knowledge since the creation of the earliest institutes. According to Michael Horn (Academic freedom in Canada: A history; 1999) academic freedom within the context of Canadian universities consists of five elements: 1) the freedom to pursue truth wherever that may lead, 2) tenure so that the truth-seeker is not subject to loss of job when the research is controversial, 3) the ability of the scholar to be critical of the university, 4) the ability of the scholar to participate in public life, and 5) co-governance within the university.

At colleges in Ontario, the concept of Academic Freedom became more significant with the passing of the Post-Secondary Education Choice and Excellence Act (2000) and the revision of the Ontario Colleges of Applied Arts and Technology Act (2002), when colleges were given the ability to grant degrees (with limitations) and engage in applied research. Since that time, Mohawk has pursued applied research in the areas of Health and Technology, forming partnerships with industry and winning funding awards from various agencies including the Natural Sciences and Engineering Research Council of Canada (NSERC), the Canadian Foundation for Innovation (CFI), Canadian Institutes of Health Research (CIHR), Ontario Centres of Excellence (OCE), the Federal Economic Development Agency for Southern Ontario (FedDev), and others. While teaching remains the focus at Mohawk College, the new attention paid to applied research and the desire for greater involvement by some faculty in applied research has contributed to a changing culture where academic freedom is more widely recognized and valued by faculty, staff and administration alike.

Certain elements of academic freedom, such as the ability to be critical of the College and the ability to participate in public life, are understood to be protected by the general principle of freedom of speech; the element of co-governance of the College is not fully achieved, but is addressed through the President’s Advisory Committee and other Advisory Committees set up at the College to solicit input from internal and community experts on various issues prior to decision making. The College Board includes three elected Board members who are employees of the College with full Board member authority.

Mohawk affirms the freedom of faculty and staff to conduct research in their field of study and to publish their research in an environment free from harassment, discrimination and undue interference (Academic Employees Collective Agreement, Article 4), even when the findings are at odds with commonly accepted views. The obligation to support and
protect this fundamental principle of academic freedom is described in the Academic Freedom in Research policy CR902. The freedom comes with the responsibility by faculty and staff to carry out the research in an ethical manner with a commitment to scholarly and scientific rigor.

11.2 Academic Honesty

The expectation of academic honesty is placed on all Mohawk College community members and applies to all academic endeavors including teaching, learning, and research, administrative and consultative work. Academic honesty means doing your own work, acknowledging sources of information, avoiding sources of unfair advantage, and behaving honestly during tests and examinations. High standards for academic honesty are imposed to preserve the values of the College, to sustain the credibility of the credentials granted by the College, and to promote an environment of integrity and respect among the student body.

Examples of academic dishonesty are outlined in the Mohawk’s policy on Academic Honesty (AC705) and include but are not limited to plagiarism, submitting an assignment of another’s work, copying from another student, possession of unauthorized aids during tests or examinations, inappropriate use of computer technology to obtain an unfair advantage on a test or examination, and falsification of an academic credential.

If academic dishonesty is suspected, students have the right to disagree with the charge and begin an informal appeal process involving the faculty member and Associate Dean or VP. If the issue is not resolved, the student may pursue a formal appeal process whereby a hearing is conducted in front of an Appeal Panel and a final decision is reached. Penalties for academic dishonesty depend on the nature of the offence and range from a written warning to expulsion from the College.

Because the forms of academic dishonesty can be confusing to some students, the Mohawk College Library has developed tools and guidelines for plagiarism prevention and links to more information about the topic. An APA Help Guide is available online defining proper bibliographic style; an interactive tutorial on plagiarism includes information about the difference between quoting and paraphrasing; a special class was created to help students understand how the online educational tool “TurnitIn” can be used to check for originality in their assignments and help them avoid inadvertent plagiarism (professors are encouraged to use TurnitIn).

11.3 Ownership of Intellectual Property

The approach to ownership of Intellectual Property (IP) at Mohawk College reflects the view that academic excellence, inquisitiveness and curiosity are highly valued. In step with the mandate to become Ontario’s first specialized institute of Health and Technology, Mohawk is differentiating itself as a leader in Health and Technology with
an increased emphasis on applied research and an aim to attract the brightest faculty and students in these areas. Based on an environmental scan of like-minded postsecondary institutions and consultations with faculty and external experts, a new IP Policy was created in 2013 that balances the responsible use of public funds with the cultivation of an innovation culture and protection of creators’ rights.

Except where stipulated, ownership of rights in IP created in the course of research activities at Mohawk belong to the creator. The exceptions are when the material was developed using external funding; when it was developed in the course of teaching; or when it was developed with the negotiated understanding that the College would own the copyright. In the Collective Agreement, it is further clarified that “a work commissioned by the College or produced pursuant to the employee’s normal administrative or professional duties with the College shall be and remain the property of the College.” (Article 13)

Mohawk encourages students, staff and faculty to widely disseminate research findings and to pursue commercialization opportunities where they exist. The decision to commercialize rests with the creator and may be done alone or with the support of the College. Should support for commercialization activities by the College be requested, the creator must agree to assign to the College all rights in and to the IP. Nevertheless, the distribution of income from IP owned by the College weighs in favour of the creator: 75% is distributed to the creator and 25% to the College.

Much of the applied research conducted at Mohawk is done in collaboration with industry. Mohawk embraces collaborative work and acknowledges that ownership of IP of materials developed as a joint initiative or under a sponsored contract is governed by the provisions of that contract. All collaborative research must be undertaken in an atmosphere of mutual informed consent.

Disputes related to the ownership of IP are encouraged to be dealt with at an informal level. If a conflict cannot be resolved informally, the matter may be submitted to the Dean of Applied Research for an administrative decision. Disagreement with any determination made by that Office may be directed to the Vice President, Academic, or his or her designee, for a final determination.

11.4 Research

Research at Mohawk implies practical, applied research focusing on solving real-world problems. Collaborations with industry produce relevant, innovative new products and processes that can be put directly to use in the marketplace. Combining the experience of faculty, the facilities of the College, the funding of agencies, the talent of students and the needs of businesses, applied research is now being conducted on a larger scale at Mohawk than ever before.
Integrity in research is overseen by an independent Research Ethics Board (REB) which reviews “ethical acceptability of research” on behalf of Mohawk College. Following the principles that govern research conducted with humans as per the Tri-County Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2, December 2010), the REB is compliant with the following principles:

- Requirement for free and informed consent
- Respect for vulnerable persons
- Respect for privacy and confidentiality
- Respect for justice and inclusiveness
- Balancing harms and benefits
- Minimizing harm
- Maximizing benefit

The TCPS2 is a joint policy of the Canadian Institutes of Health Research, the Natural Sciences and Engineering Research Council and the Social Sciences and Humanities Research Council.

Mohawk’s REB has the authority to approve, reject or propose modifications to any proposed research involving human subjects carried out under the auspices of Mohawk College.
SECTION 12: STUDENT PROTECTION

Acting with integrity and transparency is a stated promise contained within one of Mohawk’s five core values (to be accountable). The protection of student interests is upheld through a variety of mechanisms: an ethical recruitment process; the development of truthful and accurate promotional materials; adherence to publicly accessible policies and procedures; regular and frequent solicitation of student feedback; the availability of support services for students; and the joint promotion of a positive learning experience by the College and the Mohawk Students’ Association. In addition to Mohawk’s own policies that have been created to protect students, including the Academic Appeals (SS-3105-2009), Access to Student Records (SS-3106-1978), Student Behaviour (SS-3200-2006), Student Complaint Procedure (SS-3204-2006), Withdrawal and Redirection Procedure (SS-3102-2008), the College also adheres to the Ontario Human Rights Code, the Immigration and Refugee Protection Act, the Freedom of Information and Protection of Privacy Act and the Ministry of Training, Colleges and Universities Binding Policy Direction on Admission.

12.1 Student Recruitment

Mohawk College is committed to an applicant-centred admissions process that ensures all applicants are treated equitably and fairly. The consistent application of fair and open admissions criteria is an important component of the College’s commitment to making Mohawk the “College of choice”.

Each year recruitment officers visit hundreds of high schools, Adult Education Centres and events across Ontario in order to showcase Mohawk College as being future focussed and creating future ready graduates. Prospective students, guidance counsellors, parents and families are encouraged to participate in presentations to learn more about programs, facilities, admission requirements, graduate employment opportunities and more. Individual and group tours are offered year-round for all campuses. Open houses for College campuses are held twice per year (Spring and Fall).

12.2 Promotional Materials and Reports

Key information regarding Mohawk College is made available to students, employers and other stakeholders through a wide range of promotional materials. To ensure accuracy and truthfulness, a thorough review of all materials is conducted prior to publication, posting and distribution. For example, the Academic Calendar (See Appendix 13), distributed both in print and electronically on the college’s website, is reviewed each year from May to June. Content is created, reviewed and signed off by Marketing, the Associate Dean, the Associate Registrar, and Admissions prior to publication.
Sample Materials used to Promote the College

<table>
<thead>
<tr>
<th>Information</th>
<th>Promotional Material or Report</th>
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<tbody>
<tr>
<td>Mission, vision and values</td>
<td>Mohawk College Annual Report</td>
</tr>
<tr>
<td>Academic structure and plan</td>
<td>Mohawk College Academic Plan</td>
</tr>
<tr>
<td>Program descriptions, including course titles by semester</td>
<td>Full-time academic calendar</td>
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<td>Catalogue</td>
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<tr>
<td>Recruitment facts</td>
<td>Fast facts</td>
</tr>
<tr>
<td>Course descriptions, including credit value</td>
<td>Organized by program on <a href="http://www.mohawkcollege.ca">www.mohawkcollege.ca</a></td>
</tr>
<tr>
<td>Student handbook</td>
<td>OnTrak</td>
</tr>
</tbody>
</table>

12.3 Student Awareness of Policies and Procedures

College policies and procedures have been designed to provide and support an enriching and rewarding learning experience in which the rights of individuals are respected. The student, in addition to the general public is able to access all relevant policies and procedures through the Mohawk College website at mohawkcollege.ca/about/policies.

Registration for full-time programs is completed online. To ensure awareness of policies and procedures prior to registration, students are alerted by the statement: “By clicking on your program number you agree to abide by the Policies of Mohawk College and understand the Privacy and Legal Statements.” Direct links to Corporate Policies and Procedures and Privacy and Legal Statements are provided.

Upon registration, every student receives the student handbook “OnTrak” (See Appendix 14). The handbook contains a calendar with important school dates such as when classes start or break, last date to add or drop a course, last date to withdraw for fee refund and last date to appeal final grades. Also outlined are the policies and procedures, regulations, rights and responsibilities of students at Mohawk.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Corresponding Policy or Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions</td>
<td>Admissions (SS-3101-1980)</td>
</tr>
<tr>
<td>Credit Transfer for incoming students</td>
<td>Credit Transfer (AS-2002-2013)</td>
</tr>
<tr>
<td>Credit transfer with and recognition by other institutions</td>
<td>Credit Transfer (AS-2002-2013)</td>
</tr>
<tr>
<td>Entrance examinations</td>
<td>Admissions (SS-3101-1980)</td>
</tr>
</tbody>
</table>
Resolution of Disputes
The College is committed to fairness and consistency in making decisions affecting students. When disputes arise, a full range of resolution services is available to assist with policy implementation or to address interpersonal and academic disputes or systemic issues (see also 12.5 Support Services).

The Student Complaint Procedure (SS-3204-2006) provides students with a process to make a complaint against a College employee whom they believe has behaved in an inappropriate manner. This procedure is applicable to student concerns and in situations where other College policies and procedures do not apply (situations involving Human Rights are addressed in policy GC-4301-1982).

The Academic Appeals Policy (SS-3105-2009) provides students with a mechanism for reasonable review of grading decisions affecting their academic progress. Students who believe that they have not received a fair academic decision related to a final grade in a course have access to a comprehensive, respectful and impartial review of their concerns.
Security of Academic Records
The College does give out any information on an individual student without the prior written consent authorizing the College to do so with the exception of information contained in a college transcript. The Student/Graduate Reference Policy (C762) states that where an employer or other person has a valid reason to request information that is beyond that supplied in a transcript, then the individual requesting the information will be directed to contact the student directly.

Payment Schedule of Fees and Charges
All information on fees and applicable charges is summarized in a table (Post-Secondary Fees for (relevant year)) and posted on the Mohawk College website. Program-specific fees are organized by programs online and average tuition is also printed in the Academic Calendar.

Student Dismissal
Expectations of student behavior refer to actions that make Mohawk a productive and positive place to learn and work. The expectations, described in the Student Behavior Policy (SS-3200-2006), are intended to guide student behavior and support staff in managing inappropriate behavior. The policy outlines responses to inappropriate behaviour, including restorative measures and disciplinary sanctions that can be implemented depending on the severity and pattern of the conduct in question.

Withdrawals and Refunds
The Program Promotion and Graduation Policy (SS-3103-2009) advises students that those with a Weighted GPA less than 50 will be required to leave their program. It is strongly recommended that students in this situation seek advisement to explore opportunities for continuing study at the College.

Students who officially withdraw from the College within the first ten days of class will have all courses removed from their transcript and are entitled to a full refund of all tuition and ancillary fees paid, less a $500 administrative fee. An Official Withdrawal form must be filled out and submitted.

Students who withdraw after the first ten days but within ten weeks of the start of class will receive a “W” (withdrawn) for all courses on their transcript. The tuition and ancillary fees for the current semester are non-refundable. All prepaid semesters beyond the current semester are refundable.

Students who withdraw after the first ten weeks of classes, or who do not complete an Official Withdrawal form, will receive grades earned on their transcript. See Withdrawal and Redirection Procedure SS-3102-2008 in Appendix 11
12.4 Blended, Hybrid or Online Delivery

The Bachelor of Digital Health (Honours) will incorporate blended learning into its program. Blended learning allows students to benefit from a more flexible schedule and provides greater access to course resources and learning opportunities. The 2015-16 Full Time Academic Calendar describes blended learning at Mohawk to prospective students (p3). Courses that are selected for blended delivery will be identified in the Academic Calendar. Students will also receive instruction on how to successfully navigate blended or online courses during the Program and Career Launch Sessions, planned and implemented by each program area during the first week of school. Additionally, students will have access to the Digital Skills Course and Toolkit available to all new and existing students through eLearn.
SECTION 13: ECONOMIC NEED

New programs at Mohawk are developed based on the needs of applicants, registrants and employers. The standard process requires economic research and consultation with community stakeholders to support a statement of interest. Subsequently, at least two of four of the following criteria must be met:

1. The proposed program (or closest similar program) is oversubscribed at other institutions in the GTHA area
2. The proposed program is supported by recommendations of a comprehensive Program Review
3. The proposed program aligns with the College’s top 5 strategic priorities
4. The proposed program presents a minimum fiscal return of 35% in the first year

The alignment of the proposed Bachelor of Digital Health (Honours) program to the College’s mandate to become the province’s first specialized Institute of Health and Technology is indicative of its internal support. Wider support and evidence of present and anticipated economic need for the program is demonstrated in this section using economic forecasts, employer and student surveys, area enrolment data, reports from the Health and ICT industries, and job advertisements for positions which graduates would be qualified to fill.

13.1 Overview

Program Need
Virtually every sector of the Canadian economy is impacted by technological changes. As adoption of digital technology in society increases, so must the digital competence level of the workforce. In 2010, Industry Canada published a consultation paper entitled Improving Canada’s Digital Advantage: Strategies for Sustainable Prosperity, which solicited public input to address the challenges of an emerging digital divide. The paper argued that information and communications technology (ICT) skills are needed not only in the ICT field, but in every sector of the economy, at every level in the workforce, in every geographical region. One of the paper’s long-term recommendations for addressing the skills gap was to combine the skills taught in postsecondary ICT programs with those of other fields. In large part, the appeal of Mohawk’s proposed Bachelor of Digital Health (Honours) program is its focus on technology in the context of another sought-after field: health. Graduates with a passion for technology and/or for health are expected to be attracted to the program; employers in either sector will gain graduates with a complementary set of skills and an understanding of the interrelationship between them.

The interdisciplinary approach to the design of the program is one of two ways skills will be balanced. The other way involves the application of theoretical knowledge in practical
settings. Hands-on learning is a distinguishing feature of a college education that students and employers value. Aligned with key findings of an assessment of educational programs in health informatics by COACH: Canada’s Health Informatics Association that “programs valued ‘real life’ experience and experiential learning”\(^1\), the degree requirements of Mohawk’s proposed program stipulate a minimum of two co-op terms and a fourth year capstone applied research project.

**Skills Gap**
To make Canada’s healthcare system sustainable, innovations to increase productivity and improve healthcare outcomes are needed. But the success of investments in platforms and digital tools for the storage, retrieval and exchange of information, the monitoring of health and the delivery of care will depend on workers having the right skills. According to Industry Canada’s consultation paper: “In the health sector, steps need to be taken to ensure that large scale investments in electronic health information systems are not undermined by a shortfall in the supply of health informatics and health information management professionals.”\(^2\)

Exactly how many health informatics and health information system management professionals will be needed to avoid a skills gap or labour shortage in the near future was forecasted for Mohawk in a 2013 report by PricewaterhouseCoopers (PWC). Using data from a 2009 labour market forecast by COACH, PWC adjusted estimates for Ontario and projected hiring requirements over the next four years. The results are presented below:

**Hiring Requirements**

<table>
<thead>
<tr>
<th></th>
<th>COACH REPORT</th>
<th>PwC PROJECTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2014</td>
<td>2015</td>
</tr>
<tr>
<td>Senior IT Management</td>
<td>122</td>
<td>128</td>
</tr>
<tr>
<td>Architecture/ Development</td>
<td>184</td>
<td>193</td>
</tr>
<tr>
<td>Application Implementation / Support</td>
<td>1297</td>
<td>1,359</td>
</tr>
<tr>
<td>Security</td>
<td>41</td>
<td>43</td>
</tr>
<tr>
<td>Quality Assurance / Testing</td>
<td>121</td>
<td>127</td>
</tr>
<tr>
<td>Help Desk</td>
<td>250</td>
<td>262</td>
</tr>
<tr>
<td>Network, Storage and Other Infrastructure Support</td>
<td>260</td>
<td>272</td>
</tr>
<tr>
<td>Hiring requirement</td>
<td>2,275</td>
<td>2,385</td>
</tr>
</tbody>
</table>
13.2 Employment Opportunities

Potential Positions

Students enrolled in the program will become knowledgeable in the following areas:

- Patient self-management
- Implementing efficiency improvements to the health system
- Privacy and security issues specific to health data
- The use of social media in healthcare
- Cloud computing and the processing of large health-related datasets
- Measurement tracking and improvement of health through devices, sensors and wearables
- Personalized health delivery
- Patient safety
- Gamification and behavior modification
- Health system integration and interoperability

Upon graduation, candidates will be qualified to seek positions such as Clinical Systems Analyst, Information Systems Analyst, Data Integrity Analyst, Database Architect, Integration Architect, Information Privacy Coordinator, Health Records Technician, Health Systems Specialist, Project Manager, Computer Programmer and Health IT Consultant.

Sample Job Postings
Sample job postings are attached in Appendix 9.

13.3 Employer Surveys

Through co-op and graduate recruitment services, Mohawk College is closely engaged with regional employers. Online surveys were sent to a targeted sub-set of prospective employers in the health and technology sectors who may be recruiting graduates with a profile that matches the profile of Mohawk’s proposed program graduate. Responses from 31 representative organizations are provided below:

In your opinion, how well does the proposed program of study curriculum reflect the needs of industry?

<table>
<thead>
<tr>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely well</td>
<td>5</td>
</tr>
<tr>
<td>Very well</td>
<td>19</td>
</tr>
<tr>
<td>Somewhat</td>
<td>6</td>
</tr>
<tr>
<td>Slightly</td>
<td>0</td>
</tr>
<tr>
<td>Not at all</td>
<td>1</td>
</tr>
</tbody>
</table>
How critical is the need for employees at your company to be equipped with the skills taught in this program?

<table>
<thead>
<tr>
<th>Response</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely critical</td>
<td>6</td>
<td>20.0%</td>
</tr>
<tr>
<td>Very critical</td>
<td>10</td>
<td>33.3%</td>
</tr>
<tr>
<td>Advantageous but not critical</td>
<td>7</td>
<td>23.3%</td>
</tr>
<tr>
<td>Somewhat advantageous</td>
<td>3</td>
<td>10.0%</td>
</tr>
<tr>
<td>Not at all</td>
<td>4</td>
<td>13.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

How important is it for an employee to have a degree in order to advance in your company?

<table>
<thead>
<tr>
<th>Response</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely important</td>
<td>6</td>
<td>19.4%</td>
</tr>
<tr>
<td>Very important</td>
<td>13</td>
<td>41.9%</td>
</tr>
<tr>
<td>Somewhat important</td>
<td>10</td>
<td>32.3%</td>
</tr>
<tr>
<td>Slightly important</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Not at all important</td>
<td>2</td>
<td>6.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>31</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

13.4 Student Surveys

Students registered in existing Mohawk Health and Technology programs were surveyed to measure demand for the proposed program. Using an online tool, students answered five questions online. Responses from 52 students’ representative of potential applicants are provided below:
How would you rate your level of interest in Mohawk’s proposed program if you were a potential applicant?

<table>
<thead>
<tr>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely optimistic</td>
<td>13</td>
</tr>
<tr>
<td>Very optimistic</td>
<td>13</td>
</tr>
<tr>
<td>Optimistic</td>
<td>18</td>
</tr>
<tr>
<td>Neither optimistic or pessimistic</td>
<td>6</td>
</tr>
<tr>
<td>Not at all optimistic</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>52</td>
</tr>
</tbody>
</table>

If the proposed program had been available when you first applied to Mohawk, which would have been your first choice?

<table>
<thead>
<tr>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>My current program</td>
<td>29</td>
</tr>
<tr>
<td>Mohawk’s proposed program</td>
<td>19</td>
</tr>
<tr>
<td>Another program at Mohawk</td>
<td>1</td>
</tr>
<tr>
<td>Another program at a different institution</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50</td>
</tr>
</tbody>
</table>

How important is it to you to include courses in the program that count as credit towards certificates such as Lean and Project Management?

<table>
<thead>
<tr>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely important</td>
<td>15</td>
</tr>
<tr>
<td>Very important</td>
<td>13</td>
</tr>
<tr>
<td>Somewhat important</td>
<td>12</td>
</tr>
<tr>
<td>Slightly important</td>
<td>5</td>
</tr>
<tr>
<td>Not at all important</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>52</td>
</tr>
</tbody>
</table>
Please rank the aspects of the program that most appeal to you

Q5: Please rank the aspects of the program that most appeal to you:

13.5 Enrolment Trends and Catchment Demand

The College differentiates itself as a specialized institute of health and technology serving the Western Golden Horseshoe by leveraging its traditional strengths in the areas of health and technology, and in the provision of apprenticeship, certificate, diploma, and degree programs, as well as having recognized strength in applied research. The College is a business partner aligned with Hamilton’s economic development strategy and provides internationally recognized, hands-on applied research, notably in health and technology, to solve challenges and power businesses’ success. Enrolment at the other colleges in Ontario that offer similar programs indicate that strong interest in the proposed program can be expected. Conversion rates ranging between 18% to 29% were consistent at Seneca, Sheridan and Conestoga in the compared programs over the last three years.
## Fall Enrollment Trends

<table>
<thead>
<tr>
<th>Program Choice Count</th>
<th>Application</th>
<th>Registration</th>
<th>Enrolment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTCU Code and Title: 80504 - BACHELOR OF APPLIED TECHNOLOGY-SOFTWARE DEVELOPMENT</td>
<td>College Name: SENECA</td>
<td>Program Code: BSD</td>
<td>BACHELOR OF TECHNOLOGY (SOFTWARE DEVELOPMENT)</td>
</tr>
<tr>
<td>MTCU Code and Title: 80509 - BACH OF APPLIED INFORMATION SCIENCES (INFORMATION SYSTEMS SECURITY)</td>
<td>College Name: SHERIDAN</td>
<td>Program Code: PBAIS</td>
<td>BACHELOR OF APPLIED INFORMATION SCIENCES (INFORMATION SYSTEMS SECURITY)</td>
</tr>
<tr>
<td>MTCU Code and Title: 80516 - BACHELOR OF APPLIED COMPUTER SCIENCE (MOBILE COMPUTING)</td>
<td>College Name: SHERIDAN</td>
<td>Program Code: PBACS</td>
<td>BACHELOR OF APPLIED OF COMPUTER SCIENCE (MOBILE COMPUTING)</td>
</tr>
<tr>
<td>MTCU Code and Title: 81643 - BACHELOR OF APPLIED HEALTH SCIENCES (HEALTH INFORMATICS MANAGEMENT)</td>
<td>College Name: CONESTOGA</td>
<td>Program Code: 1131C</td>
<td>BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE</td>
</tr>
</tbody>
</table>

*(as of March 7, 2014)*

Catchment data indicate that student demand for similar programs in nearby catchment areas is not being met. For example, over the last three years, less than one third of applicants to Conestoga’s Bachelor of Applied Health Sciences (Health Informatics Management) from Conestoga’s catchment area were converted to registrants in the program (it should be noted that 100% of graduates of this program found employment...
within 6 months of graduation, according to Conestoga’s website). Mohawk can expect to attract students from nearby GTHA catchment areas for the proposed program. See table overleaf.
# Student Demand by Catchment

| Leaving Catchment | Program Code | Program Name | APPLICATION | | | | | | REGISTRATION |
|-------------------|--------------|--------------|-------------|---|---|---|---|---|---|---|---|
| AB_CATCHMENT      | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | 1 | | | | | |
| ALGO_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | 1 | | | | | |
| BC_CATCHMENT      | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | 2 | | | | | |
| CAMB_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | 1 | | | | | |
| CENT_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 2 | 1 | 1 | 1 | 2 | 1 | | |
| CONF_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | 1 | | | | | |
| CONS_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 63 | 54 | 75 | 91 | 91 | 16 | 15 | 14 | 20 |
| DURH_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | 4 | 1 | | | | | |
| FANS_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 6 | 5 | 9 | 9 | 8 | 2 | 1 | 1 | 4 |
| GBTC_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | 1 | | | | | | 1 |
| GEOR_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 5 | 4 | 5 | 4 | 5 | 1 | | | |
| HUMB_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | | | | | | | |
| LAMB_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 2 | 2 | 1 | | | | | | |
| LOYT_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | | | | | | | |
| MOHA_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 8 | 9 | 5 | 5 | 8 | 1 | | | |
| NIAG_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 6 | 1 | 1 | 1 | | | | | |
| NORT_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | | | | | | | |
| SAUL_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | 4 | 2 | 2 | 1 | | | |
| SENE_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 4 | 3 | 9 | 10 | 8 | 2 | 3 | | |
| SHER_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | 1 | 1 | | | | | |
| SLAW_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | 1 | 1 | | | | | |
| SSFL_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | 1 | 1 | | | | | |
| STCL_CATCHMENT    | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 1 | 1 | 1 | 1 | | | | | |
| UNKNOWN EN        | CONESTOGA    | 1131C        | BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE | 3 | 5 | 1 | | 1 | 1 | | | |

*(as of March 7, 2014)*

BACHELOR OF DIGITAL HEALTH (HONOURS) 104
13.6 Economic Forecast

The labour market forecast for professionals with digital skills in 2011-2016 is a concern for the Information and Communications Technology Council (ICTC).

Canada’s information and communications technology (ICT) sector will face alarming skills and labour shortages in the next five years. Global job mobility, technological and demographic change and declining postsecondary enrolments have all combined to create an impending shortfall of skilled ICT workers.3 (Information and Communications Technology Council, 2011, p. 1). Information technology is expected to play a key role transforming the various sectors of Canada’s economy and leading to prosperity. In a speech on April 24, 2012 in Stratford Ontario, Federal Industry Minister Christian Paradis said: We need a growing information and communications technology sector that drives product and service innovations and propels them in every corner of our economy. We need to make Canada a world leader in the creation and use of digital technologies. That’s where our future lies4 (Government of Canada, 2014).

What the ICTC’s research found is that “between 2011-2016, Canadian employers will need to hire some 106,000 ICT workers” 5 (ICTC, 2011, p. 1). They also noted that every corner of the economy also has its own particular needs. Labour shortages were expected to be felt most severely by employers looking for workers with a mix of ICT and domain-specific skills.

Employers are on the hunt for personnel who have specific combinations of ICT experience as well as expertise in domains such as e-health, e-finance and digital media. In the next five years, Canada is going to see a new, radically different ICT job market emerge. 6 (ICTC, 2011, p. 1)

This gap in the market will need to be filled by uniquely qualified graduates such as those from the Mohawk Digital Health program.

Digital Health refers to the application of technology in the health sector. Other terms such as eHealth or Health Informatics are also used by practitioners in industry. Health Canada describes eHealth using three examples:

- In hospitals, the use of electronic patient administration systems, laboratory and radiology information systems, and electronic messaging
- In primary care settings, the use of computer systems by general practitioners and pharmacists for patient management, medical records and electronic prescribing
- In the home, the use of telemedicine, including teleconsults and remote vital signs monitoring systems used for diabetes medicine, asthma monitoring and home dialysis systems
Health Canada makes the claim that “eHealth is an essential element of health are renewal” 7 (2010, para. 3). The federal government has been signalling this view by making investments in eHealth since the 1997 Federal Budget. In British Columbia, investments in digital technology have been made for decades as part of the province’s commitment to healthcare. “Major efforts are underway to transform the province’s healthcare system using information technology” 8 (Gartner, 2012, p. 4). A report by Gartner highlights some of the resulting benefits for BC. Estimates were developed for Canada to show the impact of digital health investments when applied across all jurisdictions.

### Quantitative Benefits of Investments in Digital Technologies in the Health Sector

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic Imaging / (PACS)</td>
<td>$89.8 million</td>
<td>$514-626 million (2008)</td>
</tr>
<tr>
<td>Drug Information Systems</td>
<td>$200.3 million</td>
<td>$435.9 million (2010)</td>
</tr>
<tr>
<td>Telehealth</td>
<td>$15.1 million</td>
<td>$90.0 million (2011)</td>
</tr>
</tbody>
</table>

Diagnostic Imaging refers to the replacement of film and paper with computers for viewing, storing and transmitting exam images; Drug Information Systems are used to link pharmacies and hospitals to a centralized database containing the prescription records of patients; and Telehealth is a method for delivering medical services to patients remotely.

The use of technology in healthcare is similar in other countries, notably the US. According to a 2013 McKinsey report, “a big data revolution is under way in healthcare” 9 (Kayyali, Van Kuiken, & Knott, 2013, para. 1). Factors driving the demand for big data include fiscal concerns, clinical trends such as making evidence-based treatment decisions using systematic reviews of information, and technical advances in collecting, storing, sharing and analyzing information from multiple sources including hospitals, private practices, clinics and labs. “Although the healthcare industry has lagged behind sectors like retail and banking in the use of big data – partly because of concerns about patient confidentiality – it could soon catch up” 10 (Kayyali, Van Kuiken, & Knott, 2013, para. 4).

The convergence of healthcare with digital technology will bring significant change to healthcare systems everywhere. It is one of many sectors in the broader economy where domain-specific issues are being addressed through the application of information and communications technology. The workforce that will support this critical segment of our economy – and our society – must be trained in a transdisciplinary program that integrates the applied knowledge and skills of information technology in the specific context of health. Mohawk’s new program takes a balanced, holistic approach that will produce the kind of skilled workers needed in the coming years.
13.7 Regional Significance

Hamilton is Canada’s tenth largest city, located on the shores of Lake Ontario between Niagara and Toronto in the centre of the Golden Horseshoe area. Resurging after difficult economic times, the city is undergoing what many call a transformation. Setting building permit records ($1.5 billion in 2012), selected as the best place to invest in Ontario (Real Estate Investment Network of Calgary), and ranked with Burlington as the fastest growing economy in 2012 (Conference Board of Canada), Hamilton is an attractive destination for families, businesses and students.

With resurgence comes a changing workforce. The City of Hamilton’s Economic Development department reported that new skills sets and a greater number of workers with higher education credentials were in demand.

Hamilton’s economy has experienced some major shifts over the past two decades, including the restructuring of the manufacturing sector and diversification towards a service-sector employment base. This has created a significant range of employment opportunities in the City but mainly jobs that require some type of post-secondary education. 11 (City of Hamilton, 2013, p. 124)

Mohawk College, along with McMaster University, are the top providers of postsecondary education in Hamilton. Top employers of educated workers in the area include Hamilton Health Sciences (6,517 FTE), St. Joseph’s Healthcare Hamilton (2,783 FTE) and Stryker Canada (216 FTE), the medical devices company12 (http://www.canadastop100.com/niagara/).

In March 2014, Workforce Planning Hamilton released the results of their “Hire Learning Survey” (See results enclosed). The findings of the survey offer exciting insights for candidates of Mohawk’s Digital Health program. Highlights include:

- Permanent full-time positions are the most common types of jobs available
- Healthcare and technical services are among the industries expected to grow
- The most commonly cited occupations in demand included IT professionals
- Thinking, oral communication and digital technology are the essential skills employers have the most difficulty finding in employees
- Skills requirements are expected to increase to a moderate extent over the next 5 years
- Particular skills requirements that are expected to increase include: technology; electronic communication and documentation; social media skills; strategic thinking
13.8 Employer Commitment

Employers in the area have been consulted in the course of the development of the proposed program. Participation in Program Advisory Committee (PAC) meetings, attendance at health and technology events and continued long-term involvement with students in collaborative applied research projects show enthusiastic employer commitment to Mohawk health and technology graduates.

In an online survey, potential employers were asked about the proposed program. Results are summarized below:

How likely would your company be willing to consider candidates from the program for employment upon graduation?

<table>
<thead>
<tr>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely likely</td>
<td>3</td>
</tr>
<tr>
<td>Very likely</td>
<td>10</td>
</tr>
<tr>
<td>Likely</td>
<td>6</td>
</tr>
<tr>
<td>Not very likely</td>
<td>5</td>
</tr>
<tr>
<td>Not at all</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
</tr>
</tbody>
</table>
2014 Hire Learning Survey
The Complete Series of Results

Collecting Hamilton’s real-time local labour market information

In January 2014, Workforce Planning Hamilton released the first annual Hire Learning Survey (HLS). The survey was distributed with support from community partners to employers across the city to capture real-time local labour market information such as current and future hiring needs, skill and educational requirements, turnover, and recruitment difficulties. The survey will be released every January so that we can track any emerging trends over time.

The HLS is part of the Hire Learning Initiative. Also included in the initiative is Workforce Planning Hamilton’s series of quarterly job vacancy reports - Help Wanted in Hamilton. Through the Hire Learning Initiative, we can get an idea of what employers are looking for right now in Hamilton.

The following pages include the complete set of results from the Hire Learning Survey available under the following topics:

- Types of Employment and Educational Requirements
- Employment Outlook
- Recruitment
- Skill Requirements
- 10 Things You Need to Know about the Hamilton’s Labour Market in 2014

Who completed the survey?

A total of 143 employers fully completed the survey, with an additional 23 companies completing a substantial portion of the survey.

By Industry (% of respondents):

- Accommodation and food services, 2%
- Business, building, other support services, 5%
- Construction, 5%
- Educational services, 7%
- Finance, insurance, real estate and leasing, 9%
- Health care and social assistance, 21%
- Information, culture and recreation, 10%
- Manufacturing, 10%
- Professional, scientific and technical services, 9%
- Public administration, 1%
- Retail/wholesale trade, 5%
- Transportation and warehousing, 5%
- Other, 12%

By Employee Size Range (% of respondents):

- Owner-operated: 4%
- 1 to 4: 13%
- 5 to 9: 13%
- 10 to 19: 15%
- 20 to 49: 11%
- 50 to 99: 9%
- 100 to 199: 11%
- 200 to 499: 13%
- 500+: 11%
Types of Employment & Educational Requirements

Permanent full-time positions are the most common types of jobs available

This chart shows the average percentage from 159 respondents in each of the employment type categories. Temporary positions include contract.

What percentage of your positions are:

- Permanent Full-Time
- Permanent Part-Time
- Temporary Full-Time
- Temporary Part-Time

46.5% of respondents indicated that 80-100% of their positions are permanent full-time.

Almost half (48.4%) of respondents only offer permanent positions in their organizations.

Most temporary employment opportunities are found in health care and social assistance, and educational services.

Opportunities for all educational backgrounds

"We look for a combination of previous experience and post-secondary training/education."

- Hamilton health care employer

High School Diploma

What % of your positions require a high school diploma?

- <50%: 36%
- 21-40%: 7%
- 41-60%: 4%
- 61-80%: 5%
- 81-100%: 47%

Sample = 104

College Diploma

What % of your positions require a college diploma?

- <20%: 25%
- 21-40%: 22%
- 41-60%: 15%
- 61-80%: 13%
- 81-100%: 25%

Sample = 134

- Manufacturing
- Retail/Wholesale trade
- Transportation and warehousing

Certificate of Qualification

30% of respondents had the majority of their positions requiring a Certificate of Qualification.

Skilled trades was one of the most commonly listed in-demand occupations by employers.

University Degree

What % of your positions require a university degree?

- <20%: 40%
- 21-40%: 11%
- 41-60%: 18%
- 61-80%: 12%
- 81-100%: 19%

Sample = 129

- Educational services
- Health care and social assistance
- Professional, scientific, technical services
Employment Outlook

Thinking about just your organization, are the number of employees currently growing, declining or staying about the same?

- Growing (44%)
- Staying about the same (45%)
- Declining (11%)

Which industries indicated they were growing?

- Health care and social assistance
- Finance, insurance, real estate, leasing
- Professional, scientific, technical services

Likely to hire in the next year?

- At least 1 new employee: 72%
- At least 20 new employees: 16%

Which occupational groups will be in the greatest demand over the next year?

- Professionals: 23% of respondents expect to increase this occupation, 5% expect to decrease this occupation.
- Managers: 10% of respondents expect to increase this occupation, 5% expect to decrease this occupation.
- Technical: 19% of respondents expect to increase this occupation, 2% expect to decrease this occupation.
- Skilled Trades: 12% of respondents expect to increase this occupation, 0% expect to decrease this occupation.
- Sales and Marketing: 20% of respondents expect to increase this occupation, 2% expect to decrease this occupation.
- Administrative and Clerical: 19% of respondents expect to increase this occupation, 9% expect to decrease this occupation.
- Production and Service: 18% of respondents expect to increase this occupation, 4% expect to decrease this occupation.

Most commonly cited detailed occupations in demand:

- Skilled Trades & Apprentices
- Sales Representatives
- IT Professionals

Many of the in-demand occupations require college education.
Majority of Hamilton employers find recruitment a somewhat challenging issue

Factors that make recruitment challenging:

- Too few qualified candidates (69%)
- Too many unqualified applicants applying (46%)
- Non-competitive wages (41%)

Factors that make recruitment less challenging:

- Company profile/name recognition (60%)
- Adequate supply of qualified candidates (33%)
- Many advancement opportunities (18%)

63% of organizations that find recruitment a very challenging issue employ under 100 workers

Top 10 Recruitment Methods

1. Word of mouth/employee networks (75%)
2. Online job listing (e.g. Indeed, Workopolis) (67%)
3. Organization's website (62%)
4. Personal contacts (55%)
5. Social media (47%)
6. College/university job boards (47%)
7. Using co-op students and/or interns (43%)
8. Not-for-profit employment agencies (36%)
9. Newspaper ads (33%)
10. Staffing agencies (25%)

Do you receive any assistance from a local not-for-profit employment agency representing the following groups?

- General unemployed: 19%
- Youth: 11%
- Immigrants: 10%
- International students/internationally trained professionals: 8%
- Persons with disabilities: 6%
- Aboriginals: 6%
- Older workers: 4%

"It can be challenging knowing the best places to look to find the right employee."

- Hamilton employer
Skill Requirements

Thinking, oral communication and digital technology are the essential skills employers have the most difficulty finding in employees.

To what level of difficulty do you have finding employees that have the skills necessary in each of the essential skills areas?

These are the 9 essential skills that are used in nearly every job and throughout daily life in different ways and at varying levels of complexity.

Skills requirements are expected to increase to a moderate extent over the next 5 years.

What skill requirements in particular are expected to increase?

Technology
Electronic communication and documentation
Social media skills
Strategic thinking
Critical thinking

To what extent do you expect skills requirements to increase over the next 5 years?
1. Permanent full-time positions are the most common types of jobs available.
   - 46.5% of respondents indicated that 80-100% of their positions are permanent full-time.

2. There are job opportunities for all educational backgrounds.
   - Employers are looking for a combination of practical experience and training.

3. Many of the occupations currently in demand require college education.
   - Skilled trades and apprentices, technicians, sales representatives and IT professionals were among the most commonly cited current occupations in demand.

4. Employers generally have a positive employment outlook.
   - 72% of employers expect to hire at least one new employee in the next year.

5. Professionals, followed by sales and marketing, are the occupational groups that the most employers expect to increase in the next year.
   - 23% of respondents expect to increase hiring for professionals and 20% of respondents expect to increase sales and marketing positions.

6. The majority of employers find recruitment a somewhat challenging issue.
   - 87% of employers find recruitment either very challenging or somewhat challenging.

7. The top recruitment methods are word of mouth/employee networks and online job listings.
   - 75% of respondents use word of mouth/employee networks to recruit new workers, and 67% use online job listings such as Indeed or Workopolis.

8. The most common factors that make recruitment challenging includes too few qualified candidates, too many unqualified candidates applying and non-competitive wages.

9. Essential skills (that are used in nearly every job) that employers have the most difficulty finding include thinking, oral communication and digital technology.
   - 60%, 54% and 52% of respondents have either some difficulty or high difficulty finding employees that have the necessary thinking, oral communication and digital technology skills, respectively.

10. Skill requirements are expected to increase to a moderate extent over the next 5 years.
    - Particular skills expected to increase include technology, electronic communications and documentation, social media skills, strategic and critical thinking.

Interpreting the results of the 2014 Hire Learning Survey

The results of the 2014 Hire Learning Survey can be used to enrich our knowledge of Hamilton’s current labour market conditions. The employer voices heard through the survey can help us understand the labour market data released from Statistics Canada and other data-collecting organizations. As with any information of this type, you should always interpret results with caution and use a variety of sources when collecting labour market information to assess what is happening in the community.

As this is the first year the Hire Learning Survey was released, the information gathered here represents one point in time. In future years we will be able to place the results in a comparative context and look at any changing trends over time. Check out www.workforceplanninghamilton.ca for more information about Hamilton’s local labour market.
# Health Informatics Professional Career Matrix®

<table>
<thead>
<tr>
<th>Level</th>
<th>Clinical &amp; Health Services</th>
<th>Canadian Health System</th>
<th>Project Management</th>
<th>Organizational &amp; Behavioural Management</th>
<th>Analysis &amp; Evaluation</th>
<th>Information Management</th>
<th>Information Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Master</td>
<td>Chief Clinical Information Officer</td>
<td>Chief Information Officer</td>
<td>Project Services Vice President</td>
<td>Chief Transformation Officer</td>
<td>Chief Knowledge Officer</td>
<td>Chief Privacy Officer</td>
<td>Chief Technology Officer</td>
</tr>
<tr>
<td>4 Expert</td>
<td>Clinical Informatics Director</td>
<td>eHealth Program Director</td>
<td>eHealth Strategist</td>
<td>PMO Director</td>
<td>Change &amp; Evaluation Services Director</td>
<td>Process Improvement Director</td>
<td>Senior Methodologist</td>
</tr>
<tr>
<td>3 Proficient</td>
<td>Clinical Informatics Manager</td>
<td>Clinical Informatics Specialist</td>
<td>eSafety Manager</td>
<td>Senior Business Analyst</td>
<td>Business Development Specialist</td>
<td>PMO Manager</td>
<td>Project Manager</td>
</tr>
<tr>
<td>1 Emerging Professional</td>
<td>Clinical Informatics Coordinator</td>
<td>Junior Business Analyst</td>
<td>Program Coordinator</td>
<td>Project Coordinator</td>
<td>Training Coordinator</td>
<td>Product Analyst</td>
<td>Research Coordinator</td>
</tr>
</tbody>
</table>

*Association canadienne d'informatique de la santé*
13.9 References


http://www.mckinsey.com/insights/health_systems_and_services/the_big-data_revolution_in_us_health_care


SECTION 14: DUPLICATION

14.1 Gap analysis

It is not the intention of Mohawk College to duplicate other programs offered in Ontario by universities or to raise credentials among similar programs in the college system by offering the proposed Bachelor of Digital Health (Honours). The proposed Mohawk program is distinctive in its application of digital technology to the health sector, offering specialized courses unavailable at other postsecondary institutions, and in its commitment to experiential learning through laboratory coursework, mandatory co-op work terms and a capstone applied research project.

Programs at five Ontario colleges and six universities were reviewed in depth. Those institutions include:
- Algonquin College
- Centennial College
- Conestoga College
- Seneca College
- Sheridan College
- McMaster University
- Carleton University
- University of Waterloo
- University of Guelph
- University of Western Ontario (Western University)
- York University

Appendix 10 provides the detailed comparison of the proposed program with potentially related programs, including a summary and analysis of the similarities and differences. The following table provides a brief summary.

<table>
<thead>
<tr>
<th>Institution &amp; Program</th>
<th>Similarities</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mohawk / McMaster Bachelor of Technology (Computer and Information Technology)</td>
<td>Core areas of programming fundamentals, operating systems fundamentals and data structures.</td>
<td>No industry sector focus in the BTech program. Specific health-focused courses at Mohawk include Digital Health Fundamentals &amp; the Canadian Healthcare System; Modelling and Gamification for Health; Physiology, Pathology &amp; Medical Coding; and Digital Health Architectures, Standards &amp; Interoperability.</td>
</tr>
<tr>
<td>Algonquin / Carleton Bachelor of Information</td>
<td>Fundamental areas including mathematics, physics, statistics and programming.</td>
<td>Carleton/Algonquin program focuses on the design, installation, operation and management of future complex information networks offering</td>
</tr>
<tr>
<td>Institution &amp; Program</td>
<td>Similarities</td>
<td>Differences</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Technology Network Technology</td>
<td></td>
<td>specialized courses such Wireless Networks, Advanced Network Switching, Emerging Network Technologies and a Network project.</td>
</tr>
<tr>
<td>Centennial Health Informatics Technology (Advanced Diploma)</td>
<td>Core courses cover programming, network fundamentals, user interface design, and telehealth.</td>
<td>The Centennial program is a three-year program with less depth than the Mohawk program. Specialized courses at Mohawk not offered at Centennial will introduce students to the Canadian healthcare system and cover topics such as: Digital Health Fundamentals and the Canadian Healthcare System, Client and Patient Care Devices and Decision Support Systems, Epidemiology and Healthcare Statistics, Privacy and Security in Digital Health, and Health Administration.</td>
</tr>
<tr>
<td>Conestoga Bachelor of Applied Health Information Science</td>
<td>The focus of both programs is applying information technology knowledge and skills in the health sector. Both offer core courses that cover programming, the Canadian Healthcare System, Clinical Systems and Security &amp; Privacy in healthcare.</td>
<td>Specialized courses in Conestoga’s program develop soft skills such as Group Dynamics, User Training and Adult Education, and health-related topics such as Biomedical Concepts (3 courses compared to 1 in Mohawk’s program) and Healthcare Quality Improvement. The Mohawk program provides more depth in the areas of software development, networking and devices, and IT for healthcare, including the following courses: Network Fundamentals, Social Computing and Social Media Platforms, Modelling and Gamification for Health, Mobile</td>
</tr>
<tr>
<td>Institution &amp; Program</td>
<td>Similarities</td>
<td>Differences</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Seneca Bachelor of Technology (Software Development)</td>
<td>Similarities between the Seneca program and Mohawk’s proposed program exist in core areas of operating systems fundamentals, programming fundamentals and user interface and experience.</td>
<td>There is no industry sector focus in Seneca’s program. Specific health-focused courses at Mohawk include Digital Health Fundamentals &amp; the Canadian Healthcare System; Modelling and Gamification for Health; Physiology, Pathology &amp; Medical Coding; and Digital Health Architectures, Standards &amp; Interoperability.</td>
</tr>
<tr>
<td>Sheridan Bachelor of Applied Information Sciences (Information Systems Security)</td>
<td>Similarities between Sheridan’s program and Mohawk’s proposed program exist in core areas of operating systems fundamentals, statistics and data security fundamentals.</td>
<td>Specialized courses in the Sheridan program include Security Threats &amp; Risk Assessment; Information Systems Forensics &amp; Investigation; and Malicious Code: Design &amp; Defence whereas specific health-focused courses at Mohawk include Digital Health Fundamentals &amp; the Canadian Healthcare System; Modelling and Gamification for Health; Physiology, Pathology &amp; Medical Coding; and Digital Health Architectures, Standards &amp; Interoperability.</td>
</tr>
<tr>
<td>Sheridan Bachelor of Applied Computer Science (Mobile Computing)</td>
<td>Similarities between the two programs exist where core courses cover programming, network fundamentals, user interface design, and telehealth.</td>
<td>The Centennial program is a three-year program with less depth than the Mohawk program. Specialized courses at Mohawk not offered at Centennial will introduce students to the Canadian healthcare system and cover topics such as: Digital Health Fundamentals and the Canadian Healthcare System, Client and Patient Care Devices and Decision Support Systems, Epidemiology and Health Care Statistics, Privacy and Security in</td>
</tr>
<tr>
<td>Institution &amp; Program</td>
<td>Similarities</td>
<td>Differences</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>University of Waterloo Bachelor of Computer Science (Bioinformatics)</td>
<td>While there are program content similarities in the areas of mathematics and programming fundamentals.</td>
<td>Digital Health, and Health Administration.</td>
</tr>
<tr>
<td>University of Waterloo Bachelor of Computer Science (Bioinformatics)</td>
<td>Specialized courses in Waterloo’s program include Introductory Cell Biology; Physical &amp; Chemical Properties of Matters; and Genetics.</td>
<td>Specialized courses in Waterloo’s program include Introductory Cell Biology; Physical &amp; Chemical Properties of Matters; and Genetics.</td>
</tr>
<tr>
<td>University of Guelph Bachelor of Computing (Software Engineering)</td>
<td>Similarities between Guelph’s program and Mohawk’s proposed program exist in core areas of programming fundamentals, operating systems fundamentals and data structures.</td>
<td>There is no industry sector focus in the University of Guelph’s program. Specific health-focused courses at Mohawk include Digital Health Fundamentals &amp; the Canadian Healthcare System; Modelling and Gamification for Health; Physiology, Pathology &amp; Medical Coding; and Digital Health Architectures, Standards &amp; Interoperability.</td>
</tr>
<tr>
<td>York University Bachelor of Arts (School of Information Technology) – Health Industry</td>
<td>No course information available on website.</td>
<td>No course information available on website.</td>
</tr>
<tr>
<td>Western University Bachelor of Engineering Science (Software Engineering – Health Informatics Option)</td>
<td>There are program content similarities in terms of programming fundamentals, mathematics and software design.</td>
<td>The first year and final years vary significantly. The first year at Western is common in all engineering disciplines, where courses include Properties of Materials, Chemistry and Physics. At Mohawk, the proposed program focuses on software from Year 1. Specialized courses in both programs explore security in digital health and software quality assurance but Western’s program does not offer full courses in the following areas: the Canadian Health System; Digital</td>
</tr>
<tr>
<td>Institution &amp; Program</td>
<td>Similarities</td>
<td>Differences</td>
</tr>
<tr>
<td>-----------------------</td>
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<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Imaging for Health; Physiology, Pathology, and Medical Terminology; Patient Safety and Risk Management; and Telehealth, Virtual Hospitals, and Remote Patient Monitoring; and Digital Health Architectures, Standards &amp; Interoperability.</td>
</tr>
</tbody>
</table>
SECTION 15: POLICIES

The policies of Mohawk College relevant to this application are listed in the table below and attached in Appendix 11.

Policies at Mohawk are developed internally by departments. Approval is granted by the Mohawk senior management team (SMT) after thorough review by the Policy Committee. The date of adoption of a policy is reflected in the last four digits of the policy number (category letter code – category number code – date of adoption).

<table>
<thead>
<tr>
<th>Pertaining to</th>
<th>Policy Number &amp; Policy Title</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 3: Admission, Promotion and Graduation</strong></td>
<td></td>
</tr>
<tr>
<td>• admission of mature students</td>
<td>SS-3101-1980 Admissions Standards</td>
</tr>
<tr>
<td>• the level of achievement required of students in the program for promotion and graduation</td>
<td>SS-3103-2009 Program Promotion and Graduation Requirements (degree elements to be added)</td>
</tr>
<tr>
<td>• academic remediation, sanctions and suspension for students who do not meet minimum requirements</td>
<td>SS-3104-2009 Grading and Transcripts SS-3103-2009 Program Promotion and Graduation Requirements</td>
</tr>
<tr>
<td>• credit transfer / recognition (including bridging requirements for certificate/diploma to degree laddering)</td>
<td>AS-2002-2013 Credit Transfer</td>
</tr>
<tr>
<td>• entrance examinations and advanced placement based on prior learning assessments for “life experience”</td>
<td>SS-3100-2008 Prior Learning Assessment and Recognition</td>
</tr>
<tr>
<td><strong>Section 5: Program Delivery</strong></td>
<td></td>
</tr>
<tr>
<td>• quality assurance of program delivery method(s)</td>
<td>AS-2000-2013 Program Quality</td>
</tr>
<tr>
<td>• mechanisms and processes for student feedback regarding program delivery</td>
<td>AS-2003-2013 Student Feedback on Teaching</td>
</tr>
<tr>
<td>• technology, computer and online modes of delivery</td>
<td>AS-XXXX-2015 Technology Based Delivery (draft)</td>
</tr>
<tr>
<td>• professional development of faculty including the promotion of curricular and instructional innovation as well as technological skills</td>
<td>CS-1312-2005 Professional Development for Staff</td>
</tr>
<tr>
<td>• Course development and course outline management</td>
<td>AS-2004-2007 program curriculum policy</td>
</tr>
</tbody>
</table>
### Section 6: Capacity to Deliver

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>• academic/professional credentials required of present and future faculty teaching courses in the program</td>
<td>AS-XXXX-2015 Academic Hiring (Degrees) (draft)</td>
</tr>
<tr>
<td>• academic/professional credentials required of faculty acting as research/clinical/exhibition supervisors in the program</td>
<td>AS-XXXX-2015 Academic Hiring (Degrees) (draft)</td>
</tr>
<tr>
<td>• the requirement to have on file evidence supplied directly to the college by the granting agency of the highest academic credential and any required professional credentials claimed by faculty members</td>
<td>AS-XXXX-2015 Academic Hiring (Degrees) (draft)</td>
</tr>
<tr>
<td>• the regular review of faculty performance, including student evaluation of teaching and supervision</td>
<td>AS-XXXX-2015 Academic Hiring (Degrees) (draft)</td>
</tr>
<tr>
<td>• the means for ensuring the currency of faculty knowledge in the field</td>
<td>CS-1312-2005 Professional Development for Staff</td>
</tr>
<tr>
<td>• faculty teaching and supervision loads</td>
<td></td>
</tr>
<tr>
<td>• faculty availability to students</td>
<td></td>
</tr>
<tr>
<td>• professional development of faculty including the promotion of curricular and instructional innovation as well as technological skills, where appropriate</td>
<td>CS-1312-2005 Professional Development for Staff</td>
</tr>
</tbody>
</table>

### Section 10: Program Evaluation

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>• internal periodic review of the program</td>
<td>AS-2000-2013 Program Quality</td>
</tr>
</tbody>
</table>

### Section 11: Academic Freedom and Integrity

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>academic honesty and the college’s plan for informing faculty and students about, and ensuring their compliance with, policies pertaining to academic honesty</td>
<td>SS-3203-2008 Academic Honesty</td>
</tr>
<tr>
<td>ownership of intellectual products of its employees and students</td>
<td>GC-4100-2013 Intellectual Property</td>
</tr>
<tr>
<td>compliance with copyright law</td>
<td>GC-4101-2013 Copyright</td>
</tr>
<tr>
<td>research involving humans and/or animals and the management of research funds</td>
<td>AS-2101-2013 Ethical Conduct for Research Involving Humans AS-2104-2007 Ethical Conduct for Research Involving Animals</td>
</tr>
<tr>
<td>Section 12: Student Protection</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>the resolution of students’ academic appeals, complaints,</td>
<td>SS-3105-2009 Academic Appeals</td>
</tr>
<tr>
<td>grievances and/or other disputes</td>
<td>SS-3204-2006 Student Complaint Procedure</td>
</tr>
<tr>
<td>student dismissal</td>
<td>SS-3200-2006 Student Behaviour</td>
</tr>
<tr>
<td></td>
<td>SS-3103-2009 Program Promotion and Graduation Requirements</td>
</tr>
<tr>
<td>Withdrawal and Redirection Procedure</td>
<td>SS-3102-2008 Withdrawal and Redirection Procedure</td>
</tr>
</tbody>
</table>
LIST OF APPENDICES
APPENDIX 1: PROGRAM ADVISORY COMMITTEE MINUTES
Minutes of the Digital Health Advisory Committee Meeting
Held Monday, March 24, 2014
5-7pm

Present:
Tony Thoma, Dean, Faculty of Engineering Technology and Media Studies
Tom Low, Associate Dean,
Sharon Scollard, Professor, Mohawk College
Duane Bender, Director of mHealth & eHealth Research, Mohawk College
Arun Agrawal, Senior eHealth Research Analyst, Mohawk College
Jamie Mattina, Operations Manager, Faculty of Engineering Technology, Mohawk College
David Carter, Executive Director, Innovation Factory Hamilton
Ann McKibbon, Professor, McMaster University eHealth Program
David Chan, McMaster Department of Family Medicine
Mary Sakuluk, Hamilton Public Library
Bob Pocius, Cloud Operations & Business Cloud Services, Blackberry
Mike Krasnay, Director, Solutions Architecture, eHealth Ontario
Don Newsham, CEO, COACH
Mark Farrow, CIO, Hamilton Health Sciences
John Campbell, Experis
Nick Zamora, Chief Clinical Advisor, Telus Health
**ITEM** | **DISCUSSION**
--- | ---
1. Introductions | T. Thoma welcomed all participants to the meeting, stated the purpose of the meeting, and introductions were made for the group.

2. Gaps in the program of studies | • A. McKibbon mentioned more emphasis is placed on sickness and disease as opposed to wellness. Also privacy, confidentiality, and security are mentioned but not necessarily ethics; more focused should be placed on ethics as this matter is becoming more important.
• S. Scollard mentioned that ethics could be added to the legal and security course.

T. Low inquired if there are any suggestions from the group with regards to the pre-requisites/entry requirements for the new programs.

T. Thoma inquired if there are any suggestions from the group with regards to the following: Is there need for multiple Math courses? Which science is the most appropriate amongst biology, physics, and chemistry? Which one or combination should become a requirement?

• In the discussion, it was suggested that the students should be familiar with funding formulas, Canada Health Act, and the public sector procurement process.
• With regards to modelling, M. Krasnay mentioned that case tools are used by eHealth Ontario and learning tools could be suggested.
• Participants were asked if they could provide suggestions related to the business process involving engineering and lean aspects.
• D. Newsham mentioned the human factor side of things is not represented with regards to design/usability.

Participants were then asked if they could provide suggestions involving change management.
• D. Newsham mentioned that patient safety and risk management are not well represented (a potential risk for patient harm – e.g., pharmaceutical robots).
• S. Scollard mentioned an element of safety and risk could be introduced early in the program, as part of the General Safety course.

D. Bender asked if it would be appropriate to teach a course on software development, focusing on the integration aspects of software development.
• M. Krasnay agreed students should be taught about software development while T. Thoma mentioned there is always need for interfaces (e.g., for research,
D. Carter indicated that grads need to have even a general understanding of software development in order to read/write specs for 3rd party development.

M. Farrow added his company is going full circle back to development cycles; local development of apps is taking place.

Furthermore, D. Carter made a reference to an App for digital visualization.

B. Pocius mentioned that large shops are building their own in-house Apps comparing to the small shops where this situation is not encountered. Referring to software development vs systems analysis, remarks were made mentioning that software development is back and a focus should be placed on integration.

M. Farrow acknowledged that grads need at least the baseline of project management.

### 3. Additional career options

Suggestions with regards to career options included the following:

- Expand data architect to enterprise architect and other forms of architecture
- Business process analyst
- Project management
- Mobile device technologist

D. Bender asked what employers expect from a new program graduate.

- J. Campbell mentioned that certifications are important as they offer an advantage; amongst all of them the PMP certification alignment is the most recognised.
- As part of the discussion it was added that Engineering is doing a 1 year PMP certification. T. Thoma mentioned that the base courses and some additional ones will be developed for a PMP certification in collaboration with PMI (PMI would allow to use their body of knowledge or PMP) for the new programs; Statistics and Lean Six Sigma introduction (which would offer possibilities for black belt/green belt through ASQ) to also be developed for all 3 degrees.
- M. Sakuluk indicated the Cloud Computing specialist as an additional career option.
- M. Farrow acknowledged that the focus is currently on Apps; in maybe a decade from now professions such as Apps Developer/Analyst/Manager will be developed.

### 4. Accreditation/certification

- D. Newsham mentioned the undergraduate program would meet COACH’s criteria therefore individuals would automatically be eligible.
- COACH certifies individuals and not programs.
| 5. Question on Entrepreneurship | J. Campbell indicated that there is a current trend known as “Intrapreneurship” referring to individuals that are able to save costs, recognize opportunities etc. while they are part of an organization; people with this type of mindset would be looked for in the future. As part of the conversation it was acknowledged that both entre- and intra-preneurship skills will be covered in the new programs to help transform the health system |
| 6. General Comments | • M. Farrow expressed the fact that the program offers a lot, but a lot of “bits” (therefore what will the person coming out of the program have; how would they have the ability to stream?) As part of the discussion it was also mentioned that the first 3 years of the program offer a great foundation and a possibility for a focus/specialization should be looked for in year 4.  

• B. Pocius indicated the structure of the courses is really good; though, removing some health aspects and including in-depth courses on subjects such as data would turn the program into something very similar to an existing program?  

D. Bender asked participants to suggest if the focus should be on mobile health. M. Farrow mentioned the focus should be on mobile devices.  

• M. Farrow suggested that in semesters 7/8 option should be given to move into something already studied; semesters 7/8 should allow students to specialize more. As part of the conversation it was pointed out the fact the current program of studies offers “lots of tastes of things, but never a meal of anything”. Some courses that are divided into Part 1 & Part 2 could be combined into full year courses so students can connect more with the material.  

• N. Zamora indicated that the applied part should be a yearlong to allow students to dig deeper and recommended that Year 4 should be applied and specialized for students to dig deeper into a single topic area through applied research courses, etc. S. Scollard indicated that the 4th year Capstone project and co-op would allow for deeper application of learning.  

• T. Thoma pointed out the fact that courses for which the focus is too narrow could limit job opportunists; he also mentioned that programs as outlined allow students to cross over to other programs within the College. It was suggested by participants that a |
major/minor structure could be included for the new programs.

J. Campbell asked why the 1st co-op is not mandatory.
- The discussion continued with an inquiry on why there are not 8 month placements?
- Employers recommended 4 month and 8 month placements.
- Furthermore it was mentioned in the discussion the co-op between Semesters 1 and 2 is optional but encouraged as some students may not be ready for a work term and also the College does not want to disadvantage them upon graduation.

What about other certificate programs? 1 year? Online?
People with degrees, foreign trained professionals
- D. Bender mentioned that there is current work done for a Foreign Trainer certificate

<table>
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<tr>
<th>7. Is there a need for this program and would you support Mohawk College’s application?</th>
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<tr>
<td>All attendees in support</td>
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<th>8. Final Comments</th>
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<td>A question was asked on whether participants think there is a gap in educating offerings within the new programs.</td>
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<td>- D. Carter referred to mobile computing and lifestyle applications.</td>
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<td>- M. Farrow mentioned the digital health market is the place to be in the upcoming years.</td>
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<td>- D. Newsham indicated the right niche should be found and that what is unique should be used (i.e. the unique technology available).</td>
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<td>- M. Sakuluk mentioned there is a fairly good balance in the programs between generic and specific.</td>
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<td>- N. Zamora specified that understanding “who does what” is really important in the health care system (e.g. understanding what the problems in healthcare are that IT is solving and applying the adequate information/technology to solve those specific problems).</td>
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<td>- D. Newsham mentioned the applied side of things has a high degree of currency (as in current); for anything applied, the challenge is to stay current.</td>
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<td>- S. Scollard inquired if a course on “Current Innovations in Digital Health” could be added to the POS, which would have a generic description and evolve as per market trends</td>
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<tr>
<td>- Dr. D. Chan mentioned the students should have a more general concept of citizens in the society; more human background, patient interactivity, patient involvement, and sensitivity to human issues (e.g. “the</td>
</tr>
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</table>
| care of the elderly” term could be used instead of “geriatric care”).
| Furthermore N. Zamora made a remark on understanding the fiduciary duty of the health system (i.e., who is the customer at the end of the day?).
| M. Farrow mentioned that the applied nature of field can make it personal; digital health is all about the patient.
| T. Thoma mentioned Mohawk would welcome guest speakers or instructors to teach a course in the new programs.

| **9. Follow-up** |
| Online survey to be sent out and completed by attendees |
| Sample support letter for attendees to edit and sign |
| Send full POS and breakdown of courses |
| Send Powerpoint |
**MOTION 1**

The Program Advisory Committee for the Digital Health program at Mohawk College is being asked to support and approve the proposed curriculum and application to the Ministry of Training Colleges and University, of the Bachelor’s Degree in Digital Health, by the Faculty of Engineering Technology & Media & Entertainment.

Moved By:

Seconded by:

Members Present and Summary of Votes:

<table>
<thead>
<tr>
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<td>Arun Agrawal</td>
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<td>Mohawk College, Senior eHealth Research Analyst</td>
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<td>Innovation Factory Hamilton, Executive Director</td>
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<td>Mohawk College, Operations Manager, Faculty of Engineering Technology</td>
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**SUMMARY OF VOTES: ALL IN FAVOUR.**
MOTION 2

The Program Advisory Committee for the Digital Health program at Mohawk College agrees that the proposed curriculum of the Bachelor’s Degree in Digital Health, presented by the Faculty of Engineering Technology & Media & Entertainment, meets and or exceeds the current requirements of the field of study.

Moved by:

Seconded by:

Members Present and Summary of Votes.

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**SUMMARY OF VOTES:** ALL IN FAVOUR.
APPENDIX 3: STUDENT FEEDBACK FORMS
Student Feedback on Teaching Survey

Teaching Effectiveness
(Scale: 1-strongly disagree, 2-disagree, 3-agree, 4-strongly agree, Not Applicable)

1. The teacher appears to be prepared for class.
2. The teacher speaks clearly.
3. The teacher explains concepts and ideas clearly.
4. The teacher manages classroom behaviour to create a positive learning environment.
5. The teacher responds to questions, comments, and/or e-mails in a way that helps me learn.
6. The teacher is accessible outside of class (by appointment, email, etc).
7. The teacher incorporates real life examples that are connected to the course content.
8. The teacher makes criteria for grading assessments (tests, assignments, projects, etc) clear in advance.
9. The teacher provides feedback on assessments (tests, assignments, projects, etc) in an agreed upon timeframe.
10. The teacher uses active learning techniques (case studies, discussions, group work, projects, labs, scenarios, simulations, etc) to engage me as a learner.
11. The teacher appears capable with the use of technology.
12. The teacher demonstrates enthusiasm for the subject.
13. The teacher treats me with respect.
14. Additional comments: a) What did the teacher do well? b) What could the teacher do to better support your learning? (open-ended)

Course Delivery
(Scale: 1-strongly disagree, 2-disagree, 3-agree, 4-strongly agree, Not Applicable)

15. The materials available (textbook, courseware, equipment, etc) in this course are important to achieving learning outcomes.
16. The eLearn activities (content, discussions, quizzes, self-assessments, etc) in this course help me learn.
17. Additional web resources (videos, articles, web pages) outside of eLearn in this course help me learn.
18. The ratio of time spent face-to-face in the classroom and spent on-line is a good mix for this course.
19. Assessments (tests, assignments, projects, etc) in this course help to further my understanding of the subject.
20. The variety of activities and assessments (tests, assignments, projects, etc) in this course provides options for me to demonstrate my learning.
21. Additional comments: a) What did you like MOST about this course? b) What did you like LEAST about this course? (open-ended)
Student Feedback for Online Courses

Teaching Effectiveness
(Scale for all questions (unless denoted): Strongly Agree, Agree, Disagree, Strongly Disagree, Not Applicable)

1. My teacher provided a welcome announcement.
2. My teacher created a positive learning environment.
3. Course information was provided (e.g., course schedule, course outline, and/or learning plan).
4. My teacher built a personal relationship with me through regular communications (e.g., progress check, reminders, due dates, and/or announcements).
5. Expectations of students’ responsibilities for the course were clearly stated.
6. Forum was provided for interaction and collaboration (e.g., discussion board, chat, blog, journal, wiki, email, and/or phone).
7. My teacher responded to questions and emails in an agreed upon timeframe.
8. A variety of assignments/activities were provided to help students achieve the learning.
9. My teacher used various media (e.g. video clips, PowerPoint presentations, and/or Prezi) throughout the course to engage me as a learner.
10. Overall, my teacher is effective in online learning.

Assessment Methods
(Scale for all questions (unless denoted): Strongly Agree, Agree, Disagree, Strongly Disagree, Not Applicable)

11. The assessment methods and learning activities helped me to achieve the course learning outcomes.
12. The criteria for grading assessments (e.g., tests, assignment, and/or projects) were provided in advance.
13. My teacher provided feedback on assessments (e.g., tests, assignments, and/or projects) in an agreed upon timeframe.
14. Opportunities for feedback on my progress were provided throughout the course.

Course Design
(Scale for all questions (unless denoted): Strongly Agree, Agree, Disagree, Strongly Disagree, Not Applicable)

15. Course materials were organized into a logical order or units that helped me to learn.
16. Technical requirements (e.g. browser, plugins, and/or drivers) were clearly visible.
17. Course material was accessible with no “broken” links (e.g. live links).
18. Technical assistance was available if I needed help (e.g., CMU Online, and/or Tutorials).
19. Workload and pace of delivery was suitable for this course.
20. Overall, the course design/set-up helped me to learn the course material.
21. I would take another online course at Mohawk.
22. What is the MOST effective course activity that enhanced your learning in this course? (open-ended)
23. What is the LEAST effective course activity to your learning in this course? (open-ended)
APPENDIX 5: LETTERS OF SUPPORT – EMPLOYERS
Tony Thoma  
Dean, Engineering Technology  
Mohawk College  
Fennell Ave. & West 5th Street  
Hamilton, ON L8N 3T2  

RE: Proposed Bachelor of Applied Technology (Digital Health)  

I am pleased to endorse the establishment of Mohawk College’s proposed Bachelor of Applied Technology (Digital Health).  

This innovative program clearly meets the needs of Ontario’s health industry. Currently, every 2 out of 3 Ontarians are covered by electronic medical record (EMR) software. The use of EMR software has greatly improved the quality of health care that Ontarians receive.  

The courses available in this program will offer students a comprehensive overview of the digital health field and will prepare graduates of the program to handle the complexity of ensuring that electronic health records are built in a safe and secure manner.  

On behalf of eHealth Ontario, I am pleased to offer my support for this new program which will enhance Mohawk College’s already substantial contributions to the eHealth discipline.  

Sincerely,  

Dr. Peter Bascom  
Chief Architect  
eHealth Ontario
May 27, 2015

Tony Thoma  
Dean, Engineering Technology  
Mohawk College  
Fennell Avenue & West 5th Street  
Hamilton, ON L8N 3T2  

RE: Proposed Bachelor of Applied Technology (Digital Health)

On behalf of Hamilton Health Services, I would like to support the establishment of a Bachelor of Applied Technology (Digital Health) degree program at Mohawk College.

This program will be a strong addition to Hamilton’s post-secondary health education offerings and will further reinforce the reputation of Hamilton and Mohawk as leaders in health and technology.

The Digital Health program will allow Hamilton and the Golden Horseshoe region to train and retain highly skilled graduates with experience in digital health. It will also foster new opportunities for further collaboration between our hospital group and the college as we foresee opportunities for students from this program to collaborate with Hamilton’s health community on real-world projects and co-op terms.

Sincerely,

Mark Farrow  
Vice President, Health Information Technology Services and Chief Information Officer  
Hamilton Health Sciences
May 22, 2015

Tony Thoma
Dean, Engineering Technology
Mohawk College
Fennell Ave. & West 5th Street
Hamilton, ON L8N 3T2

RE: Proposed Bachelor of Applied Technology (Digital Health)

On behalf of the Ontario Telemedicine Network (OTN), I would like to express my support for the creation of the proposed Bachelor of Applied Technology (Digital Health) degree program.

I am pleased to see that your Digital Health program explores the topic of telemedicine within its curriculum. At OTN, we believe that continued innovation in telemedicine is important to ensuring that healthcare professionals get patients the care they need, regardless of time and location.

This new program will help prepare its graduates to take key positions in this growing industry. The program delivery is comprehensive and the inclusion of real-world projects and co-op work terms will allow graduates of the program to begin contributing to the field immediately.

This unique program will make a valuable contribution to our field and we endorse its creation.

Sincerely,

Edward M. Brown, MD
Chief Executive Officer
Ontario Telemedicine Network
May 22, 2015

Mr. Tony Thoma
Dean, Engineering Technology
Mohawk College
Fennell Ave. & West 5th Street
Hamilton, ON L8N 3T2

RE: Proposed Bachelor of Applied Technology (Digital Health)

Dear Mr. Thoma:

Thank you for the opportunity to review the proposed Bachelor of Applied Technology (Digital Health) degree program.

The continued success of Ontario’s health system depends on the development of trained professionals with specialized knowledge in the field of digital health. Technology can positively impact all elements of patient care and as a province we continue to make rapid advancements in this field.

The proposed curriculum of this program is therefore highly relevant to the needs of Ontario’s health sector. Additionally, Mohawk College is a frequent collaborator in Ontario’s health sector and is ideally placed to offer this unique program.

On behalf of the Ministry of Health and Long-Term Care, I give my full support to Mohawk College’s efforts in nurturing innovation in the area of digital health through this initiative, and to Mohawk College’s continued collaboration with other digital health initiatives in Ontario.

Sincerely,

[Signature]

Lorelle Taylor
Chief Information Officer
Ministry of Health and Long-Term Care
April 17, 2015

Tony Thoma  
Dean, Engineering Technology  
Mohawk College  
Fennell Ave. & West 5th Street  
Hamilton, ON L8N 3T2

RE: Proposed Bachelor or Applied Technology (Digital Health)

Thank you for the opportunity to review the proposed Bachelor of Applied Technology (Digital Health) degree program. This letter serves as my endorsement of this initiative.

I am pleased to see that your proposed program considers a blended learning approach. The in-class academic curriculum coupled with practical hands-on training is an ideal approach for students to be prepared for applying their skills in the work force. Graduates from this program will have a pathway to graduate studies at McMaster.

Mohawk’s strength in health and technology is well-known in our region; this unique, new program promises to enhance that reputation by equipping engineering professionals with both fundamental knowledge as well as specialized in-demand skills.

On behalf of the Bachelor of Technology program at McMaster University, I give my full support to Mohawk College’s efforts in advancing the science and application of Digital Health in the Hamilton region.

Sincerely,

[Signature]

Alan Murray,  
Executive Director of the McMaster-Mohawk Bachelor of Technology Partnership
Tony Thoma

Dean, Engineering Technology
Mohawk College
Fennell Ave. & West 5th Street
Hamilton, ON L8N 3T2

RE: Proposed Bachelor of Applied Technology (Digital Health)

This letter serves as our support of Mohawk College’s proposed Bachelor of Applied Technology (Digital Health) degree.

COACH: Canada’s Health Informatics Association is the voice of health informatics in Canada, and our members support the advancement of healthcare through information technology. This proposed program allows for the advancement of health informatics by providing specialized training in in-demand areas such as the use of digital devices in the provision of care, training in cloud computing and the processing of large health-related datasets, and privacy and security issues specific to health data.

This unique new program will draw new talent to the field and ensure that graduates working in the field are equipped with a recognized and meaningful credential.

On behalf of COACH: Canada’s Health Informatics Association, I give my full support to Mohawk College’s efforts in developing a new degree to support the advancement of digital health in the Ontario region.

Sincerely,

Grant Gillis
Executive Director, Forums and Practices
COACH: Canada’s Health Informatics Association
04 June 2014

Tony Thoma  
Dean, Engineering Technology  
Mohawk College  
Fennell Ave. & West 5th Street  
Hamilton, ON L8N 3T2

Re: Proposed Bachelor of Applied Technology Programs

Mohawk College has shared their proposal for three four-year Bachelor of Applied Technology programs (Digital Health, Electrical Power Systems and Mechanical Design). This letter is in support of the initiative.

In my view, the program’s in-class academic curriculum combined with its practical hands-on training will provide the industry with well-prepared graduates. Mohawk’s commitment to excellence in engineering technology is well-known in our region; these unique new programs promise to enhance that reputation by producing engineering professionals with both foundational knowledge and in-demand skills.

The curriculum includes the body of knowledge on Six Sigma in line with the ASQ certification requirements.

The Executive Committee of the ASQ Hamilton Section is pleased to give full support to Mohawk College’s efforts in advancing the science of Quality in the Hamilton region.

Sincerely,

[Signature]

Kris Krishnamoorthy, P. Eng  
Chair / ASQ Hamilton Section (0400)
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   Appendix B - Program Review Schedule 2014 – 2015  
   Appendix C - List of Programs for Review 2014 – 2015  
   Appendix E - Documents for Focus/Stakeholder Consultations
In 2002, the Ministry of Training, Colleges and Universities (MTCU) afforded Ontario College’s greater autonomy with program development, curriculum enhancements and quality assurance through the implementation of the Minister’s Binding Directive for the Framework for Programs of Instructions. However, there are specific criteria and processes outlined in the Directive that Ontario colleges have to adhere to that directly influence review of programs of instruction. The directive indicates that:

“Colleges are to establish mechanisms for the review of their programs of instruction to ensure ongoing quality, relevancy, and currency. A college’s policy on quality assurance for programs of instruction is to be publicly available” (http://caat.edu.gov.on.ca).

To maintain quality assurance processes in Ontario colleges in a self-regulatory environment, the Ontario College Quality Assurance Service was created to act as an intermediary between MTCU and Ontario colleges. This service is responsible for two key areas of quality assurance:

1) **Program Quality Assurance Process Audit (PQAPA)**

PQAPA is intended to review the existing quality assurance practices, such as Program Review, in place in each college. Colleges are audited based on six (6) criteria:

**Criterion 1.** Program-level learning outcomes for all programs of instruction are set, are consistent with the college mission and the program’s intended purpose, and are appropriate for the credential offered upon successful completion of the program.

**Criterion 2.** Admission, credit for prior learning, promotion, graduation, and other related academic policies support program development and student achievement of program learning outcomes.

**Criterion 3.** Programs conform to the "Framework for Programs of Instruction" and the Credentials Framework, are consistent with accepted college system nomenclature/program titling principles, and maintain relevance.

**Criterion 4.** Methods of program delivery and student evaluation are consistent with the program learning outcomes.
Criterion 5. Human, physical, financial, and support resources to support student achievement of program learning outcomes are available and accessible.

Criterion 6. Regular program quality assessment that involves faculty, students, industry representatives, and others as appropriate for the purpose of continual improvement is in place and happens.

Mohawk College’s Program Review process integrates elements of the PQAPA criteria to ensure issues of quality are addressed on a regular basis. In order to achieve this, several policies were developed and committees established or revised to meet these criteria. These policies reside on the Mohawk College website and are accessible to the public.

2) Credential Validation Service (CVS)—CVS is intended to “maintain the integrity of the credentials offered by the system and protect the interests of students and employers who require a reasonable guarantee of consistency and quality in postsecondary programs of instruction offered by the colleges of applied arts and technology in Ontario” (www.ocqas.org).

The Program Review process at Mohawk College is also designed to advance the College’s strategic plan. The strategic priorities in the strategic plan1 (Quality, Innovation and Sustainability) are assessed in program review and outcomes to support each priority developed based on the results of the assessment.

As well, the Mohawk College Program Quality Policy (AS-2000-2013) establishes the college framework for the program review process, resultant operational actions and supports the strategic plan.

DEVELOPMENT NEW QUALITY STANDARDS

Effective September 2015, the Ontario College Quality Assurance Service (OCQAS) will be implementing accreditation standards2. Colleges will therefore be transitioning from the quality audits to accreditation of institutions. In preparation for this transition OCQAS has developed a set of quality standards that sets out the requirements colleges will need to meet to become accredited under the new process. There are six quality criteria that must be met under the new process:

1. Program Quality Management System
2. Existence and Communication of Policies and Practices
3. Program Design
4. Program Delivery and Student Assessment

5. Conformity with Government Requirements
6. Availability and Allocation of College-wide Resources

In order to meet the standards of accreditation, the college will be required to provide clear evidence that it is has the policies and practices in place, which are evidence based and supported by research.

In seeking to ensure alignment with the newly developed accreditation standards, the college has developed a set of program standards to be applied to all programs. These standards fall into four main categories:

1. Program Learning Outcomes
2. The Curriculum
3. Delivery Methodology
4. Assessment Methodology

It is expected that the college will be familiar with, and follow, current, accepted, evidence-based practices and research related to the quality of programs and student learning, and to have in place related policies and practices that are consistent with this evidence and research. Each of these Standards, and Requirements, wherever applicable, will be evaluated by the accreditors in light of such evidence and research.

The strategy therefore is to employ a combination of the standards, policies, people and processes. This will ensure quality in every area of the college.
PROGRAM REVIEW AT MOHAWK

Program reviews (PR) yields numerous benefits and provides an opportunity to review, analyze, and assess the content, currency, direction, and quality of a program with respect to program learning outcomes (PLOs) and the student experience at Mohawk College. It fosters academic excellence, helps programs determine how to raise the quality of its offerings, and provides guidance for faculty and administrative decisions in support of continuous program development and enhancements. In its strictest sense, program review brings about program improvement through the collection of evidence about the quality and effectiveness of programs, through shared reflections and collegial dialog about the programs’ current quality and future direction, and through constructive feedback involving all stakeholders (students, program professors, program advisory committees, industry partners etc.)

At Mohawk there are two main reviews which are conducted: an annual review and a comprehensive review (conducted every 5 years). This manual is intended to provide assistance to all persons involved in program reviews. The manual will also provide information for those who are planning reviews or who simply want to get information on how the process is conducted.

You will find information on the program review process at Mohawk, lists of resources, reporting templates and guides, in addition to other supports that may be needed to complete the process successfully, within time and budget.

Every effort has been taken to document the process as succinctly as best as possible. However, if you are in doubt, please contact the Program Quality office.

“PRODUCTIVITY AND EFFICIENCY CAN BE ACHIEVED ONLY STEP BY STEP WITH SUSTAINED HARD WORK, RELENTLESS ATTENTION TO DETAILS AND INSISTENCE ON THE HIGHEST STANDARDS OF QUALITY AND PERFORMANCE.” – J. R. D. Tata
GOALS OF PROGRAM REVIEW

Academic Program Review is one cornerstone of Mohawk's continuous improvement process. This is conducted primarily to:

- Assess the program against established provincial and college standards
- Establish and implement an action plan for the program
- Examine issues related to student access, success and satisfaction
- Determine if the program adequately prepares students for changing job markets, market demands and/or for transitions to further study
- Examine innovation or alternative teaching/learning/assessment practices
- Assure that all program/course changes are informed by student and industry requirements

TYPES OF PROGRAM REVIEW

There are two levels of reviews conducted at Mohawk College:

1. The Comprehensive Program Review
2. The Annual Review

THE COMPREHENSIVE PROGRAM REVIEW

Whereas the annual review concentrates on the action plan items, the comprehensive review is far more extensive and evaluates the program against the program quality standards. It is a five stage process and is estimated to be covered over a twelve (12) month period, involving several internal and external stakeholders. Figure 1 briefly outlines the stages and some of the activities included at each stage.
Resources for conducting the Program Review

The college makes available numerous resources to the program review process through various units, including, but not limited to:

- Program Quality
- Centre for Teaching and Learning
- Institutional Research
- Finance
- Pathways and Credit Transfer
- Library

Roles and Responsibilities of personnel involved in the Program Review

Program review is designed to include input from a number of stakeholders, resulting in efficiency and a culture of inclusiveness. Stakeholders typically include: program faculty and staff, students, employers/industry partners, program advisory committees. Other external members are co-opted on a needs basis and may include, University partners, in the case of collaborative programs. This manual seeks to outline some of the major responsibilities of specific groups:
Program Quality
The Program Quality team is responsible for facilitating the process for a smooth program review. The team will:
- Provide support in coordinating and facilitating the process with the various support groups, provide several support materials and personnel.
- Provide advice on policy and procedural matters, ensuring that at each stage of the process, the college and provincial standards are being implemented accordingly.
- Receive the final report for forwarding to the Office of the VPA.

Program Review Lead
The Program Review Lead’s (sometimes referred to as the Academic Lead) responsibilities include, but not limited to:
- Participating actively in Program Review Leadership Development Sessions.
- Coordinating and convening program faculty meetings, stakeholder consultation sessions, data collection.
- Developing, coordinating and communicating Program Review implementation plan, including timelines, and ensure timelines are met (“Work back schedule” based on 12-month process).
- Completing review and managing supporting materials on eLearn.
- Developing multi-year action plan as a result of comprehensive program review.
- Preparing Program Review final report.
- Meeting regularly with the Program Review Team to hold discussions, clarify issues and discuss updates
- Providing updates to Associate Dean and Deans

Centre for Teaching and Learning
The Centre for Teaching and Learning primarily through its Curriculum Development Specialist (CDS) will provide support for all curriculum related matters. This includes mapping, CLinking, review of learning outcomes, delivery and assessment methodologies. The CDS along with the Program Quality Manager will also conduct the program review workshops – Program Learning Outcomes, Curriculum Design, Delivery and Assessment Methodologies.

Following on the action plan, the CTL will also provide the necessary supports to complete activities. These include course outline reviews, POS adjustments, design/redesign of courses for eLearn (through the team of Instructional Designers), in addition to professional development sessions.

Library
The Library serves as the repository for academic resources. The Library will provide information regarding updated and available resources. Information gleaned from the program reviews will also aid the Library in collections and reference plan.

Institutional Research (IR)
Program Reviews rely on the use of valid data to make qualified decisions. IR therefore collects, preserves, edits, analyzes and interprets data as well as provides high quality and timely information.
Program Faculty and Staff

The participation of this group, more than any other, is germane to the success of program reviews. Program faculty and staff are involved in a variety of ways:

1. Participating in the self-reflection exercise
2. Participating in workshops, discussions and meetings
3. Developing recommendations
4. Providing feedback on the report and the impact of the review

Students

The participation of students is also significant to the success of program reviews. Students are involved by:

1. Participating in focus group sessions
2. Providing feedback on program performance
3. Making recommendations for program improvement

CONDUCTING PROGRAM REVIEW

Figure 2 illustrates the operational stages and process that will be implemented during the review process.

Figure 2: Program review process and procedure
Program review process and procedure

Pre-Planning Stage and Orientation – At this stage the Program Quality Unit will generate the program review schedule. Information will then be sent to the relevant Associate Deans, who will identify Program Review Leads. Once the Lead has been identified, the PQ Unit will schedule an orientation session to include the Associate Dean to discuss the review process, schedule any critical next steps, including agreement on timelines and deadlines and developing the program review team.

It is anticipated that during this period, the Associate Dean and or Program Review Lead will meet with program faculty and staff to discuss the overall review process.

Data Collection – Concurrent to the orientation and pre-planning stage, critical data to informing the program review will be collected. These include:

1. The program faculty course outline review and CLinking session, led by the Associate Dean and the Program Review Lead. Program Quality and the Curriculum Development Specialist will provide support.
2. Provision of pertinent data from Institutional Research
3. Competitive data is also collected and analyzed
4. Collect other readily available information, reports, minutes of meetings, student data, faculty research and reports etc.

It is further anticipated that the team will review and gather additional data where necessary.

Presentation of Data Sets by Institutional Research

Data collected by Institutional Research will be presented to the faculty. Data sets will include:

1. Competitive Program Profile (Market Demand)
2. Employment Demand
3. Student and Employer Satisfaction
4. Student Success and Retention

These data sets will be presented prior to the start of the analysis workshops, as it is anticipated that they will help set the stage for whatever proposals are made.

Consultation Workshops

Various stakeholders (industry, PAC, employers, students, graduates) for the program are invited to attend a strategic discussion session in regard to curriculum, essential skills for an entry level position, trends in the industry, graduate employment and experiential learning. It may be necessary to host a different session per stakeholder group (minimum of twelve people is recommended). For example, Session 1: employers, industry and PAC; Session 2: students and graduates. Note: In many instances, a program could convene a PAC meeting and glean
much of the information needed. Additionally, minutes of meetings (held within the last 6 – 12 months) that had discussed pertinent issues could also be reviewed.

Each Program Review Lead will plan the meetings, finalize room logistics, invite participants, make arrangements for note taking at sessions and summarizing for the final report. It is recommended that each Program Review Lead invites a facilitator who will lead the discussion and prepare a summary report.

Planning and Executing the Consultation Workshop

It is recommended that Program Review Leads consider a minimum of six (6) weeks lead time in planning and executing the consultation session. Refer to the following documents as guides for planning and executing the session.

Analysis Workshops

A major part of the program review process is the analysis of data that has been collected. The analysis will be written based on the four pillars of the program quality standards (Program Learning Outcomes, Curriculum, Delivery and Assessment). In an effort to assist faculty members complete the analysis, the Program Quality Unit and the Centre for Teaching and Learning (CTL) will be hosting a series of workshops on the program quality standards (Program Learning Outcomes, Curriculum Design, Delivery and Assessment Methodologies). During these workshops, Institutional Research, Pathways and the Library are expected to participate, sharing on pertinent information and their impact on program review. Following the analysis workshops, program faculty will validate their programs. The Program Review Lead will then complete the analysis section of the report based on the information collected. Support will be provided by relevant personnel, including Institutional Research and the Curriculum Development Specialist.

Some pertinent issues that must be considered during these sessions include:

1. The program’s alignment with the college’s strategic goals, academic plan and strategic mandate agreement (SMA).
2. The learning outcome achievements of students/graduates in relation to:
   a. by comparison with the program’s stated learning outcomes
   b. the opinions of employers, students/graduates; and
   c. the standards of any related regulatory, accrediting or professional association
3. The continuing appropriateness of the program of study course outlines, method of delivery and curriculum for its educational goals and standards.
4. The continuing adequacy of the methods used for assessing and evaluating student progress and achievement.

5. The efficient and effective utilization of existing human, physical, technological and financial resources, in addition to its ability to remain viable.

Program Review Final Report

The program review final report culminates the process and documents pertinent information about the program and recommendations for action. The structure of the final report is outlined below.

Structure of Final Report

- **Executive Summary**
  Executive summaries are written literally for an executive who most likely DOES NOT have the time to read the entire document, is usually written last and is no longer than 10% of the original document. It is recommended to not be more than two pages long. It will include highlights of the quality reviews of the program, its current status, major strengths, concerns and opportunities, as well as the recommendations.

- **Introduction**
  The introduction is written first and provides a synopsis of the program at the beginning of the program review. It does not contain any information gleaned from the review process.

- **Environmental Scan (Market demand, Competitive analysis etc.)**
  This section provides information pertinent to the program, especially as it relates to its market share, position, impact and opportunities for sustainability. It also provides a comparative analysis with other similar programs in the province. This data is largely provided by Institutional Research.

- **Current State**
  This section reports on the program as it currently exists. It documents responses/reports from the stakeholder sessions, including PAC meetings. This section also reports the current state of course outlines, mapping (CLinking); blended learning. Much of this information is a summary of the faculty self-study, reflective enquiry, reflection exercise.

- **Analysis**
  The analysis section provides a summary of the data gathered, citing strengths and areas for development. The report will be sectioned according to:

    - Program Learning Outcomes
    - Curriculum
    - Delivery
    - Assessment
Recommendations
The report will detail these, which are then captured in one section of the document.

Action Plan
Based on the recommendations made, an action plan is to be developed that will outline the enhancement plan for the program, with timelines. This serves as a tool for completing the annual reviews, in addition to identification of the supports needed.

Conclusion
The conclusion summarizes the findings of the program review. The outcomes of the document and data provided are summarized, along with program highlights and commendations. Recommendations are usually restated and any observations or non-implementable recommendations are noted.

Appendices
The appendices provide evidences of the information/documentation collected throughout the program review process. These documents are usually referenced in the main body of the report. It can be sectioned according to the documents collected. For example:

Appendix A – Program Documents
- Curriculum maps
- Essential Employability Skills maps
- Vocational Learning Outcomes maps

Appendix B – Consultation Session
- Program Advisory Committee report
- Student feedback session

It is anticipated that the final report will be reviewed by the program faculty, Program Quality Manager, and the Curriculum Development Specialist to ensure consistency and consensus of information and recommendations. It is recommended that a program team meeting be scheduled to review the report and that a meeting also be scheduled with the Program Quality Manager, Curriculum Development Specialist and Program Review Lead to discuss the final report.

Once the final report is completed, it is to be sent to the Associate Dean for initial review and approval, then onto the Dean for approval. Once approved by the Dean, it is then to be forwarded to the Program Quality Unit for forwarding to the Office of the Vice President, Academic (VPA). The Program Review Team (Dean, Associate Dean, Program Review Lead), along with the Program Quality Unit, will then schedule a meeting with the VPA to discuss the report. More specifically, the discussion will include a review of the executive summary and resources that will be needed by the program area to achieve the activities detailed in the action plan.
The External Verification Process

A new addition to the program review process is the implementation of an external verification process. The use of external verifiers is the process by which the college assures itself that the academic standards of its programs are comparable with similar programs and systems offered and implemented elsewhere and that the assessment process has been conducted fairly, in accordance with the approved standards, structure, content and regulations, and without prejudice to any student. This process will only be implemented for post-secondary programs that do not go through an external accreditation process, that already have these systems built in, with an end report that notes recommendations and actions.

The reports provided by external verifiers are an integral part of Mohawk’s quality assurance process. They form part of the documentation requirements for the Program Review and Enhancement Process (Action Plan).

More details on the verification process are to be finalized.

THE ANNUAL REVIEW PROCESS

In keeping with Policy #AS-2000-2013 (Program Quality Policy), Mohawk College is committed to academic programming excellence (Sec. 4.1). Accordingly, the college is committed to regular review, restructuring, reorganization and enhancement of the academic programming complement as an essential strategy to keep pace with demographic shifts, changing employments trends, global competition and student and employer needs (Sec. 4.6). It is in this light that every program offered at the college will undergo an annual review, thereby providing the college with a basis for the comprehensive planning process, while also assessing the status of recommendations/action plan items made during the comprehensive review process.

Procedure for conducting Annual Reviews

At the end of each comprehensive review, each program develops a set of actionable items to be completed leading up to the next scheduled reviews. Annually, programs will provide an update of the status of their program review action plans.
GLOSSARY AND LIST OF ACRONYMS

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<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AD</td>
<td>Associate Dean</td>
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<td>CDS</td>
<td>Curriculum Development Specialist</td>
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<td>CTL</td>
<td>Centre for Teaching and Learning</td>
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<td>CVS</td>
<td>Credential Validation Service</td>
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<td>EES</td>
<td>Essential Employability Skills</td>
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<td>IR</td>
<td>Institutional Research</td>
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<td>MTCU</td>
<td>Ministry of Training, Colleges and Universities</td>
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<td>OCAS</td>
<td>Ontario College Application Service</td>
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<td>OCQAS</td>
<td>Ontario College Quality Assurance Service</td>
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<td>PAC</td>
<td>Program Advisory Committee</td>
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<td>PLAR</td>
<td>Prior Learning Assessment and Recognition</td>
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<td>PLO</td>
<td>Program Learning Outcome</td>
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<td>POS</td>
<td>Program of Studies</td>
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<td>Program Quality</td>
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<td>Program Quality Assurance Process Audit</td>
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<td>SMA</td>
<td>Strategic Mandate Agreement</td>
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<td>VLO</td>
<td>Vocational Learning Outcome</td>
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<td>VPA</td>
<td>Vice President Academic</td>
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Appendix

Appendix A - Program Standards
Appendix B - Program Review Schedule 2014 – 2015
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Appendix E - Documents for Focus/Stakeholder Consultations
APPENDIX 9: SAMPLE JOB POSTINGS
Sample Job Postings

Organization: St. Joseph’s Healthcare Hamilton (SJHH)
Job Title: Clinical Coding Specialist
Department: Health Data & Information Services
Posting Number: 3094

Date: 13/03/14

POSITION SUMMARY

The Clinical Coding Specialist performs the function of coding and abstracting, as well as carrying out the department’s goals and objectives of providing & maintaining comprehensive, accurate and complete health records. The Clinical Coding Specialist is responsible for the coding and classification of all diseases and interventions for inpatient and outpatient encounters, in accordance with CIHI standards and MOHLTC requirements. Other appropriate duties may be assigned as required.

QUALIFICATIONS

- Employee must be certified with the Canadian Health Information Management Association (CHIMA), in good standing
- Expert knowledge of ICD-10-CA/CCI coding practices and policies.
- MS office suite of products including Excel, Word, Power Point and Access.
- Knowledge of computerized abstracting systems (for both DAD and NACRS), encoder and grouper. (3M preferred)
- Excellent working knowledge of CIHI Coding standards, RIW, CMG, CACS, complexity and diagnoses typing
- Strong communication skills are an asset to this position
- Prior coding experience an asset, preferably in a large teaching hospital.
- Comprehensive knowledge of pathophysiology, biomedical sciences, information sciences and technology and integration of clinical and financial information.
- Able to work in a team environment
- Consideration given to previous work record and attendance

HOURS OF WORK

- Rotating shifts - days, evenings, weekends.

***
Organization: Hamilton Health Services – Main office at 293 Wellington North  
Job Title: ICT Service Desk Team Lead  
Department: IT  
Posting Number: 49504  
Date: 19/03/14  

UNIT SUMMARY  
Information and Communication Technologies (ICT) Department is presently located at the sites of HHS with the main office located at 293 Wellington Street North. Staff are present on all sites as needed to support the 24 hour by 7 day needs of Hamilton Health Sciences.  

POSITION SUMMARY  
The ICT Service Desk Team Lead will oversee the Service Agents performing the services of the HelpDesk and ensure that clients (HHS, and other aligned organizations) are receiving the appropriate assistance in a timely fashion and to escalate incidents or problems when the situation is warranted. The ICT Service Desk Team Lead directs HelpDesk service agents and carries out responsibilities in accordance with the organization’s policies.  

QUALIFICATIONS  
1. College Diploma or University Degree in the field of Computer Science, Information Sciences, or related field and/or minimum 5 years experience of customer support and service equivalent work experience  
2. Related experience in providing the services expected of a service agent role reflecting helpdesk services  
3. Current ITIL certification  
4. Certifications in other related fields of study appropriate to this role  
5. 5 years supervisory experience in a technical help desk environment  
6. Excellent ability to diagnose PC, system, and printer issues using knowledge base or existing technical knowledge/skills  
7. Sound working knowledge of basic network concepts including, TCP/IP, DNS, LAN/WAN concepts, computers, wireless and related technology  
8. Demonstrated ability to communicate effectively, calmly, and patiently with both technical and non-technical audiences  
9. Recognized and current credentials (A+...) an asset  

Proficiency in both Official Languages, French and English, is considered an asset.  

SCHEDULE WORK HOURS  
• Days, evenings (on-call as required)  

STATUS  
• Regular Full-time  
• Hours per week: 37.5  

***
Information Support includes the following departments: Health Records and Transcription, Patient Registration, Decision Support Services, Financial Planning and Analysis. Information Support facilitates the creation of a knowledge rich environment for making timely and informed tactical and strategic decisions and maximizing value of care and services provided. It provides accurate, timely, useful information for making decisions based on evidence to help deliver appropriate patient care. Also provides the expertise in analyzing and interpreting data and presenting and educating the corporation on this information.

POSITION SUMMARY

The Health Records Technician’s responsibilities include: quantitative analysis of patient records, CIHI coding and abstracting, computerized data entry, CIHI month end submissions and balancing, correction of database problems, compilation of data on expired patients, preparation of health records for court and attending court, requests for release of information and other duties as assigned. Functions according to the job description for Health Records Technicians.

QUALIFICATIONS

1. Graduate of a recognized Health Information Management Program
2. Certified with Canadian College of Health Information Management and must be an active member.
3. Member of the Ontario Health Record Association is preferred.
4. Experience in ICD-10/CCI coding system and CMG, RIW assignment methodology.
6. Familiarity with Med 2020 software and/or Meditech
7. Has good judgment to make decisions
8. Excellent communication skills
9. Ability to work independently and under occasional interruptions

Proficiency in both Official Languages, French and English, is considered an asset.

SCHEDULE WORK HOURS

- Days

STATUS

- Regular Full-time
- Hours per week: 37.5

***
Organization: Rexall Pharma - Mississauga, ON  
Job Title: Data Integrity Supervisor  
Tracking Code: 820-029  

Date: Feb. 28, 2014  

JOB DESCRIPTION

Reporting to the Manager Merchandise Systems & Data Integrity the Data Integrity Supervisor is responsible for leading a team of Category Coordinators that support the Category Management team in listing all new items and setting up promotional proposals in merchandising systems.

REQUIRED SKILLS

• Oversees a team of Category Coordinators and ensures that they are listing items and setting up items in promotions in a timely (on schedule), accurate (no errors), and in a standard format so that the data integrity of our systems (FMS/VL) are maintained at all times and items scan correctly at store level
• Provides coaching and mentoring of team members to ensure they are working in an efficient, effective and consistent manner. Identifies, prioritizes and distributes work across the team to ensure departmental priorities are achieved
• Conducts performance reviews with team members and manages performance related issues
• Monitors reporting to ensure accuracy and timely information is given to all stores in order for all products to scan correctly in our stores
• Establishes and monitors workflow throughout the group to ensure all teams (Category Managers) are serviced in a timely manner
• Establishes and monitors SLA’s (Service Level Agreements) between various groups
• Reports on SLA’s and develops action plans to ensure SLA’s are met and improved upon
• Assists the Category Coordinators with the resolution of store issues (i.e., items not scanning, etc.) in a timely fashion and in accordance with established policies
• Support the Merchandise group with solutions to any systems problem that may arise. This includes determining if it is the system or the process that needs attention and applying the necessary information or changes to resolve the issue
• Understand Merchandise systems and recommend process or business improvements. Act with IT group to ensure systems enhancements are developed as required by the merchandise group needs
• Involve and solicit from Category Management and other Senior Merchandise Managers to ensure that the merchandise systems developed and implemented in Merchandise Group met the needs of the users
• Leads process improvement initiatives within Merchandise Services and once delivered, develops Standard Operating Procedures to ensure that the improvements are sustained
• Prepares and modifies SOP’s as required and ensures that they are followed by all team members

REQUIRED EXPERIENCE

• 2-3 years College Diploma in a related discipline required; University Degree preferred
• 3-5 years experience working with a Retail Management Systems (RMS) – particularly in managing data as it relates to Item and Promotions
• Strong background in working with Retail Management systems (PMM or JDA preferable)
• 2-3 years experience in a people management/supervisory role
• Excellent time management and prioritization skills
• Excellent verbal and written communication skills
• Excellent organizational, financial and analytic skills
• Advanced Microsoft Office skills, including Power Point
• Must possess the right balance between being creative and paying attention to detail
• Ability to work a fast paced and changing environment
• Knowledge of related regulations
• Demonstrated presentation and negotiation skills.

POSITION TYPE

• Full-Time/Regular

***
Organization: Plan Canada - Toronto  
Job Title: Data Integrity Supervisor  
Tracking Code: 820-029  
Department: Information Management  

Date: March 7, 2014  

ROLES AND RESPONSIBILITIES  
As a member of the Information Management Team, you will be required to work in a fast-paced team environment; you will provide data integrity, consistency and overall data quality for Plan Canada’s donor database. This position requires a keen eye for detail, a comprehensive understanding of data integrity as well as an energetic team player who will collaborate with other team members across the organization to train new users and assist with ongoing training design and delivery.

- Review and analyze daily reports to determine record hygiene and quality according to Plan Canada’s database protocols  
- Identify duplicate donor records and recommend modifications to set criteria for capturing potential duplicates  
- Perform merge function ensuring most appropriate record is preserved, ensuring all relevant data is transferred accurately  
- Conduct regular data audits and update to ensure data consistency; including assessment of database dropdown values and mandatory fields  
- Proactively correct general data errors and ensure users understand and comply with data standards  
- Revise and edit donor records to accurately reflect current information and/or update according to Plan Canada standardization  
- Identify, investigate and link appropriate records to track relationships  
- Assist with the creation, export and subsequent import of back feed files that support various communication, and solicitation activities  
- Execute global changes to data files where appropriate  
- Document changes on a per record basis as well as maintain overall documentation for standards and procedures  
- Develop and deliver training to support the effectiveness of the donor database  
- and provide ongoing feedback and guidance to internal teams  

SKILLS/ EXPERIENCE/ QUALIFICATIONS  
- 1-2 years’ experience with information management systems, data, and query tools  
- Analytical and focused with attention to details  
- Strong data manipulation abilities using macros and pivot tables, and Access  
- Ability to learn and apply new technologies  
- Strong organizational skills, ability to prioritize and deadline oriented  
- Excellent interpersonal, communication (verbal and written) and training skills  
- Excellent computer skills, including Microsoft Office suite (Excel, Word, PowerPoint)  
- Ability to work within a team as well as independently  
- Experience with Raiser’s Edge is considered an asset  
- Experience with VB.net and TSQL is considered an asset  

REPORTS TO:  
- Director, Information Management  

***
Organization: SickKids - Toronto
Job Title: Project Analyst
Job ID: 2759
Department: Research Operations
Date Posted: 2014-03-21

POSITION DESCRIPTION

Working at The Hospital for Sick Children’s Research Institute is not just a job - it’s a career. The staff are our greatest strength as they form our vision, carry out our mission and represent our values. The Research Information Technology department provides an opportunity to work in a challenging and rewarding environment, utilizing cutting edge technology to support ground-breaking research that is recognized world-wide.

Working as a member of the Research IT Clinical Research Data Management (CRDM) team, the Project Analyst is responsible for assisting in the day-to-day management of the assigned projects to ensure software development and IT implementation activities are progressing as planned, and are meeting the documented requirements. The role will interface with Research IT clients and end users of custom software applications to ensure their issues are triaged or escalated appropriately. As time allows, the role will also provide support for REDCap drop-ins, workshops, training sessions and the online forum.

HERE’S WHAT YOU’LL GET TO DO

Given the dynamic nature of medical research, responsibilities will evolve as needed and will include:

- Coordinate the work of the members of the CRDM team.
- Maintain timely communications with all CRDM team members.
- Communicate project progress via Project Status Reports and weekly team meetings.
- Prepare agendas and minutes for designated meetings under the direction of the Project Manager(s).
- Record and monitor project issues, from discovery through to resolution.
- Using internal standards and procedures for project reporting and documentation.
- Maintain project documentation as assigned.
- Support and conduct REDCap end user training sessions through workshops, drop-ins, and online forums.
- Assist with requirements gathering activities.

HERE’S WHAT YOU’LL NEED

- Bachelor’s degree in Technology Management or related field, or equivalent work experience.
- Understanding of the software development life-cycle.
- Familiarity with REDCap is an asset.
- Familiarity with project management methodologies (ie. PMBOK) is an asset.
- Ability to work independently and in a team environment.
- Well developed analytical, problem-solving and organizational skills.
- Strong written and oral communications skills are essential.
- Strong attention to detail.
- Experience with using Microsoft Office products such as Word, Excel, Visio, Project and PowerPoint.
- Experience working in an academic or healthcare environment is an asset.

EMPLOYMENT TYPE

- Permanent, Full-time

***
Mohawk / McMaster University

BACHELOR OF TECHNOLOGY (COMPUTER AND INFORMATION TECHNOLOGY)

Program Code: N/A

Length of Program: A flexible weekend and evening schedule allows students to also work full time

Credential Awarded: University Degree and Ontario College Advanced Diploma

Co-op/ Clinics/ Field Placements
- Mandatory co-op
- Three work terms

Admission Requirements

Ontario Secondary School Diploma (OSSD), or equivalent, OR mature student:
- Advanced Functions U
- Chemistry U
- English U
- Physics U

2 U or M courses of your choice

Program Description

The B.Tech. program combines both technological and management studies so graduates are able to function in various levels – from shop floor technological situations to liaising with senior levels of management. The combination of technology and management courses, along with mandatory co-op experience, helps students learn how to make technology and management decisions in a business context. Students who successfully complete the program will receive a BTech degree from McMaster and an advanced college diploma from Mohawk with a specialty in Biotechnology.

Learn about the design, development, and deployment of computing systems in the software products and computing infrastructure areas from both technical and managerial points of view.

Seventeen core technical topics include mathematics, software design and testing, database management, networking, security, computer architecture, and advanced programming concepts such as parallel software architectures and real-time systems. Seven management courses complement your studies.

Program Content

Similarities between the BTech program and Mohawk’s proposed program exist in core areas of programming fundamentals, operating systems fundamentals and data structures, but there is no industry sector focus in the BTech program. Specific health-focused courses at Mohawk include Digital Health Fundamentals & the Canadian Healthcare System; Modelling and Gamification for Health; Physiology, Pathology & Medical Coding; and Digital Health Architectures, Standards & Interoperability.

Career Opportunities

BTech graduates are candidates for engineering, project management, and supervisory roles that require a technical background. They create and manage computing systems to support a wide range of industries such as telecommunications, manufacturing, e-commerce, finance and healthcare.

Graduates of the proposed program will be uniquely trained to enter the health field and have careers as Clinical Analyst, Data Integrity Analyst, Project Manager or IT Consultant.
### Algonquin College / Carleton University

#### BACHELOR OF INFORMATION TECHNOLOGY NETWORK TECHNOLOGY

<table>
<thead>
<tr>
<th><strong>Program Code:</strong></th>
<th>N/A</th>
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<tbody>
<tr>
<td><strong>Length of Program:</strong></td>
<td>4 years, full time day</td>
</tr>
<tr>
<td><strong>Credential Awarded:</strong></td>
<td>University Degree and Ontario College Advanced Diploma, CCNA (Cisco Certified Network Associate) and CCNP (Cisco Certified Network Professional) certifications</td>
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</tbody>
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#### Co-op/ Clinics/ Field Placements
- Optional co-op
- Entrance requirement is 70% and a CGPA of 8.0 (B) to continue on the Coop program; or you can register for co-op after you have started in your respective program

#### Admission Requirements

**Ontario Secondary School Diploma (OSSD), or equivalent, OR mature student:**
- a minimum of six 4U or 4M courses including 1 math credit at the 4U level
- equivalent courses may be substituted between the OAC and new curriculum courses
  * Calculus and Vectors and Physics recommended

#### Program Description

Information networks will continue to grow at a fast pace and will play an essential role in tomorrow’s society. Expansion of these networks and the evolution of the technology supporting them will require a new breed of professionals with considerable knowledge skills and hands-on training. The four-year NET program focuses on the design, management, operation and installation of future complex information networks such as those that make up the Internet and cell phone networks. The program is multidisciplinary in nature, combining courses in computer and network technology with courses in physics, mathematics, business, communications and arts and social sciences.

In this program, you will not only explore theories and concepts but also learn about their practical application. You will learn to design, manage, secure, operate, install and configure advanced IT networks.

The NET program has a partnership with the Cisco Networking Academy program, whereby students are trained to successfully write the Cisco Certified Network Associate (CCNA) and Professional (CCNP) certification exams. NET students will be able to earn industry-recognized certification, which is in high demand in the job market.

#### Program Content

There are similarities in fundamental areas where courses include mathematics, physics, statistics and programming but the focus of study diverges in later years. Carleton/Algonquin program focuses on the design, installation, operation and management of future complex information networks offering specialized courses such as Wireless Networks, Advanced Network Switching, Emerging Network Technologies and a Network project. Mohawk’s focus on applied computer science in a health context includes specialized courses in Digital Health Fundamentals & the Canadian Health System, Digital Health Architectures, Standards & Interoperability and Cloud, Distributed and Service Computing

#### Career Opportunities

Graduates of the Algonquin/Carleton program will be qualified to work in the broad ICT field as a Network Administrator, Network Designer, Network Architect and related positions; graduates of the proposed program will be trained to enter the health field and have careers as Clinical Analyst, Data Integrity Analyst, Project Manager or IT Consultant.
# Centennial College

## HEALTH INFORMATICS TECHNOLOGY

**Program Code:** 3508  
**Length of Program:** 3 yrs (6 sems)  
**Credential Awarded:** Ontario College Advanced Diploma

## HEALTH INFORMATICS TECHNOLOGY (CO-OP)

**Program Code:** 3518  
**Length of Program:** 3 yrs (9 sems)  
**Credential Awarded:** Ontario College Advanced Diploma

## HEALTH INFORMATICS TECHNOLOGY (FAST TRACK)

**Program Code:** 3528  
**Length of Program:** 2 yrs (4 sems)  
**Credential Awarded:** Ontario College Advanced Diploma

## HEALTH INFORMATICS TECHNOLOGY (FAST TRACK, CO-OP)

**Program Code:** 3538  
**Length of Program:** 2 yrs (6 sems)  
**Credential Awarded:** Ontario College Advanced Diploma

### Co-op/ Clinics/ Field Placements
- Three work terms for students in the co-op stream

### Admission Requirements

Ontario Secondary School Diploma (OSSD), or equivalent, or mature student:
- English Grade 12 C or U, or equivalent (minimum grade required) or take the Centennial College English Skills Assessment for Admission (score of 170 or 171 is required for admission)
- Mathematics Grade 11 M or U, or Grade 12 C or U, or equivalent or take a Centennial College Engineering Math Skills Assessment for Admission

### Program Description

Health Informatics Technology will incorporate knowledge of both information technology and healthcare systems. The coursework will emphasize object-oriented software design methodologies, user-oriented interface design, structure of healthcare information systems, telehealth, data security and privacy in healthcare systems. It will also focus on technologies such as C#, Java, J2EE, Oracle, MS-SQL Server, Unix/Linux, Microsoft’s .NET, HTML/XHTML, Java and WebSphere, Data warehousing and Data mining, and BI tools in healthcare systems and more.

To underscore the applied focus of the curriculum, the program will include two software development projects in the field of health informatics. These real world business applications will require you to utilize all the technical, systems and business skills gained during your studies.

The Health Informatics Technology program is a fully CIPS/CTAB accredited program. The skills acquired by the graduates will enable them to design, develop, modify, and test software for healthcare applications. As a graduate from this program, you will be able to analyze and model data, develop healthcare databases and apply different computer medical-imaging techniques. You will also use tools, algorithms and health informatics methods for hospitals, schools, healthcare agencies and public health departments.

### Program Content

Similarities between the two programs exist where core courses cover programming, network fundamentals, user interface design, and telehealth; however, the Centennial program is a three-year program with less depth than the Mohawk program. Specialized courses at Mohawk not offered at Centennial will introduce students to the Canadian healthcare system and cover topics such as: Digital Health Fundamentals and the Canadian Healthcare System, Client and Patient Care Devices and Decision Support Systems, Epidemiology and Healthcare Statistics, Privacy and Security in Digital Health, and Health Administration.

### Career Opportunities

Graduates of the Centennial program will not be eligible for positions requiring a university degree; they may pursue careers as a Software Developer, Database Developer, Business Analyst, or Health Data Analyst. Mohawk graduates may pursue careers as a Clinical Analyst, Data Integrity Analyst, Project Manager, Software Developer or IT Consultant.
Conestoga College

BACHELOR OF APPLIED HEALTH INFORMATION SCIENCE

Program Code: 1131C
Length of Program: 4 years, full time
Credential Awarded: University Degree

Co-op/ Clinics/ Field Placements
- Mandatory co-op
- Two work terms (semesters 7 and 8)

Admission Requirements
Ontario Secondary School Diploma (OSSD), or equivalent, OR mature student:
- a minimum of six (6) Grade 12 courses with a minimum cumulative average of 65% including:
  - English (ENG4U)
  - One Grade 12 Mathematics course with a minimum average of 70% (MHF4U) OR (MCV4U) OR (MDM4U)
  - Grade 12 Biology with a minimum average of 70% (SBI4U)
  - Three (3) other Grade 12 U or M courses

Program Description
The health industry is continually challenging us with new issues and problems: how can we make waiting times in emergency rooms shorter? How can a patient in an isolated community get the same expert care as a patient in a state-of-the-art, major-city hospital? How can a patient's records, currently kept with a family doctor, be available to a hospital half way around the world because of a medical emergency abroad?

Our Applied Health Information Science degree program provides students with the knowledge and skills in health informatics and information management to enable them to make a difference in healthcare.

As health informaticians, graduates contribute to the quality of care that people receive by providing essential information to both individuals receiving care and services and to healthcare professionals. They also help ensure the best use of healthcare resources by facilitating the tracking of healthcare services and the evaluation of better ways to provide service. They can also contribute to improving the usefulness of new e-health software within healthcare organizations and by software vendors.

Program Content
The focus of both programs is applying information technology knowledge and skills in the health sector. Both offer core courses that cover programming, the Canadian Healthcare System, Clinical Systems and Security & Privacy in healthcare. Specialized courses in Conestoga's program develop soft skills such as Group Dynamics, User Training and Adult Education, and health-related topics such as Biomedical Concepts (3 courses compared to 1 in Mohawk's program) and Healthcare Quality Improvement. The Mohawk program provides more depth in the areas of software development, networking and devices, and IT for healthcare, including the following courses: Network Fundamentals, Social Computing and Social Media Platforms, Modelling and Gamification for Health, Mobile Development, Digital Health Architectures, Standards & Interoperability, Telehealth and Telemedicine, and Cloud, Distributed and Service Computing. The final differentiator is the inclusion in Mohawk's program of capstone proposal and project courses, introducing applied research.

Career Opportunities
Graduates of both programs will be trained to enter the health field and have careers as a Clinical Analyst, Data Integrity Analyst, Project Managers, Software Developer or IT Consultant.
Seneca College

BACHELOR OF TECHNOLOGY (SOFTWARE DEVELOPMENT)

Program Code: BSD
Length of Program: 4 years, full time
Credential Awarded: University Degree

Co-op/ Clinics/ Field Placements
- Mandatory co-op.
- Two work terms (after semesters 6 and 7)

Admission Requirements

Ontario Secondary School Diploma (OSSD), or equivalent, OR mature student:
- six Grade 12 (U) or (M) courses with a minimum 65% average including:
  - Grade 12 English ENG4U
  - any grade 12 U level Mathematics

Mature students (age 19 years or older) must submit proof of credits in the above courses or their equivalent. It is recommended that the other (U) or (M) credits include one course in Business and one course in Computer Studies.

Program Description

The Software Development degree curriculum includes an extensive exploration of software languages, operating systems, web applications, multimedia interfaces, information security, databases and system analysis, and design principles. You also learn communication skills and sharpen your business acumen to help you succeed in today's complex workplaces.

The program educates you as a software developer, but it also trains you to be a well-rounded professional with both the technical and non-technical skills critical to success in the business environment.

Program Content

Similarities between the Seneca program and Mohawk's proposed program exist in core areas of operating systems fundamentals, programming fundamentals and user interface and experience, but there is no industry sector focus in Seneca's program. Specific health-focused courses at Mohawk include Digital Health Fundamentals & the Canadian Healthcare System; Modelling and Gamification for Health; Physiology, Pathology & Medical Coding; and Digital Health Architectures, Standards & Interoperability.

Career Opportunities

Graduates of the Bachelor of Technology (Software Development) program at Seneca may choose careers in a variety of general IT positions while Mohawk's graduates will be uniquely qualified to deliver IT services in Canadian healthcare settings.
BACHELOR OF APPLIED INFORMATION SCIENCES (INFORMATION SYSTEMS SECURITY)

Program Code: PBAIS

Length of Program: 4 years, full time

Credential Awarded: University Degree

Co-op/ Clinics/ Field Placements

- Mandatory internship
- One 28 week paid internship after semester 6

Admission Requirements

Ontario Secondary School Diploma (OSSD), or equivalent, OR mature student:

- English, Grade 12 (ENG4U)
- any Grade 12 science (U or M) or Grade 12 Computer Science (U) or Grade 12 Computer Engineering Technology (U or M)
- any Grade 12 mathematics (U)
- three other Grade 12 credits (U or M)
- minimum 65% overall average
- OR two semesters of postsecondary education including required courses with a minimum 65% overall average

Program Description

The explosion of Internet traffic has created enormous demand for information systems security professionals. In this program, you’ll advance from fundamental computer science principles to more specialized courses covering all aspects of information systems security, including:

- Network security
- Database security
- Data forensics
- E-Commerce applications and Internet security
- Data protection
- Applied cryptology
- Malicious code analysis
- Secure programming
- Security auditing
- Legal and ethical issues in IS security related professions

The Sheridan Bachelor of Applied Information Sciences (BAISc) program provides outstanding preparation for a rewarding career in this rapidly growing field.

Program Content

Similarities between Sheridan’s Bachelor of Applied Information Sciences (Information Systems Security) program and Mohawk’s proposed program exist in core areas of operating systems fundamentals, statistics and data security fundamentals but the focus of study diverges. Specialized courses in the Sheridan program include Security Threats & Risk Assessment; Information Systems Forensics & Investigation; and Malicious Code: Design & Defence whereas specific health-focused courses at Mohawk include Digital Health Fundamentals & the Canadian Healthcare System; Modelling and Gamification for Health; Physiology, Pathology & Medical Coding; and Digital Health Architectures, Standards & Interoperability.

Career Opportunities

The intent of the Mohawk program is to qualify graduates for careers in IT in a healthcare context while Sheridan graduates will be more suited to work on the issue of data security in various contexts.
Sheridan College

BACHELOR OF APPLIED COMPUTER SCIENCE (MOBILE COMPUTING)

Program Code: PBACS
Length of Program: 4 years, full time
Credential Awarded: University Degree

Co-op/ Clinics/ Field Placements
• Manditory internships: two semesters of internship after semester 5; one semester of internship after semester 7

Admission Requirements
Ontario Secondary School Diploma (OSSD), or equivalent, OR mature student:
• English, Grade 12 (ENG4U)
• any grade 12 science (U or M), or Grade 12 Computer and Information Science (ICS4M) or Grade 12 Computer Engineering (ICE4M); and
• any grade 12 mathematics (U);
• three other Grade 12 subjects (U or M); and
• minimum 65% overall average.
• OR two semesters of postsecondary education including required courses with a minimum 65% overall average.

Program Description
Health Informatics Technology will incorporate knowledge of both information technology and healthcare systems. The coursework will emphasize object-oriented software design methodologies, user-oriented interface design, structure of healthcare information systems, telehealth, data security and privacy in healthcare systems. It will also focus on technologies such as C#, Java, J2EE, Oracle, MS-SQL Server, Unix/Linux, Microsoft’s .NET, HTML/XML, Rational/WebSphere, Data warehousing and Data mining, and BI tools in healthcare systems and more.

To underscore the applied focus of the curriculum, the program will include two software development projects in the field of health informatics. These real world business applications will require you to utilize all the technical, systems and business skills gained during your studies.

The Health Informatics Technology program is a fully CIPS/CTAB accredited program. The skills acquired by the graduates will enable them to design, develop, modify, and test software for healthcare applications. As a graduate from this program, you will be able to analyze and model data, develop healthcare databases and apply different computer medical-imaging techniques. You will also use tools, algorithms and health informatics methods for hospitals, schools, healthcare agencies and public health departments.

Program Content
Similarities between the two programs exist where core courses cover programming, network fundamentals, user interface design, and telehealth; however, the Centennial program is a three-year program with less depth than the Mohawk program. Specialized courses at Mohawk not offered at Centennial will introduce students to the Canadian healthcare system and cover topics such as: Digital Health Fundamentals and the Canadian Healthcare System, Client and Patient Care Devices and Decision Support Systems, Epidemiology and Health Care Statistics, Privacy and Security in Digital Health, and Health Administration.

Career Opportunities
Graduates of the Centennial program will not be eligible for positions requiring a university degree; they may pursue careers as a Software Developer, Database Developer, Business Analyst, or Health Data Analyst. Mohawk graduates may pursue careers as a Clinical Analyst, Data Integrity Analyst, Project Manager, Software Developer or IT Consultant.
BACHELOR OF COMPUTER SCIENCE (BIOINFORMATICS)

Program Code: BSD
Length of Program: 4 years, full time
Credential Awarded: University Degree

Co-op/ Clinics/ Field Placements
- Optional co-op
- Although Bioinformatics is offered in both co-op and regular, it is intended primarily for co-op students.

Admission Requirements
Ontario Secondary School Diploma (OSSD), or equivalent, OR mature student:
  - six grade 12 U &/or M courses including:
    - Advanced Functions
    - Calculus and Vectors
    - Chemistry
    - any English U
    - Physics or Biology
  - Recommended course: Grade 11 computer science
The minimum average required for admission is expected to be 78 - 80%

Program Description
A cross between biology and computing, bioinformatics is helping to revolutionize how scientific research is conducted. Bioinformatics applies the power of computer science to explore the wealth of complex biological data collected by scientists. This information can be used to solve important biological problems, and to search for novel therapies for diseases.
You’ll take courses in math and computer sciences, along with classes in biochemistry, biology, and chemistry. The knowledge you’ll gain can be applied in many exciting areas, such as the Human Genome Project, which uses bioinformatics to yield data on 3 billion DNA sequences.

Program Content
While there are program content similarities in the areas of mathematics and programming fundamentals, the focus of study diverges. Specialized courses in Waterloo’s program include Introductory Cell Biology; Physical & Chemical Properties of Matters; and Genetics. Specialized courses in the proposed Mohawk program include Digital Health Fundamentals & the Canadian Health System, Digital Health Architectures, Standards & Interoperability and Cloud, Distributed and Service Computing.

Career Opportunities
Graduates from Waterloo’s program may find positions such as Software Engineer, Quality Assurance Officer, and Research Scientist; graduates of the proposed program will be trained for positions such as Clinical Analyst, Data Integrity Analyst, Privacy Specialist, or Project Manager.
# University of Guelph

## BACHELOR OF COMPUTING (SOFTWARE ENGINEERING)

- **Program Code:** PBAIS
- **Length of Program:** 4 years, full time
- **Credential Awarded:** University Degree

### Co-op/ Clinics/ Field Placements
- Optional co-op
- Minimum four work terms in the co-op stream

### Admission Requirements

Ontario Secondary School Diploma (OSSD), or equivalent, OR mature student:
- ENG 4U
- MCV 4U
- 4 additional 4U or 4M courses

Computing and data management courses are recommended.

### Program Description

Providing a foundation in computer science concepts, this program includes hardware, theory and applied software development.

This major will focus on development and design, as well as professional standards. Students’ soft skills such as communication and teamwork skills will be advanced and strengthened. You will have a unique opportunity to study courses on different aspects of software engineering including design methods, professional communications and large software engineering projects.

### Program Content

Similarities between Guelph’s program and Mohawk’s proposed program exist in core areas of programming fundamentals, operating systems fundamentals and data structures, but there is no industry sector focus in the University of Guelph’s program. Specific health-focused courses at Mohawk include Digital Health Fundamentals & the Canadian Healthcare System; Modelling and Gamification for Health; Physiology, Pathology & Medical Coding; and Digital Health Architectures, Standards & Interoperability.

### Career Opportunities

Graduates of the Bachelor of Computing (Software Engineering) program at Guelph may choose positions such as Game Programmer, Systems Analyst, or E-Commerce Specialist while Mohawk’s graduates will be uniquely qualified for positions in Canadian healthcare settings.
York University

BACHELOR OF ARTS (SCHOOL OF INFORMATION TECHNOLOGY) – HEALTH INDUSTRY

Program Code: BSD
Length of Program: 4 years, full time
Credential Awarded: University Degree

Co-op/ Clinics/ Field Placements
- Optional co-op for Honours ITEC programs
- Up to 16-months work placement for students who have completed nine credits and have a B average or better in all ITEC courses

Admission Requirements
Ontario Secondary School Diploma (OSSD), or equivalent, OR mature student:
- any 4U math or equivalent taken in the last five years

Program Description
Information technology deals with information and its use in organizations and society. York’s Information Technology (ITEC) programs provide you with the educational background to pursue an exciting career in the application of computers to a variety of tasks faced by organizations today.

York’s ITEC graduates are knowledgeable about a range of aspects of information management and related fields. This includes not only an understanding of information technology, but also a broad understanding of the impacts of information technology on society, the organization and individuals. Through courses in data structures, database systems, user interfaces and information technologies, you will learn about information management systems and how to achieve organizational objectives that relate to technology without the traditional emphasis on software development. You will also take courses outside of ITEC specifically designed to develop analytical and communication skills, skills which are central to the program.

Program Content
No course information available on website.

Career Opportunities
Graduates of the York program may find work as IT project managers and consultants, application developers, systems analysts and designers while Mohawk’s graduates will be qualified to deliver IT services in Canadian healthcare settings.
University of Western Ontario (Western University)

BACHELOR OF ENGINEERING SCIENCE (SOFTWARE ENGINEERING - HEALTH INFORMATICS OPTION)

Program Code: BSD
Length of Program: 4 years, full time
Credential Awarded: University Degree

Co-op/ Clinics/ Field Placements

• Optional 12-16 month internship prior to the last year of the program or Summer Engineering Co-Op (SECOP), a 4-month summer co-op work experience

Admission Requirements

Ontario Secondary School Diploma (OSSD), or equivalent, OR mature student:
• six grade 12 U &/or M courses including:
  • English ENG4U
  • Advanced Functions MHF4U
  • Calculus and Vectors MCV4U
  • Chemistry SCH4U
  • Physics SPH4U
  • One additional 4U or 4M course from any discipline

Students entering the Software Engineering program must have completed the common first year curriculum of Engineering with at least 60% YWA and passing grades in Applied Mathematics 1411A/B, Applied Mathematics 1413, the former Physics 1026 and Engineering Science 1036A/B or Computer Science 1026A/B or the former Computer Science 036a/b.

Students in the Software Engineering program who have completed the third year may enrol in the Health Informatics option.

Program Description

Students in the Health Informatics option complete the same first three years as all students in the Software Engineering program. Software Engineering is one of nine core engineering programs at Western.

Students are trained for the specification, design, implementation, and maintenance of software systems. Western’s Software Engineering program has a core of disciplines that covers all phases of the software cycle. This program offers a solid foundation in computer hardware and computer networks, while exploring the essentials of computer science. In fourth year, students have the opportunity to complete a Health Informatics Option.

Western’s Software Engineering program has a core of disciplines that covers all phases of the software life cycle. Our program offers a solid foundation in computer hardware and computer networks, while exploring the essentials of computer science. Teamwork and entrepreneurship are emphasized in our program with laboratories equipped with the latest technologies and products used by software engineers in industry.

Program Content:

There are program content similarities in terms of programming fundamentals, mathematics and software design, but the first year and final years vary significantly. The first year at Western is common in all engineering disciplines, where courses include Properties of Materials, Chemistry and Physics. At Mohawk, the proposed program focuses on software from Year 1. Specialized courses in both programs explore security in digital health and software quality assurance but Western’s program does not offer full courses in the following areas: the Canadian Health System; Digital Imaging for Health; Physiology, Pathology, and Medical Terminology; Patient Safety and Risk Management; and Telehealth, Virtual Hospitals, and Remote Patient Monitoring; and Digital Health Architectures, Standards & Interoperability.

Career opportunities

Graduates from both programs may work in positions involving the design and implementation of health information systems (e.g., establishing electronic patient records, or establishing ‘best practices’ databases) in various health care settings.
APPENDIX 15: MOHAWK COLLEGE STRATEGIC MANDATE AGREEMENT
Strategic Mandate Agreement

(2014-17)

Between:

The Ministry of Training, Colleges and Universities

&

The Mohawk College of Applied Arts and Technology
ONTARIO’S VISION FOR POSTSECONDARY EDUCATION

Ontario’s colleges and universities will drive creativity, innovation, knowledge, and community engagement through teaching and research. They will put students first by providing the best possible learning experience for all qualified learners in an affordable and financially sustainable way, ensuring high quality and globally competitive outcomes for students and Ontario’s creative economy.

MOHAWK COLLEGE VISION/MANDATE

Vision
Prosperous communities and transformed lives.

Mission
Creating new realities by opening endless opportunities.

PREAMBLE

This Strategic Mandate Agreement between the Ministry of Training, Colleges and Universities (the Ministry) and The Mohawk College of Applied Arts and Technology (the College) outlines the role the College currently performs in the postsecondary education system and how it will build on its current strengths to achieve its vision and help drive system-wide objectives articulated by the Ministry’s Differentiation Policy Framework.

The Strategic Mandate Agreement (SMA):

• Identifies the College’s existing institutional strengths;
• Supports the current vision, mission, and mandate of the College within the context of the Ontario Colleges of Applied Arts and Technology Act, 2002, and outlines how the College’s priorities align with Ontario’s vision and Differentiation Policy Framework; and
• Informs Ministry decision making through greater alignment of Ministry policies and processes to further support and guide the College’s areas of strength.

The term of the SMA is from April 1, 2014, to March 31, 2017. The SMA proposal submitted by the College to the Ministry has been used to inform the SMA and is appended to the agreement.

The agreement may be amended in the event of substantive policy or program changes that would significantly affect commitments made in the SMA. Any such amendment would be mutually agreed to in writing, dated, and signed by both signatories. The Ministry acknowledges that the College is in the process of appointing a new President.
MOHAWK COLLEGE KEY AREAS OF DIFFERENTIATION

The College differentiates itself as a specialized institute of health and technology serving the Western Golden Horseshoe by leveraging its traditional strengths in the areas of health and technology, and in the provision of apprenticeship, certificate, diploma, and degree programs, as well as having recognized strength in applied research.

The College is a business partner aligned with Hamilton’s economic development strategy and provides internationally recognized, hands-on applied research, notably in health and technology, to solve challenges and power businesses’ success.

The College provides a comprehensive range of programs to transform its students and community through enhanced access to postsecondary education, and proven success in skilled trades and apprenticeship programming.

ALIGNMENT WITH THE DIFFERENTIATION POLICY FRAMEWORK

The following outlines areas of strength agreed upon by the College and the Ministry, and the alignment of these areas of strength with the Ministry’s Differentiation Policy Framework.

1. JOBS, INNOVATION, AND ECONOMIC DEVELOPMENT

This component highlights institutions’ collaborative work with employers, community partners, and regions, or at a global level, to establish their role in fostering social and economic development, and serving the needs of the economy and labour market.

1.1 Areas of Institutional Strength

The College focuses on jobs, innovation, and economic development in the areas of:

- The Centre for applied research and innovation, iDeaWorks, supports regional entrepreneurial collaboration and commercialization of projects with small and medium enterprises (SMEs), with a focus on:
  - Electronic health records and management
  - Advanced materials research
  - Smart grid energy technology

- Examples of strengths in applied research include:
  - Natural Sciences and Engineering Research Council of Canada (NSERC) funding for three research projects.
  - A Research Chair in energy research.
  - Two Federal Economic Development Agency (FedDev) awards to assist SMEs
– Establishing the Mohawk mHealth and eHealth Development and Innovation Centre (MEDIC).
– Partnering with employers such as Hydro One, Siemens, and ArcelorMittal Dofasco.

1.2 Additional Comments

• 2012-13 Ministry data notes that employment rates were 83.4% (above the sector average of 83.1%), employment rates in a related field were 48.5% (above the sector average of 45.1%), and employer satisfaction levels were 93.8% (above the sector average of 93.2%).

Institutional Strategies

The College plans to renew its Engineering Technology facilities, which will provide new partnership opportunities with businesses, and engage students and faculty in the use of labs and technology for research and teaching.

1.3 Metrics

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<tbody>
<tr>
<td>• Number of students employed in co-op</td>
<td>• Graduate employment rates</td>
</tr>
<tr>
<td>• Amount of research income per annum</td>
<td>• Employer satisfaction rates</td>
</tr>
<tr>
<td>• Number of registrants in postsecondary education from priority designated areas</td>
<td>• Number of graduates employed full-time in a related job</td>
</tr>
</tbody>
</table>

2. TEACHING AND LEARNING

This component captures institutional strengths in program delivery methods that expand learning options for students, and improve their learning experience and career preparedness. This may include, but is not limited to, experiential learning, online learning, entrepreneurial learning, work integrated learning, and international exchange opportunities.

\(^1\) Additional system-wide metrics focused on applied research, commercialization, entrepreneurial activity, and community impact will be developed in consultation with the sector.
2.1 Areas of Institutional Strength

The College offers programs through a number of delivery methods, including:

- A new Academic Plan, released in 2012, has five strategies using technology as a foundation.
- The College now delivers all postsecondary programs in a blended learning format.
- The College has a strong focus on delivering skilled trades and apprenticeship programming.

2.2 Additional Comments

- According to Ministry data, the College reported a very high number of e-learning activities in 2012-13 (41 e-learning programs, 1,337 e-learning courses, and 9,232 registrations).
- In 2012-13, the College’s graduation rate was 62.1%, which is below the provincial average of 64.8%, and the retention rate from first to second year was 72.3%.

Institutional Strategies

- The College has targeted strategies to improve student outcomes, including expanded supports to serve its diverse student population. For example, the college is renewing its Assessments for Success support tools to focus on student engagement, progress and retention. In addition, faculty are being trained in a consistent approach to class orientation sessions to enhance the student experience.

- Additional proposed activities include expanding “School within a College” programs, the creation of stackable programs, customized credentials, more part-time programs, and options for students to set their own pace of learning.

- Building on its work to expand the use of e-portfolios, the College is in the process of establishing a “Graduate Profile” to reflect the learning outcomes and skills of its students. E-portfolios are one way students can demonstrate the acquisition of course, program, and institutional outcomes.

- The College has developed five defined institutional learning outcomes (Communicator, Collaborator, Critical Thinker, Continuous Learner, Responsible Citizen) – a first in the system.

- The College plans to continue to expand its online learning activities through participation in the Ontario Online Institute, as well as maintaining a leadership position in OntarioLearn.
2.3 Metrics

<table>
<thead>
<tr>
<th>Institutional Metrics</th>
<th>System-Wide Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Essential elements of blended learning in every lecture course</td>
<td>• Student Satisfaction Survey results</td>
</tr>
<tr>
<td>• Percentage of students graduating with Institutional Learning Outcomes</td>
<td>• Graduation rates</td>
</tr>
<tr>
<td>• Percentage of students graduating with e-portfolios</td>
<td>• Retention rates</td>
</tr>
</tbody>
</table>

3. STUDENT POPULATION

This component recognizes the unique institutional missions that improve access, retention, and success for underrepresented groups (Aboriginal, first generation, students with disabilities) and francophones. This component also highlights other important student groups that institutions serve that link to their institutional strength. This may include, but is not limited to, international students, mature students, or indirect entrants.

3.1 Areas of Institutional Strength

The College focuses on improving access and success for underrepresented groups in the areas of:

• The College’s five-point Student Success Plan is aimed at improving access, retention, student success, and graduation rates.

• The Access Initiative promotes access to postsecondary education among vulnerable youth through innovative collaboration with targeted communities and school board partners.

• Aboriginal Recruitment and Project Pathfinder initiatives target college-age and secondary school Aboriginal learners.

3.2 Additional Comments

• Ministry data indicates that Aboriginal learners represented 4.2% of the full-time student population at the College in 2012-13 (at the system average).

• In 2012-13, 39.5% of students at the College reported that they were first-generation students, above the sector average of 30.3%.

• The Ministry notes that access is one of the top three priorities of the College, which has a well-developed strategy.
Institutional Strategies

- The College has received funding from the Ministry to support the Bundled Arrows Project, which aims to build a regional Indigenous Education Plan with educational partners and the Aboriginal community.

3.3 Metrics

<table>
<thead>
<tr>
<th>Institutional Metrics</th>
<th>System-Wide Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Number of registrants in postsecondary education from priority designated areas</td>
<td>• Number and proportion of Aboriginal, first generation, students with disabilities, and francophone</td>
</tr>
<tr>
<td>• Number of Aboriginal students enrolled</td>
<td>students at an institution</td>
</tr>
<tr>
<td>• Student engagement index</td>
<td>• Number and proportion of international students enrolled in Ontario (as reported in annual</td>
</tr>
<tr>
<td></td>
<td>institutional enrolment reporting)</td>
</tr>
<tr>
<td></td>
<td>• Proportion of an institution’s enrolment that receives OSAP</td>
</tr>
</tbody>
</table>

4. PROGRAM OFFERINGS

This component articulates the breadth of programming, enrolment, and credentials offered, along with program areas of institutional strength/specialization, including any vocationally oriented mandates. This component also recognizes institutions that provide bilingual and/or French-language programming for students.

4.1 Areas of Institutional Strength

Current areas of program strength include:

1. Health
2. Allied Health
3. Technology
4. Apprenticeship
5. Business
6. Community Services
7. Communication Arts
Proposed program areas for growth include:

1. Health/Allied Health
2. Technology
3. Business
4. Apprenticeship

4.2 Additional Comments

• The College’s plans to expand total credential offerings in existing areas of program strength are supported by student outcomes and program infrastructure.
• The Ministry acknowledges the College’s strength in Health and Technology programming, including its commitment to a more regional approach, which is consistent with Ontario’s Differentiation Policy Framework. The Ministry welcomes the College’s intent to avoid duplicating subject areas in which neighbouring institutions specialize.

Institutional Strategies

• The College has indicated an interest in delivering four-year degrees in Health/Allied Health (Bachelor of eHealth), Technology (Bachelor of Prototyping), as well as Smart Grid Technologies, among others.
• The College plans to develop a degree with a business focus, likely in Financial Services, which will be submitted to the Ministry for consideration once decisions have been made on the above-noted degrees.

4.3 Metrics

<table>
<thead>
<tr>
<th>Institutional Metrics</th>
<th>System-Wide Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Proportion of enrolment at colleges by occupational cluster and by credential</td>
</tr>
<tr>
<td></td>
<td>• Institution’s system share of enrolment by occupational cluster and by credential</td>
</tr>
<tr>
<td></td>
<td>• Number of apprentices in each trade</td>
</tr>
</tbody>
</table>

5. INSTITUTIONAL COLLABORATION TO SUPPORT STUDENT MOBILITY

This component profiles partnerships between institutions that ensure students have access to a continuum of learning opportunities in a coordinated system. This may include, but is not limited to, credit transfer pathways and collaborative or joint programs between or within sectors.
5.1 Areas of Institutional Strength
The College focuses on improving collaboration, pathways, and student mobility through:

- A strong partnership with McMaster University, including joint degree programs for secondary school graduates, degree completion programs for college graduates, and elective programming for McMaster students.
- Successful collaborative health sciences degree programs in shared, state of the art facilities at the McMaster campus called the McMaster-Mohawk Institute of Applied Health Sciences.
- A number of partnerships with both the catholic and public school boards.

5.2 Additional Comments
- The Ministry notes the strong partnerships between the College and McMaster University, and encourages continued collaboration to improve pathways and opportunities for students.

Institutional Strategies
The Ministry notes the College’s plans to expand its partnerships to other colleges and universities, including a credit transfer partnership with Seneca College that will provide new degree-completion options for students of both colleges.

5.3 Metrics

<table>
<thead>
<tr>
<th>Institutional Metrics</th>
<th>System-Wide Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Number of university students/graduates enrolled in the College’s programs</td>
<td>• Number of college and university pathways and/or articulation agreements (college-college, college-university, university-college)</td>
</tr>
<tr>
<td></td>
<td>• Number of transfer applicants and registrants</td>
</tr>
<tr>
<td></td>
<td>• Number of college graduates enrolled in university programs</td>
</tr>
</tbody>
</table>

ASPIRATIONS
The Ministry recognizes the importance of supporting institutions to evolve and acknowledges the strategic aspirations of its postsecondary education institutions; the SMA is not intended to capture all decisions and issues in the postsecondary education system, as many will be addressed through the Ministry’s policies and standard processes.
a) Institutional Types
The Ministry notes the College’s proposal to be an institute of health and technology. The Ministry does not have a policy classifying additional institutional types and considers this issue to be outside of the SMA process. The use of “specialized institute of health and technology” is a college marketing decision.

b) Expanded Credentials
The Ministry has noted the College’s aspirations to expand degree granting activity and its proposal that a credential aimed at students in 2+2 (Associate Degree) programs be established. In addition, the Ministry has noted the College’s position in favour of college three-year degrees. The Ministry is conducting a policy review of Ontario’s credential options in order to support decision-making related to any changes to credentials.

c) Capital Expansion
The College requests capital funding from the Province to build an engineering technology facility that aligns with a program area of strength. The College is also pursuing federal, local, and business funding and support. The Ministry notes that funding for capital is outside the scope of the SMA process. However future capital projects should be aligned with the College’s areas of strength highlighted in this SMA. Decisions regarding approval and/or funding for capital projects will be made within the context of the Ministry’s long-term capital planning process and the Major Capacity Expansion Policy Framework, released December 20th, 2013.

d) Apprenticeship Delivery
The Ministry acknowledges the College’s proposal to implement new delivery models as part of its commitment to apprenticeship and the skilled trades. The Ministry is currently undertaking efforts to modernize Ontario’s apprenticeship administration and any decisions will be made within this context.

ENROLMENT GROWTH
The strategic enrolment and planning exercise is in the context of a public commitment in the 2011 Budget to increase postsecondary education enrolment by 60,000 additional students over 2010-11 levels. This government has demonstrated a longstanding commitment to ensuring access to postsecondary education for all qualified students.

The College’s planned enrolment forecast as expressed in this baseline eligible enrolment scenario is considered reasonable and in line with Ministry expectations, based on the current and projected demographic and fiscal environments.
Baseline Projected Eligible Full-Time Headcounts

<table>
<thead>
<tr>
<th>Level</th>
<th>2014-15</th>
<th>2015-16</th>
<th>2016-17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate/Diploma</td>
<td>9,743</td>
<td>10,084</td>
<td>10,437</td>
</tr>
<tr>
<td>Degree</td>
<td>1,661</td>
<td>1,719</td>
<td>1,779</td>
</tr>
<tr>
<td>Mohawk Total</td>
<td>11,404</td>
<td>11,803</td>
<td>12,216</td>
</tr>
</tbody>
</table>

Note: The College has significant winter and summer intakes in order to maximize the use of resources and provide flexibility for students that are not reflected in the baseline above.

FINANCIAL SUSTAINABILITY

The Ministry and the College recognize that financial sustainability and accountability are critical to achieving institutional mandates and realizing Ontario’s vision for the postsecondary education system. To this end, it is agreed that:

- It is the responsibility of the governing board and Senior Administrators of the College to identify, track, and address financial pressures and sustainability issues. At the same time, the Ministry has a financial stewardship role. The Ministry and the College agree to work collaboratively to achieve the common goal of financial sustainability, and to ensure that Ontarians have access to a full range of affordable, high-quality postsecondary education options, now and in the future; and

- The College remains accountable to the Ministry with respect to effective and efficient use of resources to maximize the value and impact of investments made in the postsecondary education system.

The Ministry and the College agree to use the following metrics to assess the financial health and sustainability of the institution:

1. Annual surplus/deficit
2. Accumulated surplus/deficit
3. Net Assets to Expense Ratio
4. Debt Servicing Ratio
5. Quick Ratio
6. Debt to Asset Ratio
7. Net Income to Revenue Ratio
MINISTRY/GOVERNMENT COMMITMENTS

Over time, the Ministry commits to align many of its policy, process, and funding levers with the Differentiation Policy Framework and SMAs in order to support the strengths of institutions and implement differentiation. To this end, the Ministry will:

- Engage with both the college and university sectors around potential changes to the funding formula, beginning with the university sector in 2014-15;
- Update the college and university program funding approval process to improve transparency and align with institutional strengths as outlined in the SMAs;
- Streamline reporting requirements across Ministry business lines with the goals of (1) creating greater consistency of reporting requirements across separate initiatives, (2) increasing automation of reporting processes, and (3) reducing the amount of data required from institutions without compromising accountability. In the interim, the Multi-Year Accountability Report Backs will be adjusted and used as the annual reporting mechanism for metrics set out in the SMAs;
- Consult on the definition, development, and utilization of metrics;
- Undertake a review of Ontario’s credential options; and
- Continue the work of the Nursing Tripartite Committee.

The Ministry and the College are committed to continuing to work together to:

- Support student access, quality, and success;
- Drive creativity, innovation, knowledge, and community engagement through teaching and research;
- Increase the competitiveness of Ontario’s postsecondary education system;
- Focus the strengths of Ontario’s institutions; and
- Maintain a financially sustainable postsecondary education system.

SIGNED for and on behalf of the Ministry of Training, Colleges and Universities by:

Deborah Newman
Deputy Minister
April 14, 2014
Date

SIGNED for and on behalf of The Mohawk College of Applied Arts and Technology by:

Bob Carrington
President
April 24, 2014
Date