FOR RECOMMENDATION **PUBLIC** **OPEN SESSION**

TO:	UTM Academic Affairs Committee
SPONSOR:	Professor Amrita Daniere, Vice-Principal Academic and Dean
CONTACT INFO:	905-828-3719, vpdean.utm@utoronto.ca
PRESENTER:	Professor Heather Miller,Vice-Dean, Teaching & Learning
CONTACT INFO:	905-569-4768, vdteachlearn.utm@utoronto.ca
DATE:	April 26, 2021 for May 3, 2021
AGENDA ITEM:	4

ITEM IDENTIFICATION:

New Program: Major in Technology, Coding and Society, UTM

JURISDICTIONAL INFORMATION:

Under section 5.5 of its *Terms of Reference*, the Academic Affairs Committee recommends new undergraduate programs for approval to the Committee on Academic Policy & Programs.

GOVERNANCE PATH:

1. **UTM Academic Affairs Committee [For Recommendation] (May 3, 2021)**
2. Committee on Academic Policy and Programs [For Approval] (May 5, 2021)

PREVIOUS ACTION TAKEN:

No previous action was taken on this proposal.

HIGHLIGHTS:

The Institute of Communication, Culture, Information & Technology (ICCIT) at the University of Toronto Mississauga (UTM) is proposing a new Major Program (8.0 credits) in the area of Technology, Coding & Society (TCS), effective September 2021. This program will be offered within the four-year Honours Bachelors of Arts degree and will prepare graduates to meet the needs of our rapidly-changing society and workforce that are brought on by the emergence of new interactive technologies and by the societal and economic consequences of using these technologies. The TCS major will contribute to the development of professionals who have a strong understanding of and consideration for the cultural and humanistic aspects of designing technology.

There is a strong cohort of faculty centred in ICCIT who are actively engaged in research involving technology and culture. The TCS major will build on this expertise to merge these

areas by developing strong programming and critical thinking skills to: develop digital platforms, analyze the data they produce and theorize their use from humanistic and social science perspectives. Students will focus on the social and ethical elements while producing computer code. Additionally, the program will leverage ICCIT's experience in experiential education and work-integrated learning settings to provide students with unique opportunities to apply their learning in and outside of the traditional classroom setting.

This proposed major program was subject to an external appraisal on March 9th and March 11th by Jeff Hancock (Stanford University) and Katie Shilton (University of Maryland). The appraisers were highly enthusiastic of the program and proposal. The Dean's response to the appraisal report outlines the minor modifications made to this final proposal submission based on their helpful suggestions.

FINANCIAL IMPLICATIONS:

There are no net implications for the campus' operating budget.

RECOMMENDATION:

Be It Recommended,

THAT the proposed new in Major in Technology, Coding and Society, UTM, offered by the Institute of Communication, Culture, Information & Technology (ICCIT), recommended by the Vice-Principal Academic & Dean, Professor Amrita Daniere, and described in the proposal dated April 14, 2021, be approved, effective September 1, 2021.

DOCUMENTATION PROVIDED:

New Undergraduate Program Proposal – Major in Technology, Coding and Society, UTM

UNIVERSITY OF TORONTO

University of Toronto
New Undergraduate Program Proposal

This template has been developed in line with the University of Toronto's Quality Assurance Process. This template should be used to bring forward all proposals for new undergraduate programs for governance approval under the University of Toronto's Quality Assurance Process. It is designed to ensure that all evaluation criteria established by the Quality Council are addressed in bringing forward a proposal for a new program.

Please note that all proposed new undergraduate programs are subject to external review.

Name of proposed program:	Major in Technology, Coding, and Society
Degree conferred:	Honours Bachelor of Arts (HBA)
Department/unit (if applicable) where the program will be housed:	Institute of Communication, Culture, Information and Technology (ICCIT)
Faculty/academic division:	University of Toronto Mississauga (UTM)
Dean's office contact:	Heather Miller, Vice-Dean, Teaching & Learning Vdteachlearn.utm@utoronto.ca
Proponent:	Rhonda McEwen, Professor & Director, ICCIT Rhonda.mcewen@utoronto.ca Jeffrey Boase, Professor, ICCIT J.boase@utoronto.ca Cosmin Munteanu, Professor, ICCIT Cosmin.munteanu@utoronto.ca Tracey Bowen, Professor, Teaching Stream, ICCIT tracey.bowen@utronto.ca

Direct entry or selection of POSt at end of 1st year:	Selection of POSt at end of 1st year
Version date:	April 14, 2021

Development and Approval Steps	**Date (e.g., of external appraisal site visit, final sign off, governance meeting, quality council submission, ministry submission)**
New Program Consultation Meeting	March 14, 2017
Consultation Proponents/Dean's Office/Provost's Office	
Provost's Advisory Group	January 27, 2021
External Appraisal	March 9, 2021 & March 11, 2021
Decanal signoff *In signing off I confirm that I have ensured appropriate:* ✓ compliance with the evaluation criteria listed in UTQAP section 2.3 ✓ consultation with the Office of the Vice-Provost, Academic Programs early in the process of proposal development ✓ Consultation with faculty and students, other University divisions and external institutions	Amrita Daniere Vice-Principal, Academic & Dean University of Toronto Mississauga February 4, 2021
Provostial signoff *In signing off I confirm that the new program proposal:* ✓ Is complete ✓ Includes information on all the evaluation criteria listed in UTQAP section 2.3	Mark Schmuckler, Vice-Provost, Academic Programs February 18, 2021
Unit-level approval (if required)	N/A
Faculty/divisional governance	May 3, 2021
Submission to Provost's Office	
AP&P	May 5, 2021

Academic Board (if a new degree)	N.A.
Executive Committee of Governing Council (if a new degree)	N.A.
The program may begin advertising as long as any material includes the clear statement that, "No offer of admissions will be made to the program pending final approval by the Quality Council and the Ministry of Training, Colleges and Universities (where the latter is required)."	
Ontario Quality Council	June 7, 2021
Submitted to the Ministry (in case of a new degree)	N.A.

New Undergraduate Program Proposal

Major in Technology, Coding, and Society
Institute of Communication, Culture, Information and Technology
University of Toronto Mississauga

Table of Contents

1 Summary

Please provide a brief overview of the proposed program summarizing many of the points found in more detail elsewhere in the proposal. This may need to be used on a stand-alone basis and should include:

- A clear statement of purpose / a description of what is being proposed (including the normal program length and, where applicable, a short reference to the appropriateness of the degree designation and program name).
- The academic focus of the program.
- The impetus for the program's development (including student demand/societal need) and how it fits with the unit/division's academic plans.
- Projected enrolment.
- The approach used in the development of the proposal.
- Any distinctive elements.

The Institute of Communication, Culture, Information and Technology (ICCIT) at University of Toronto Mississauga (UTM) is proposing a new major program in the area of Technology, Coding, and Society (program title). This program will be offered within the four-year Honours Bachelors of Arts degree and will prepare graduates to meet the needs of our rapidly-changing society and workforce that are brought on by the emergence of new interactive technologies and by the societal and economic consequences of using these technologies. There is a strong academic and industrial need to train highly qualified personnel (HQP) in becoming true "user experience" designers, managers, or researchers who are well grounded in a cultural, societal, economical, and human understanding of how we interact with information and with digital technologies and who are able to advance the frontiers of new media interaction in a meaningful, culturally-aware, and socially beneficial way. This program will contribute to the development of professionals who have a strong understanding of and consideration for the cultural and humanistic aspects of designing technology.

The proposed program builds on the existing expertise and interests of faculty at UTM. There is a strong cohort of faculty centred in ICCIT who are actively engaged in research involving technology and culture. ICCIT has built a reputation in the academic market for research and teaching in this area and this major leverages the

interests and expertise of our existing faculty. The courses for this program that are already within the current timetable are very popular with strong interest in double major potential from students within ICCIT and from cognate disciplines.
This program is the merging of three overlapping and mutually reinforcing areas: Social Informatics, Computational Social Science, and Digital Humanities. Although these areas are distinct, they intersect in several ways: Social Informatics uses theories and methods from the social sciences to examine and develop digital platforms; Computational Social Science uses data collected from digital platforms to examine and develop social scientific theories and methods; and Digital Humanities uses theories and methods from the humanities to examine and develop digital platforms. This program merges these areas by developing strong programming and critical thinking skills to: *develop* digital platforms, *analyze* the data they produce and *theorize* their use from humanistic and social science perspectives. Students will focus on the social and ethical elements while producing computer code.

Offered within the experiential learning environment to which ICCIT is firmly committed, the program will employ hands-on application of knowledge through labs, workshops, and hackathons, to build on the theory-based analytical skills necessary to conduct research involving complex data sets.

The proposed major will be offered by the ICCIT and consist of 8.0 full-course equivalents (FCE or 16 half-credit courses). These credits are outlined in the Course Overview section below. It is anticipated that the program will begin with an intake of 30 students and grow to a steady state of 45 students per year by 2025-2026. This program will be offered in addition to existing programs in the Institute and will complement and leverage the current Communication, Culture, Information & Technology (CCIT) major and Digital Enterprise Management specialist (DEM).

2 Effective Date

Anticipated date students will start the program: September 2021.
The Major in Technology, Coding, and Society will undergo its first UTQAP review in the 2023-2024 Academic Year during the next scheduled UTQAP review of the Institute of Communication, Culture, Information and Technology and its programs.

3 Academic Rationale

You may wish to use the headings below:

- Identify what is being proposed and provide an academic rationale for the proposed program (what is being created and why?).
- Explain the appropriateness of the program name and degree nomenclature.
- If relevant, describe the mode of delivery (including online) and how it is appropriate to support students in achieving the learning objectives of the program.
- Context
  - Discuss how the program addresses the current state of the discipline or area of study. (Identify pedagogical and other issues giving rise to the creation of this program. Where appropriate, speak to changes in the area of study or student needs that may have given rise to this development.)
  - Describe the consistency of the program with the University's mission and unit/divisional academic plan and priorities.
- Distinctiveness
  - Identify any distinctive/innovative aspects of the proposed program
  - Identify similar programs offered at the University and/or by other universities (with specific reference to those in Ontario) and describe how they may be different or similar from the current program. In doing this you may wish to append a table describing other programs.

The purpose of the Technology, Coding, and Society program is to merge coding/programming skills with liberal arts, social science, and communication perspectives. As will be detailed in this "Academic Rationale" section, this new program will satisfy a growing demand for technical skills within the transdisciplinary study of the social consequences of new media.

Students enrolled in the proposed major will gain skills and knowledge that can be applied to both industrial and academic careers. Students wishing to enter industry will have the skills necessary to develop interfaces and to evaluate their effectiveness using both theoretical and empirical methods, grounded in several disciplines. They will also gain an understanding and appreciation for the ethical and policy-related issues pertaining to the development and real-life deployment of interactive software platforms. This program will provide students with marketable skills such as user

interface design, participatory design, techno-centric ethnographies, user experience, longitudinal qualitative studies, and quantitative analysis, that will enable them to contribute to a wide range of sectors where the role of new media and interactive technologies is increasing (e.g. manufacturing, information technologies, health care, assistive technologies, social services). These essential skills extend beyond the design and implementation of interactive systems by teaching students how to engage users and other stakeholders in ensuring that any interactive technology is properly designed, implemented, and updated according to (often changing) human factors, cultural and societal aspects, or environmental considerations. ICCIT students are in a unique position to acquire and further develop such skills, as they possess a significant foundation from the existing ICCIT courses for the understanding of such considerations.

Prior experience in developing a major program led to a very careful selection of the program name. The faculty engaged in a scanning exercise to ensure that the name is not in use within the University of Toronto on any of the campuses. We then looked at the names used in proximate programs internationally as this will support international student recognition of the major program. The name was shared with a small subset of ICCIT students and new ideas emerged. We then ran a survey (see Appendix F) and requested student comment on various choices with a description of the major to guide responses. From the survey we noted that “technology” needed to be the first word of the major as this resonated with students understanding of what the core focus would be. Then we found that the word “programming” seemed to make sense to students as a signal to the computing software taught in the program. Faculty wanted “society” to remain central to the major since this indicates that we are thinking of technology and programming in relation to the social sphere.

When we consulted with Computer Science (CS) at UTM, it was clear that the word “programming” could be misleading. On the recommendation of CS UTM, we moved to “coding” since this is a term often used to describe front-end software development. This brought “Technology, Coding, and Society” to forefront as a program name and after consulting with students currently in ICCIT programs, it has met with universal approval and appeal.

Students wishing to pursue graduate studies will develop the skills and knowledge required to enter graduate programs in traditional social science, information sciences and emerging interdisciplinary programs, such as information studies, science and technology studies, computational social science, interactive digital arts or network science. Examples of such programs include the Network Science PhD Program at Northeastern University[1], the Master in CSS at the University of Chicago[2], and the User Experience Design concentration within the Master of Information degree program at the U of T. All of these programs have emerged within the past five years. These programs focus on the development of data analytic and design skills that prepare students for employment in technology companies and academia. Students that complete these programs are able bring a socially oriented understanding to tasks that require a high level of technical and analytic expertise. These tasks would include the development of predictive behavioural modeling, identifying platform design challenges, and improving the design of software platforms. They will be able to accomplish these tasks by drawing on a comprehensive understanding of cultural, societal, economical, and human understanding of how we interact with information and with digital technologies.

The course list for the proposed program is outlined in the Course overview section below. The course list also includes a brief description of the learning outcomes and focus topics for each core course. Such core courses are based on and complement our faculty's existing expertise, covering several disciplines including Critical Communication, Human-Computer Interaction (HCI)/Interaction Studies, Data Analytics, and Social Science approaches to Technology Studies.

Computer Science programs come from mathematics and logic traditions that are concerned with the successful execution of instructions toward a specified goal. These traditions have not been focussed on the theoretical and methodological approaches to social interaction found in the liberal arts. At the same time, liberal arts programs do not traditionally include courses that train students on how to use coding as a means of thinking critically about technology, enhancing and disrupting social and cultural systems, and analyzing new types of digital trace data collected through interactive platforms. This proposed program transcends the confines of “traditional”

[1] www.networkscienceinstitute.org/phd

[2] https://macss.uchicago.edu/

disciplines and instead offers students opportunities to study and directly influence the emerging challenges of an increasingly digital media rich society.

The current tech industry landscape has been characterized as “disruptive” to industrial and social systems. The rapid pace of engineering innovation creates significant challenges for companies, even for those that are relatively “new” such as Google or Facebook. Graduates with the skill sets necessary to navigate these new industrial landscapes are also highly sought after in government and not-for-profit sectors. New media is now a cornerstone of government services such as settlement and immigration, municipal 3-1-1, community healthcare, disaster preparedness, and library and archives. Not-for-profit organizations have begun to focus on interactive technologies both to more efficiently use funding and to reach new users of their services.

ICCIT faculty continue to interact with peers across all of these sectors and are often solicited for recommendations on how to attract undergraduates specializing in technology design and user experience. However, few such specialists are trained to possess skills that combine design, human factors, cultural analysis, anthropology, and sociology. The academic sector, therefore, needs to better respond to these emerging industry needs for graduates that are able to design, create and use evaluation methods drawn from a variety of disciplines.

As reported by Lazowska[3] recent years have seen a dramatic growth in Computer Science (CS) enrolments at North American universities, in some cases to the order of an eight-fold increase in the number of first-year Computer Science students and four-fold increase in overall Computer Science cohorts. As per Lazowska's analysis, while part of the increase in CS enrolment can be explained by the technology boom, a significant component is due to an overwhelming number of non-CS majors increasingly opting for CS courses in the pursuit of their majors. This is further evidence of the need of students outside traditional computing disciplines to become more knowledgeable of software development, but also of the lack of suitable programs that address the needs of industry and academia for qualified graduates that bring a liberal arts, culture, communication, sociology/anthropology, and human

[3] Lazowska, E., Roberts, E., & Kurose, J. (2014). Tsunami or sea change? Responding to the explosion of student interest in computer science. NCWIT 10th Anniversary Summit, 1.

factors perspective to software development. ICCIT is best positioned to capture this need as we are a true multidisciplinary unit that connects such disciplines.

As evidenced at the 2015 Canadian Workshop on Renewing the Human-Computer Interaction Curriculum, there is a strong academic and industrial need to train highly qualified personnel (HQP) in becoming true "user experience" designers, managers, or researchers which are well grounded in a cultural, societal, economical and human understanding of how we interact with information and with digital technologies and which are able to advance the frontiers of new media interaction in a meaningful, culturally aware and societal beneficial way. Through its position in the nexus of multidisciplinary, the ICCIT will stand out as one of the few institutions in Canada to offer such a program that leverages our existing curriculum that already brings together relevant knowledge from social and computer sciences, management, arts and humanities. This will further enrich the academic offering at the University of Toronto Mississauga by contributing to the advancements of the seven pillars as outlined in the University's Strategic Plan. The program also aligns with the mission of the University of Toronto as stated in the Statement of Institutional Purpose: "The University of Toronto is committed to being an internationally significant research university, with undergraduate, graduate and professional programs of excellent quality."

Distinctive Features:

This program will be one of the few in Canada to merge Social Informatics, Computational Social Science and Digital Humanities. The uniqueness and strength of this program will also stem from its grounding in the multidisciplinary of courses offered within ICCIT. This will contribute to the development of professionals who have a good understanding of and consideration for the cultural and humanistic aspects of designing technology. As a strategic imperative, this new major shares the same first-year courses as all other programs in ICCIT (CCT109H5 Contemporary Communication Technologies and CCT110H5 Rhetoric and Media) thereby allowing students to have mobility across ICCIT program offerings. In addition, the new major program shares some courses at the 200-level and above with the existing CCIT major program and DEM specialist to promote a shared ontological foundation within our Institute while at the same time further focusing the new major in scholarship in the liberal arts and computer science.

Although the program will be course-based, most required courses will include hands-on labs and workshops where students will be required to apply theories on the use of digital platforms from humanistic and social science perspectives, analyze data produced from digital platforms. The innovative TCS curriculum embeds experiential learning into much of the classroom delivery. Several courses (e.g., CCT380H5 Human Computer Interaction and Communication, CCT383H5 The Interactive Society, CCT480H5 User Experience Analysis, CCT485H5 User Experience Design) are designed as semester-long hands-on projects that not only follow most recent industry practices, but structure the learning activities in the same format as an industry project. This includes several aspects such as the setup of project teams and the role of the teaching staff within the team's project management, or the setup and execution of project deliverables. This presents students with learning opportunities that bridge the more theoretical space of typical courses with the heavily applied dimensions of a co-op or internship. This unique approach is the result of pedagogical research by ICCIT faculty, some of which was published in relevant peer-reviewed academic venues.

Experiential learning opportunities will also be available in the form of more traditional means such as internships through CCT410H5 Internship I, an elective within the program. CCT410 extends experiential learning outside the university context through part-time industry-based work placements. Students complete CCT410H5 as part of their regular term course load and it is available to International students who are studying on the appropriate work-study visas.

Students in the TCS Major will also be eligible to concurrently obtain a Professional Experience Certificate in Digital Media, Communication, and Technology offered by the Department (International students are required to have the appropriate work/study visas). Pairing the TCS Major with the ICCIT Professional Experience Certificate in Digital Media, Communication, and Technology creates a pathway for students seeking a required work component as part of their degree.

4 Need and Demand

- Provide a brief description of the need and demand for the proposed program focusing, as appropriate, on:
  - student interest;
  - societal need;
  - employment opportunities for prospective graduates;
  - interest expressed by potential employers;
  - professional associations;
  - government agencies or policy bodies and how this has been determined.
- How is the program distinct from other programs at U of T? (Address, if relevant, how this program might affect enrolment in other related programs offered here.)
- With specific reference to the impact on need and demand, describe how the proposed program relates to (is similar to or different from) existing programs offered by other universities in North America and Internationally (with specific reference to Canadian and Ontario examples). In doing this you may wish to append a table showing other programs.

Student Interest:
The proposed Major in Technology, Coding, and Society will be attractive to students who are interested in coding for social gain, which is part of a movement in the Social Informatics sub-discipline in Information Studies. Currently the University of Toronto does not offer a program to meet this potential demand. The University of Toronto does offer a Bachelor of Information; however, this program focuses more on the management of information and broad social and information-related issues rather than developing coding and data analytic skills. It is also different than all of Computer Science undergraduate programs across the University of Toronto in that it helps students to develop fundamental coding skills necessary to work with computer scientists, develop basic apps and software, and to analyze complex data sets, rather than on developing knowledge in computing theory or on building competence in high-level and backend programming.

The proposed Technology, Coding, and Society major will also fill a distinct gap for Ontario high school graduates of the *Specialist High Skills Major in Information and*

Communications Technology (ICT)[4]. The unique nature of the Major in Technology, Coding, and Society will appeal especially to high school graduates that have self-identified an interest and competency in this field. The success of these specialist high skills majors (currently there are 128 high schools offering the ICT specialist high skills major[5]) shows a demand for academic programming at the post-secondary level in this area of study and a need for a direct and clear academic pathway for high school graduates to follow as they continue their training. Our Major in Technology, Coding, and Society will be well positioned to bring in students from this high school program but is structured in such a way that students from any background will be able to step in without academic disadvantage. Additionally, students from the computer sciences looking for a strong complement to their Science-based program will find Technology, Coding, and Society to be an attractive option. Once in the Program, Technology, Coding, and Society students will be exposed to diverse opportunities for learning and training that will prepare them for a number of options after graduation.

Since 2010, ICCIT has seen a strong and consistent growth in both our major and specialist programs (see Table 1 and Figure 1 below). The coding literacy courses offered in this program have been well received by students with strong enrolment numbers and student performance (see Section 6). Similarly, Computer Science programs and courses in the Department of Mathematical and Computational Sciences (MCS) have seen a surge in interest and enrolment in the past 4 years (see Table 2 and Graph 2 below). This growth in both areas at UTM has resulted in a strong uptake of students in ICCIT and Computer Science programs, the subset of students that would be naturally drawn to Technology, Coding, and Society. Additional analysis of student enrolment reports from application to program entry show that there is a strong relationship between CCIT and CS with students seeking majors in both. Based on these numbers, we are confident there will be a strong cross-section of students in this proposed major. In a recent survey of current ICCIT students (see Appendix F Student Survey), over 80% expressed strong interest in taking this proposed major if they were in their 1st or 2nd year. Current students also found the proposed major name to be a good descriptor of the learning content. The proposed Technology, Coding, and Society major will be of interest to those in the area of computer science

[4] http://www.edu.gov.on.ca/morestudentsuccess/SHSM.html

[5] http://www.edu.gov.on.ca/morestudentsuccess/SHSMcomplete.html

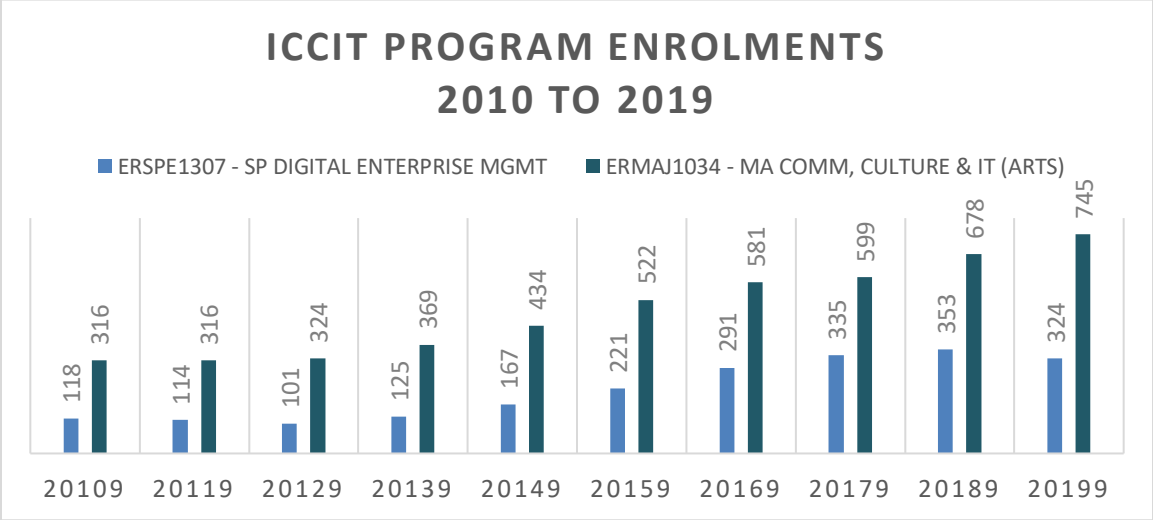
who wish to develop expertise on the social and cultural influences on technology design, and focus on the ethical and political aspects of technology platforms.

Table 1: Program enrolment counts at count date for the ICCIT programs, for each Fall session from 2010 to 2019

ICCIT Program	20109	20119	20129	20139	20149	20159	20169	20179	20189	20199
Specialist in Digital Enterprise Management, HBA	118	114	101	125	167	221	291	335	353	324
Major in Communication, Culture, Information, and Technology, HBA	316	316	324	369	434	522	581	599	678	745

Source: UTBI Cubes Program Enrolment at Count Date Cube, data extracted 8 April 2020.

Figure 1: Program enrolment counts at count date for the ICCIT programs, for each Fall session from 2010 to 2019



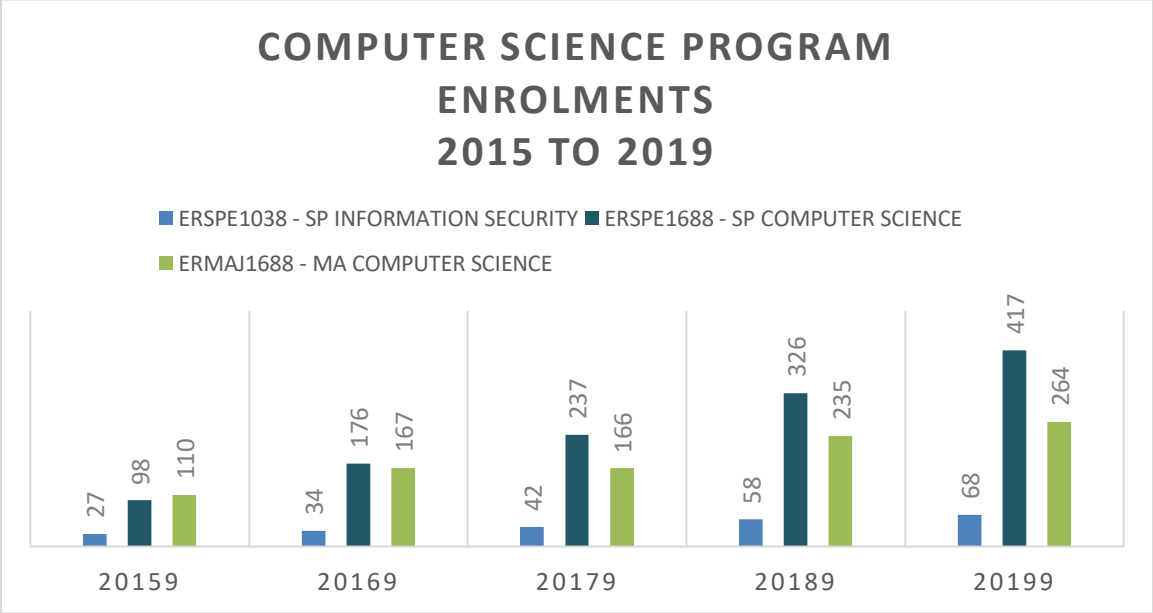
Source: UTBI Cubes Program Enrolment at Count Date Cube, data extracted 8 April 2020.

Table 2: Program enrolment counts at count date for the Computer Science programs, for each Fall session from 2015 to 2019

Computer Science Programs	20159	20169	20179	20189	20199
Specialist in Information Security, HBSc	27	34	42	58	68
Specialist in Computer Science, HBSc	98	176	237	326	417
Major in Computer Science, HBSc	110	167	166	235	264

Source: UTBI Cubes Program Enrolment at Count Date Cube, data extracted 8 April 2020.

Figure 2: Program enrolment counts at count date for the Computer Science programs, for each Fall session from 2015 to 2019



Source: UTBI Cubes Program Enrolment at Count Date Cube, data extracted 8 April 2020.

Based on student demand and recent enrolment data and trends in ICCIT and MCS (see Tables 1 and 2 above), we anticipate 40 to 45 students per year in the proposed Major in Technology, Coding, and Society. Table 3: Undergraduate Enrolment Projections (below) provides a detailed breakdown of projected enrolment in the program by year of study and academic year. With a program launch date of September 2021 and approximately 30 students in the first class, the Program should see steady growth as our new introductory Technology, Coding, and Society course (CCT111H5) was introduced in winter 2019 with a class of 40 students and a waitlist of 32, clearly showing student interest for courses that will comprise the new major. Steady state of approximately 127 students (with about 60% to 70% international students) should be reached within the first five years of the Program (i.e., by 2025-2026).

Table 3: Undergraduate Enrolment Projections

Provide details regarding the anticipated yearly in-take and projected steady-state enrolment target including a timeline for achieving it. (Please adjust the table as necessary.)

Level of Study	**Academic Year 2021-2022**	**Academic Year 2022-2023**	**Academic Year 2023-2024**	**Academic Year 2024-2025**	**Academic Year 2025-2026**	**Academic Year 2026-2027**	**Academic Year 2027-2028**
1st year	0	0	0	0	0	0	0
2nd year	30	35	40	45	45	45	45
3rd year	0	27	32	42	42	42	42
4th year	0	0	25	32	40	40	40
Total enrolment	30	62	97	119	127	127	127

In an academic context, the Major in Technology, Coding, and Society bridges social sciences and humanities training and technical skills development. Growth and demand has occurred in the emerging areas of computational social science (CSS) and User Experience/User Design (UX/UI), as evidenced by the rise of conferences and

workshops (e.g., the Annual International Conference on CSS at Northwestern University[6], the Oxford Internet Institute CSS Workshop[7], Stanford Computational Sociology Conference & Workshops[8], the Conference of the CSS Society of the Americas[9]); the increase in journals and published proceedings (e.g., the upcoming Journal of Computational Social Science[10]); the emergence of new centres and institutes (e.g., the Center for CSS at Stanford[11], the Network Science Institute at Northeastern University[12], the CSS Research Group at Microsoft[13]); and finally, the creation of graduate programs (e.g., the Network Science PhD Program at Northeastern University[14], the Master's in CSS at the University of Chicago[15], and the User Experience Design concentration within the Master of Information Program at U of T[16]) in this field of study. Not only are we seeing the emergence of computational social sciences as a new discipline, what we can also gleam from this is that most of the current work and research is occurring outside of Canada. The Technology, Major will help UTM establish a foothold in this area while preparing Coding, and Society students for a variety of graduate programs in fields such as information sciences, communication, and traditional social sciences, as well as emerging programs in computational social sciences, network science, and digital media arts. A double major in Technology, Coding, and Society and Computer Science would also be excellent preparation for traditional computer science graduate programs.

[6] http://www.kellogg.northwestern.edu/news-events/conference/ic2s2/2016.aspx

[7] http://cssworkshop.oii.ox.ac.uk/

[8] https://iriss.stanford.edu/css/events-programs/2016-summer-workshop

[9] https://computationalsocialscience.org/conferences/css2017/

[10] http://www.springer.com/social+sciences/journal/42001

[11] https://iriss.stanford.edu/css

[12] https://www.networkscienceinstitute.org/

[13] https://www.microsoft.com/en-us/research/group/computational-social-science/#

[14] https://www.networkscienceinstitute.org/phd

[15] https://macss.uchicago.edu/

[16] http://current.ischool.utoronto.ca/degrees/mi/kmd

Societal Need and Employment Opportunities for Potential Employers:
Technology, Coding, and Society will likewise fill the demand in the technology industry for individuals who possess both technical training and an understanding of broader issues surrounding the development and use of digital technologies. We are receiving requests for graduates with technical training and analytical acumen surrounding the technologies from a broad variety of sectors, including healthcare, banking, technology, clean technology, manufacturing, media, agriculture, service, and automotive. The recent impact of the COVID-19 pandemic has underscored the desirability of graduates with a deep understanding of online technologies and society. For example, our ICCIT Advisory Board members have indicated a need for graduates who have the capabilities to develop and use online tools to keep organizations afloat during stay-at-home orders. In addition, the Advisory Board shared a need for graduates to find new opportunities for companies to retain customers when the majority of transactions are moving online. The utility for individuals with the unique combination of skills in abstract thinking, data analytics and technical abilities is increasing as we become more reliant on technology in our work and personal lives. Graduates of the Major in Technology, Coding, and Society will address this need directly. Our proposed program will provide students with the technical skills and training to enter industry in such positions as analysts in government and NGO agencies, public health outreach consultants, and public relations advisors upon graduation. This would especially be the case for our students who choose to take advantage of our experiential learning and internship opportunities.

Interest expressed by potential employers, governmental, and non-governmental sectors:
Our ICCIT Advisory Council, with members from industry, government, not-for-profits and entrepreneurial community, has strongly indicated that this programme will produce the graduates required in the workplace. They have provided input to the types of social competencies and technical skills that we have incorporated into the curriculum. Even though ICCIT internship students find their own placements, more than 1/3rd of ICCIT's internship experiences are with not-for-profit organizations such as Doctors without Borders and faith-based organizations. This is facilitated by

recommended internship opportunities by ICCIT's Experiential Education Officer from the Experiential Education Unit within the Office of the Dean.

ICCIT senior administration has also been approached by three of the largest banks in Canada who are interested in identifying students with a combination of user experience and interface design skills that is important as financial technology (FinTech) becomes a normative approach in that sector. Our longstanding internship program and newly launched Professional Experience Certificate in Digital Media, Communication and Technology has attracted placements including at Doctors without Borders, CBC, RIC Center for Innovation, Canadian Tire Digital Innovation Lab, Array of Stars, GE, Rogers and MuchMusic to name just a few. These organizations have all indicated interests in employing future graduates. The students graduating with this major will also be well positioned for entrepreneurial opportunities and will be ideally suited for new business development in the high-tech sector for which southern Ontario is known.

As the pandemic has demonstrated, access to services online is now a requirement of any provider — the government is no exception. Informal discussions with city and provincial government officials has confirmed that skills in interactive media, data analytics and the integration of concepts on society and technology are fundamentals in the running of municipalities and cities.

5 Admission Requirements

- Provide formal admission requirements as they will appear in the undergraduate calendar or other official admissions materials
- Explain how the program's admission requirements are appropriate for the learning outcomes established for completion of the program.
  - How will they help to ensure students are successful?
  - Provide sufficient explanation of any additional requirements for admission to the program such as minimum grade point average, special language, portfolio, etc. (and how the program recognizes prior work or learning experience, if applicable).
- Is this or not a direct-entry program; please explain.

The proposed Technology, Coding, and Society Major will not be a direct-entry program. Students applying to this program are doing so after they have been admitted to the University of Toronto Mississauga (UTM) and have completed their first year of study. The Program will be limited in size to a subset of students that meet the minimum academic qualifications (i.e., a Type 3 subject post). Students will be eligible to apply to this program after completion of 4.0 credits at UTM, including the existing required 100-level courses of CCT109H5 Contemporary Communication Technologies, CCT110H5 Rhetoric & Media and CCT111H5 Critical Coding. In addition to completion of our first-year courses, students must demonstrate their aptitude with a minimum cumulative grade point average (CGPA) of 2.4. This signals a distinct expectation of our program learning outcomes, especially with respect to breadth and depth of knowledge, knowledge of methodologies, and awareness of limits of knowledge.

Such admission requirements are in line with ICCIT's current Specialist program in Digital Enterprise Media, which requires a minimum achievement in core CCT 100-level courses and introductory Management courses along with a minimum CGPA of approximately 2.4. It also aligns with the general process and practice of Type 3 programs at UTM. As a program with de-regulated fees that can only accept a specific number of students each year, the actual admission CGPA will differ from year to year but the advising staff within ICCIT is experienced in assisting students to understand and manage their expectations and advise them on appropriate alternative academic paths that are available to them at UTM. Students who are not able to enroll in the TCS Major will be encouraged to explore complementary studies in ICCIT's Professional Writing & Communication major or minor in combination with Computer Science, Mathematics, Statistics, Management or Sociology.

The proposed admission requirements will ensure Technology, Coding, and Society students have the required foundational knowledge and skills to succeed in the program. The first two introductory CCT courses to be offered, CCT109H5 and CCT111H5, do not have any pre-requisites and are open to any student with an interest in communication and technology. Completion of the core 100-level courses in first year will mean all students enter the program with the same exposure to communication theory, coding literacy, and the multi-disciplinary approach that is inherent in all CCT courses, allowing students to apply their knowledge and test their

skills at the 200-level. By the third and fourth years of the program, students will be well prepared to take advantage of the internship opportunities that this program will offer.

As a Type 3 subject post, the Major in Technology, Coding, and Society will be limited by size and space. Not all students that have achieved the minimum admission requirements will be able to enrol in the program due to limitations in computing resources and other technical equipment. While students from any academic background can complete this program of study, we anticipate that the majority of our students will come from the Communication, Culture, Information and Technology stream, the general Social Sciences stream, and the Computer Science, Mathematics and Statistics stream. Students from the Humanities or Management may also be interested in this field of study. Majors in Computer Science, Professional Writing, Management, and Sociology would be a good complement to Technology, Coding, and Society.

The following are the formal admission requirements for the Major in Technology, Coding, and Society. Appendix A (Academic Calendar Entry) also provides full admission requirements as part of the program's calendar entry.

Limited Enrolment — Admission is based on academic performance (CGPA) in a minimum of 4.0 credits that must include CCT109H5, CCT110H5 and CCT111H5. Enrolment in this program is determined annually and is limited to students who have a CGPA of at least 2.4. **Tuition fees for students enrolling in any CCIT Specialist/Major (except Professional Writing and Communication) programs will be higher than for other Arts and Science programs.**

6 Program Requirements, Learning Outcomes, Degree Level Expectations (DLEs) and Program Structure

- In a curriculum map, or in the table below, or in another format appropriate for the discipline, state the program learning outcomes and program requirements, and show how the program learning outcomes are appropriate for the degree level expectations.

- Discuss how the design, structure, requirements and delivery of the program are appropriate for the program learning outcomes and degree level expectations.
  - The sequencing of required courses or other learning activities, etc.
  - The mode of delivery of the program (face-to-face; blended or online; placement, etc.) and how it is appropriate to support students in achieving the learning outcomes of the program and the degree level expectations.
  - Describe how the specific elements of the curriculum (e.g., Internships, etc.) will be administered.
  - A clear indication of how faculty "scholarship and research is brought to bear on the achievement of Degree Level Expectations" (UTQAP 1.1).
  - Describe how the program structure and delivery methods reflect universal design principles and/or how the potential need to provide mental or physical health accommodations has been considered in the development of this program.
  - Describe how the program structure and delivery methods promote student wellbeing and resiliency in the learning and teaching environment.
  - Describe any elements that support a sense of community in the program.

As a major program within an HBA degree, this Technology, Coding, and Society program will require a total of 8.0 FCE for program completion. The majority of this program will be delivered face-to-face because the development of coding skills will require significant amounts of lab work and existing courses that are part of this program are already delivered face-to-face. Where there is an opportunity to offer remote delivery, we will consider adding this mode. A summary list of the program courses is included below. In addition, Appendix A (Academic Calendar Entry) provides a draft of the academic calendar entry for the Major in Technology, Coding, and Society and Appendix B (Course Descriptions) provides a full listing (course codes, names, and descriptions) of all courses (existing and new) that will be included in the proposed program.

Universal design principles such as having: a) the appropriate size and space for approach and use and, b) equitable use, are built-in to the way that we have designed the structure of this program. The smaller class sizes allow instructors and students to have high-touch interactions and allow cohorts to be more easily connected. Another universal design principle is flexibility in use, and we have provided room for elective

courses to allow students to take courses that they are most interested in as they progress through the major.

TCS majors will have access to the dedicated ICCIT advising team to assist with program planning and will have the support of UTM's Accessibility Services[17] to ensure that those requiring accommodations in their courses get the help that they need to be successful.

The TCS major is structured with clear pathways through the courses, year-by-year. From experience with the other majors and specialist programs in ICCIT, students appreciate defined pathways and it improves their sense of well-being as they are able to make realistic plans and achieve them. The ability to choose required courses from a selection of options offers flexibility in the delivery of the major and this will support resiliency as students can make decisions to add or drop courses based on known strengths.

Students taking the TCS major will join a vibrant group of students who are in one or more of our ICCIT student organizations — the ICCIT Council, DEM Association, and members of the Mindwaves and Compass writing groups. These groups are a source of community building and membership and are well supported by the ICCIT administration.

As with all of our programs in ICCIT, students will begin the Major in Technology, Coding, and Society by completing our core 100-level courses — CCT109H5 Contemporary Communication Technologies and CCT110H5 Rhetoric & Media (see Appendix B for full course descriptions). Both these courses establish a foundation of communication theory while equipping students with the technological proficiency and creative project planning skills necessary to translate theory into practice in both academic and professional settings. In addition to the common "core," Technology, Coding, and Society students will also complete CCT111H5 Critical Coding. This course was developed to introduce and provide the basic coding literacy and will serve as the foundation for the program. The themes introduced in this course will be reinforced throughout the entire program.

[17] https://www.utm.utoronto.ca/accessibility/welcome-accessibility-services

In the second year of study, students will complete a minimum of 3.0 FCE from a pre-determined course list. These courses will emphasize skills in user interface design, participatory design, techno-centric ethnographies, user experience, longitudinal qualitative studies, and quantitative analysis (among others). Courses at the 200-level will introduce the grounding of user interface programming and focus on the phenomenon of hacktivism (the misuse of a computer system or network for a socially or politically motivated reason).

Senior level requirements (third- and fourth-year courses) will see students completing 3.5 FCEs from a provided listing of course options. In these courses, the essential skills that were introduced and reinforced will be extended further and mastered as students will be required to go beyond the basics of interactive systems design and implementation. In these courses, students will learn how to engage users and other stakeholders through proper interactive technology design and implementation. In addition, students will learn how to analyze and evaluate variables such as human behaviour, cultural factors, societal demands and environmental issues to enable successful design modification and improvement.

A major theme of this program will be how social informatics, computational social science and digital humanities overlap and intersect and will require instructors and students to take a multidisciplinary approach to this program. This aligns very well not only with the currently existing ICCIT programs and courses but with the collaborative research that all of our faculty engage in, which ultimately informs our curriculum. By design, all of our CCT courses must be multidisciplinary in nature and with our demonstrated success for this approach in both our teaching and our research, Technology, Coding, and Society students will easily develop a strong understanding of the cultural and humanistic aspects of designing technology.

ICCIT has already developed eight half-courses, the content of which was designed specifically for the new major focusing on technology, coding and social implications (students outside of this program with the required pre-requisites will also be able to participate). These courses will cover subject areas from the aforementioned hacktivism and user interface program to senior level courses in gaming interaction, social media, and ethical issues and will complement the four recently introduced coding literacy courses — CCT285H5 Immersive Environment Design, CCT383H5 The

Interactive Society and CCT485H5 User Experience Design. The coding literacy courses have been well received by students with strong enrolment numbers and student performance, serving as a strong platform from which to launch our new course offerings in Technology, Coding, and Society.

Another key feature of the Major in Technology, Coding, and Society will be the experiential learning environment students will be immersed in. Though the proposed program is course based, courses will include hands-on labs, and workshops, students will also opportunities to apply skills and knowledge outside of the classroom through *CCT410 Internship I*, an elective course that includes a part-time work placement spanning a single term. Students have the opportunity to complete CCT410H5 (included in the list of TCS courses) as part of their regular academic course load during their senior year. While the internship component of the program will be optional, students will be strongly encouraged to take advantage of this opportunity to gain practical experience and network outside of UTM.

TCS students may also concurrently obtain a Professional Experience Certificate in Digital Media, Communication, and Technology, a complementary stand-alone program available to students in all Institute of Communication, Culture, Information and Technology (ICCIT) programs. The Certificate program includes two paid summer work terms plus three professional development courses also available to all students as program electives.

Program Pathway: Students taking the TCS major need 8.0 credits. CCT109H5, CCT110H5 and CCT111H5 are required for entry into the TCS program and account for 1.5 credits. TSC students take 6 second year half-courses (3.0 credits) from Table 4 below including CCT205H5, CCT208, CCT211H5, CCT212H5 and CCT285H5 which are required; and the remaining 7 half-courses (3.5 credits) at the third and fourth year including CCT320H5, CCT380H5, CCT432H5, and CCT485H5 which are required. Please see Appendix G for Curriculum Mapping Table based on Program Learning Outcomes Assessment Tools and DLEs.

Table 4: Technology Coding, and Society Courses

Course Code	Course Title	New or Existing	Primary Focus	Proposed Instructor
CCT109H5	Contemporary Communication Technologies *(Req)*	Existing	Theory	Coleman / Packer / Caraway / McEwen
CCT110H5	Rhetoric and Media *(Req)*	Existing	Theory	Szigeti / Cohen
CCT111H5	Critical Coding *(Req)*	Existing	Coding Literacy	Nixon
CCT202H5	Human-Machine Communication	Existing	Coding Literacy	McEwen
CCT205H5	Digital Innovation and Cultural Transformation *(Req)*	Existing	Theory	Packer
CCT208H5	Communications Research Methods *(Req)*	Existing	Data Analytics	Boase
CCT211H5	Fundamentals of User Interface Programming *(Req)*	Existing	Data Analytics	Nixon
CCT212H5	Hacker Culture *(Req)*	Existing	Theory	Delfanti
CCT221H5	Digital Marketing I	Existing	Theory	Virag
CCT226H5	Data Analysis I	Existing	Data Analytics	Boase / Bountali
CCT285H5	Immersive Environment Design *(Req)*	Existing	Coding Literacy	Caraway
CCT286H5	Interactive Media Design	Existing	Coding Literacy	New hire
CCT308H5	Advanced Research Methods	Existing	Data Analytics	Boase / McEwen
CCT320H5	Communication, Technology and Social Change	Existing	Theory	Delfanti

CCT380H5	Human-Computer Interaction and Communication *(Req)*	Existing	Coding Literacy	Munteanu
CCT382H5	Prototyping Digital Games	Existing	Theory & Coding Literacy	Nixon
CCT383H5	The Interactive Society	Existing	Coding Literacy	Munteanu
CCT410	Internship I	Existing	Experiential Learning	Bowen
CCT416H5	Social Data Analytics	Existing	Data Analytics	Boase / McEwen
CCT432H5	Ethics and Code *(Req)*	Existing	Coding Literacy	Karpi
CCT480H5	User Experience Analysis	Existing	Coding Literacy	Munteanu
CCT485H5	User Experience Design *(Req)*	Existing	Coding Literacy	Munteanu

Table 5: DLEs, Program Learning Outcomes and Requirements

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
1. Depth and Breadth of Knowledge In the course of their studies, students will gain an awareness and appreciation of the variety of modes of thinking, methods of inquiry and analysis, and ways of understanding the world that underpin different intellectual fields. Students will engage in critical thinking and analytical skills through courses within and beyond their core field(s) of study, across the humanities, the social and behavioural sciences, and the natural sciences.	Depth and Breadth of Knowledge is understood in the Major in Technology, Coding, and Society as the ability to: • identify and examine the central concepts, theoretical approaches and assumptions, intellectual history, and recent advances of the core field(s) of study; • describe the major topics in the core field(s) of study and how they relate to other fields of study; and • apply critical and analytical skills within and beyond the core field(s) of study.	The program is designed to provide students with the technical, research and critical thinking skills for developing interactive digital platforms, analyze data in relation to those platforms, and theorize about the impact of interactive technologies from social, humanistic and economic perspectives. The program focuses on the integration of technological skills with critical analysis and theories regarding the social use, potentialities, and consequences implicated within the design of interactive media platforms.	Depth and Breadth of knowledge of the theoretical concepts related to identifying and describing the social political economic and ethical contexts of digital technologies and practices is assessed at the introductory level through tests, quizzes essays, critical analyses and reflections in CCT109H5 Contemporary Communications Technologies, CCT110H5 Rhetoric and Media, CCT202H5 Human-Machine Communication and CCT212H5 Hacker Culture. Essays, critical analyses and

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
Students will attain depth of knowledge in their core field(s) of study through a progression of introductory, core and specialized courses.	This is reflected in students who are able to: • (PLO1) identify, describe, and evaluate the ethical aspects of development of digital media in relation to issues of inclusion, diversity, and sustainability; • (PLO2) describe and critique foundational theoretical approaches in communication, sociology, and media studies; • (PLO5) identify and apply new approaches to digital trace data collection and analysis;	Starting with the first year course in Critical Coding (CCT111H5), students develop coding literacy that is reinforced in second and third years and tested for mastery in 4th year user design and analysis courses. The depth and breadth of courses in the TCS major enables students to develop coding literacy and gain in-depth knowledge, empathy, and understanding of how their decisions when developing interactive platforms will impact society across stakeholder groups. Second year courses will build	case studies are used to describe and critique theoretical approaches in communication and media studies in CCT202H5 Human-Machine Communication, CCT212H5 Hacker Culture and CCT221H5 Digital Marketing I. Assessment of Depth and Breadth of knowledge of theoretical foundations at the intermediate and advanced levels seek to determine critical thinking that leads to identifying new approaches to digital media and communication practices and identifying ethical concerns and issues through critical analyses, case studies quizzes

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
		on students' coding skills and their theoretical understanding and cultural awareness of technology development and use gained in CCT109H5 and CCT110H5 with courses that look more specifically at Human-machine interactions for learning and sociability through CCT202H5 Human-Machine Communication and CCT205H5 Digital Innovation and Cultural transformation. In particular the following courses in the Major in Technology, Coding, and Society will contribute to the necessary depth and breadth of knowledge required by the	and oral presentations in CCT320H5 Communication, Technology and Social Change, and CCT432H5 Ethics and Code. Assessment of Depth and Breadth of knowledge related to practical skills and coding literacy begin at the introductory level in CCT111H5 Critical Coding through practical lab and software design assignments and further evaluated in relation to multi media production, presentations, tests and projects in CCT205H5 Digital Innovation and Cultural Transformation, and CCT211H5 Fundamentals

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
		graduates of this program: CCT109H5 Contemporary Communication Technologies, CCT110H5 Rhetoric and Media, CCT111H5 Critical Coding, CCT202H5 Human-Machine Communication, CCT205H5 Digital Innovation and Cultural Transformation, CCT211H5 Fundamentals of UI Programing, CCT212H5 Hacker Culture, CCT285H5 Immersive Environment Design, CCT286H5 Interactive Media Design, CCT382H5 Prototyping Digital Games, CCT432H5 Ethics and Code, CCT480H5 User Experience Analysis, CCT485H5 User Experience Design	of User interface Programming. CCT285H5 Immersive Environment Design, and CCT286H5 Interactive Media Design further test for useability of digital media and design capabilities through web portfolios, interactive design projects and prototypes and usability reports. Low stake assignments are used to scaffold learning in preparation for more complex skills applications. Staged assignments, high-fidelity prototypes oral presentations and usability reports are used to assess students' depth and breadth of knowledge at the intermediate and advanced

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
			levels of design in CCT380H5 Human-Computer Interaction and Communication, CCT382H5 Prototyping Digital Games, CCT480H5 User Experience Analysis and CCT485H5 User Experience Design. The assessment of integration of theory and practice relative to depth and beadth of knowledge begins in CCT110H5 Rhetoric and Media with projects that integrate students' theoretical knowledge of communications with the practical application projects such as podcasts and visual communication projects which is followed by multi-

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
			media presentations in CCT205H5 Digital Innovation and Cultural Transformation. CCT383H5 The Interactive Society uses debates, practicals and papers to articulate the theory to practice integration of media projects and CCT410H5 Internship I requires students to complete a work placement where they will apply their knowledge and skills to real life industry problems. Reflective writing and critical incident reports are also used for assessment.
2. Knowledge of Methodologies	Knowledge of Methodologies is understood in the Major in Technology, Coding ,and Society as the ability to:	The Technology, Coding, and Society major includes two research methods courses, one each at the 200	Knowledge of methodologies and students' abilities to develop fluency in foundational programming

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
Students will have knowledge of and experience with different methodologies and approaches relevant to their core field(s) of study.	• identify and describe methods of enquiry and/or creative activity for developing, analyzing and testing interactive media platforms • select and implement appropriate methodologies to engage in enquiry and data analysis in relation to interactive digital platforms; and • evaluate the efficacy of different methodologies in addressing questions that arise in user experience testing and platform analysis. This is reflected in students who are able to:	(CCT208H5 Communications Research Methods) and 300 levels (CCT308H5 Advanced Research Methods) as well as 2 courses in data analytics specific to the kinds of data sets students may encounter in the field and 2 courses the more fully integrate traditional research methods with coding practices. Knowledge of coding and coding literacy underline research methodologies in the TCS program. In particular the following courses in the Major in Technology, Coding, and Society will contribute to the necessary requirements for Knowledge of Methodologies: CCT111H5 Critical Coding,	skills, acquire academic research skills and social sciences data collection and analysis skills are assessed in CCT208H5 Communications Research Methods through qualitative and quantitative research assignments, tests and quizzes, in CCT226H5 Data Analysis I using Big Data projects and in CCT308H Advanced Research Methods, Data analysis project reports and oral presentations. CCT416H5 Social Data Analytics requires students to identify, collect, analyze and transform data into useable formats using case studies, reports, and oral presentations.

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
	• (PLO3) develop fluency in foundational programming skills for current digital platforms and computing tools and have skills appropriate to learning any similar tools that may be developed in future; • (PLO4) apply the primary data collection methods and analytic approaches used in social sciences; • (PLO5) identify and apply new approaches to digital trace data collection and analysis; • (PLO6) analyze and solve design problems relating to digital platforms, systems and applications; and	CCT226H5 Data Analysis I, CCT285H5 Immersive Environment Design, CCT380H5 Human Computer Interaction, CCT416H5 Social Data Analytics. Students will test their knowledge of design and research methodologies in CCT480H5 User Experience Analysis and CCT485H5 User Experience Design, both lab-based courses. CCT111H5 Critical Coding, CCT380H5 Human Computer Interaction, and CCT416H5 Social Data Analytics are courses that support the integration of research methodologies with coding fluency and literacy.	

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
	• (PLO8) identify, critique, and apply multiple techniques for data analysis in relation to technology design and user experience.		
3. Application of Knowledge Students will be able to frame relevant questions for further inquiry within or beyond the core field(s) of study. They will be able to identify and apply the appropriate tools with which they can address such questions effectively.	Application of Knowledge is understood in the Major in Technology, Coding, and Society as the ability to: • gather, review, interpret, produce, present, and critically evaluate information, arguments, assumptions, abstract concepts, hypotheses and/or creative options; • make informed judgments in accordance with the major theories, concepts, methods, and intellectual and creative traditions relative to coding	The Major in Technology, Coding, and Society involves the integration of practical labs with theoretical content with a focus of applying theories, methodologies, and designing protocols and applications within diverse digital contexts. The following courses, with a lab component, will contribute to the necessary requirements for application of knowledge and coding literacy: CCT111H5 Critical Coding, CCT211H5	Students are assessed on the application of knowledge through practical multi modal projects that include podcasts in CCT110H5 Rhetoric and Media, and multi media documents in CCT205H5 Digital Innovations and Cultural Transformation, software design projects in CCT111H5 Critical Coding and CCT211H5 Fundamentals of User Interface Programming, and interactive design projects, both web and app based in CCT285H5 Immersive

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
	and digital interfaces and platforms; • apply relevant concepts, principles, and techniques within and beyond the core principles of coding by understanding the impact of platform development across disciplinary and industry sectors; • frame appropriate questions, solve problems, and propose and test solutions; and • formulate coherent lines of argument. This is reflected in students who are able to: • (PLO4) apply the primary data collection methods and	Fundamentals of UI Programming, CCT226H5 Data Analysis I, CCT285H5 Immersive Media Design, CCT286H5 Interactive Media Design, CCT380H5 Human Computer Interaction and Communication, CCT382H5 Prototyping Digital Games, CCT383H5 The Interactive Society, CCT416H5 Social Data Analytics, CCT480H5 User Experience Analysis, CCT485H5 User Experience Design	Environment Design and CCT286H5 Interactive Media Design. Students are assessed on their abilities to both construct digital artifacts and report on the usability of their designs. CCT380H5 Human-Computer Interaction and Communication, CCT382H5 Prototyping Digital Games prepare students for user testing of their projects and assesses their capabilities of reporting on the user experience. CCT480H5 User Experience Analysis and CCT485H5 User Experience Design builds on the beginning user testing skills by assessing students' design capabilities through labs, and staged

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
	analytic approaches used in social sciences; • (PLO5) identify and apply new approaches to digital trace data collection and analysis; • (PLO6) analyze design problems relating to digital platforms, systems and applications; and • (PLO8) identify, critique, and apply multiple techniques for data analysis in relation to technology design and user experience.		design assignments and assesses their user experience testing through usability and team evaluations as well as revisions of a high-fidelity prototype that are reported through oral presentations.
4. Communication Skills Students will be able to effectively communicate and critically evaluate information, arguments, and analyses,	Communications Skills are understood in the Major in Technology, Coding, and Society as the ability to:	The Major in Technology, Coding, and Society requires students to have exceptional communication skills, particularly in the field of User Experience design. The	Written communications skills are assessed through written essays, critical analyses, case studies, usability reports, critical reflections and data analysis reports. Oral

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
using a range of modes of communication.	• express information, arguments, and analyses accurately and with clarity, using a range of modes of communication; • present work in a variety of formal and informal contexts in forms appropriate to the core field(s) of study; and • communicate effectively with a range of audiences. This is reflected in students who are able to: • (PLO7) work collaboratively and professionally on interdisciplinary teams or independently to create solutions and implementation strategies for problems relating to	following courses will contribute to the necessary requirements for Communication Skills: CCT110H5 Rhetoric and Media, CCT205H5 Digital Innovation and Cultural Transformation, CCT208H5 Communications Research Methods, CCT221H5 Digital Marketing I, CCT285H5 Immersive Environment Design, CCT286H5 Interactive Media Design, CCT308H5 Advanced Research Skills, CCT320H5 Communication, Technology and Social Change, CCT380 Human Computer Interaction and Communication, CCT382H5 Prototyping Digital Games,	communications skills will be assesses by both individual and group oral presentations and podcasts starting with CCT110H5 Rhetoric and Media and CCT285H5 Immersive Environment Design group presentations of a multimedia project, CCT308H5 Advanced Research Methods require oral presentations of research analyzed, CCT383H5 The Interactive Society debates and rebuttals, CCT380H5 Human-Computer Interaction and Communication oral presentations, oral presentations in CCT416H5 Social Data Analytics, CCT432H5 Ethics and Code, CCT480H5 User Experience

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
	design in the digital and interactive media domains; and • (PLO8) identify, critique, and apply multiple techniques for data analysis in relation to technology design and user experience.	CCT383H5 The Interactive Society, CCT410H5 Internship I, CCT432H5 Ethics and Code, CCT480H5 User Experience Analysis, CCT485H5 User Experience Design	and CCT485H5 User Experience Design. CCT410H5 Internship I supervisor evaluations include the assessment of the students' oral and written communication skills.
5. Awareness of Limits of Knowledge Students will acknowledge and appreciate the limits of their own knowledge. They will also gain an awareness of the uncertainty, ambiguity, and limits of collective knowledge and how these might influence analyses and interpretations.	Awareness of Limits of Knowledge is understood in the Major in Technology, Coding, and Society through the design and analysis of platforms and the challenges of identifying and responding to user needs in a continuously changing social, technical and economic environment. Students gain a heightened awareness and firsthand experience of the	Students apply both design and research methodologies to user testing protocols in the 4th year which will highlight the gaps in knowledge about how humans interact with information and digital interfaces. The following courses provide students with the opportunity to examine the limits of their knowledge leading up to the	Critical thinking and application of ethical design skills are integrated into courses at the introductory years such as CCT111H5 Critical Coding and CCT211H5 Fundamentals of User Interface Programming and the=n assessed in terms of gaps, issues and weak usability. Students are assessed in these courses as well as CCT285 Immersive

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
	limits to both their knowledge and technologies they design when tested by user groups. When they are required to: identify the limits of their own knowledge and ability; and recognize the uncertainty, ambiguity and limits of knowledge and how this might influence analyses and interpretation of data which will impact the users of technology in rapidly changing environments. Recognizing knowledge gaps is particularly important for TCS students as they engage with "real life" users under a myriad of conditions and circumstances. An awareness of the student's knowledge limitations is	4th year design and testing: CCT111H5 Critical Coding, CCT208H5 Communications Research Methods, CCT211H5 Fundamentals of UI Programming, CCT226H5 Data Analysis I, CCT285H5 Immersive Environment Design, CCT308H5 Advanced Resarch Methods, CCT380H5 Human Computer Interaction and Communication, CCT383H5 The Interactive Society. The importance of recognizing knowledge gaps and limits will be further reinforced as students test their coding mastery and awareness of the humanistic and ethical aspects	Environment Design, CCT286H5 Interactive Media Design, CCT380H5 Human-Computer Interaction and Communication, CCT382H5 Prototyping Digital Games and CCT480H5 User Experience and CCT485H5 User Experience Design in relation to how well they have applied the theoretical and practical knowledge through prototypes and projects and assessed on their abilities to identify gaps and also faults within the design, the testing and the reporting. Useability reports, user testing reports, quizzes and oral presentations are used to assess the students' ability to articulate

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
	reflected in students who are able to: • (PLO6) analyze design problems relating to digital platforms, systems and applications; and • (PLO8) identify, critique, and apply multiple techniques for data analysis in relation to technology design and user experience.	of design in CCT410H5 Internship I, CCT416H5 Social Data Analytics, CCT432H5 Ethics and Code, CCT480H5 User Experience Analysis, CCT485H5 User Experience Design.	the limitations of knowledge. Reflective writing and reports complement the testing tools.
6. Autonomy and Professional Capacity Students will acquire the skills and knowledge they need to become informed, ethical, independent and creative thinkers and decision-makers; gain an awareness and	Students in the TCS Major will learn to develop, analyze and then theorize about the social and economic impact of integrative technologies. They must be cognizant of the human factors involved in ethical design and coding practices. Autonomy and	The TCS Major incorporates experiential learning whenever possible including opportunities to complete industry-based internships. Experiential learning requires self-directed decision making based on reflective practice which contributes to	Assessment of students' level of autonomy and professionalism is based on several modes of evaluation. Students must demonstrate professionalism through their involvement in research work in CCT308H5 Advanced Research Methods, and

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
appreciation that knowledge and its applications are influenced by and contribute to society; and to lay the foundation for learning as a life-long endeavor.	Professional Capacity is understood in the Major in Technology, Coding, and Society as the ability to: • manage their own learning within and beyond the core field(s) of study; • uphold the ethical values of the University, including freedom of expression and enquiry and its principles of academic integrity, equity and inclusion; • exercise initiative, personal responsibility and accountability in personal and group decision-making contexts; and • identify how their areas of study relate to their personal	developing autonomy and professional capacity. Lab-based work will also require students to work collaboratively on teams where they will learn project management and negotiation skills. The following courses provide students with the opportunity to develop autonomy and a capacity for professionalism within the field and the workplace: CCT308H5 Advanced Research Methods, CCT380H5 Human Computer Interaction and Communication (required course), CCT383H5 The Interactive Society, CCT410H5	through their interactions on team projects and those (CCT380H5 Human Computer Interaction and Communication, and CCT485H5 User Experience Design) which involve user experience interactions. Courses such as CCT380H5 Human Computer Interaction and Communication, and CCT485H5 User Experience Design require students to complete peer evaluations as well as present their projects orally. Students are required to also write reflections on the work they do and their contributions to team projects. Students taking CCT410H5 Internship I must

Degree Level Expectations	Program Learning Outcomes	How the Program Design/Structure Supports the Attainment of Student Learning Outcomes	Assessment Tools
	and professional development. Experiential learning approaches to courses with the TCS major reinforce individual autonomy and team-based projects reinforce professional practices. These attributes are reflected in students who are able to: • (PLO7) work collaboratively and professionally on interdisciplinary teams or independently to create solutions and implementation strategies for problems relating to design in the digital and interactive media domains.	Internship I, CCT485H5 User Experience Design	demonstrate autonomy when at their work placements and then articulate how they understand their professional responsibility and accountability through reflective critical incident reports and oral presentations.

7 Assessment of Learning

- Appropriateness of the proposed methods for the assessment of student achievement of the intended program learning outcomes and degree level expectations.
- Describe plans for documenting and demonstrating the level of performance of students consistent with the DLEs. (Assessment of Teaching and Learning examples in Guide to Quality Assurance Processes.)

The Technology, Coding, and Society Major focuses on a combination of teaching strategies and course delivery, which in turn, offers the opportunity to use a diverse range of assessment tools.

The ICCIT is committed to incorporating experiential learning into as many courses as possible. The list of assessment methods includes tests, projects, digital assets and objects, group projects, group presentations, posters, and reflections. As much as traditional tests, quizzes and essays are featured, the approach to assessment in the Technology, Coding, and Society Major highlights a diverse range of assessment tools that include case studies, prototype design and construction, Mobile App design and development, podcasts usability evaluations, portfolios, videos, self-evaluations and reflections and oral presentations on usability evaluations, prototype designs and ethical debates. The Technology, Coding, and Society Major incorporates a collaborative approach to learning that is the key to students` success, with group projects and presentations used in a higher number of courses than most other assessment methods — particularly in the upper years in keeping with degree level expectation curriculum plans. Two required capstone courses allow for formal assessment of student breadth and integration across core areas of the program – CCT432H5 (Ethics and Code) emphasizes the theoretical side of the program and is complimented by CCT485H5 (User Experience Design), which focuses on technical and design aspects. An additional two capstone courses (CCT400H5, Advanced Project and CCT499Y5 Research Opportunity) are available as degree electives to students. Experiential learning is incorporated into a number of courses where students work on user design projects or create immersive environments, as well as opportunities provided by CCT410H5 Internship I and the Professional Experience Certificate in Digital Media, Communications and Technology as high impact approaches to teaching and learning. Critical reflection also figures high amongst the assessment tools used that complements the extensive use of group work and collaboration, befitting of digital

technology industries. ICCIT recognizes the importance of writing within the discipline and CCT110H5 has an intensive writing focus.

Quality Assurance of the major would be managed through our annual program review process where the ICCIT Curriculum Committee assesses whether students have achieved the PLOs within the DLEs defined and will include curriculum mapping. This will be informed by regular meetings with the ICCIT Student Council and ICCIT Advisory Board, which includes representation from not-for-profit organizations and secondary school educators. ICCIT already reaches out to their alumni via a program survey. It is expected that TCS graduates will be included in this alumni network and survey, with program-specific questions for the TCS major to be included with the first graduating class.

8 Program Description and Calendar Copy

- Provide a description of the program (audiences: prospective and current students, staff, and employers) that can be used for external and internal posting that includes the key features of the program:
  - Program's purpose (who is it for, what are the outcomes).
  - Nature of learning environment (including mode of delivery).
  - Approaches to teaching/learning/assessment.
  - Basic information (e.g., FCE count, program length, etc.).
- Provide, as an appendix, a clear and full calendar copy including:
  - The program description; the program requirements including all required courses and recommended electives and their prerequisites, including for any streams.
- Provide as an appendix:
  - A full list of the all courses included in the program including course numbers, titles, and descriptions.
  - Please indicate clearly whether they are new/existing. (Please note that all new courses should be proposed and approved independently in line with established academic change procedures. Where possible, append full course proposals as an appendix).

Major Program ERMAJ#### Technology, Coding, and Society

The Technology, Coding, and Society (TCS) major program focuses on the impact of technologies, including hardware, platform and associated software, on people and on society more generally. Students learn essential computer coding skills, are taught theories

on the use of digital platforms from humanistic and social science perspectives, learn to analyze the data that digital platforms produce, and then apply these concepts through practical labs. Students are strongly encouraged to pair the major with ICCIT's Professional Experience Certificate in Digital Media, Communication, and Technology, which includes a required professional experience internship.

See Appendix A for a full list of the all courses included in the program including course

9 Consultation

- Describe the expected impact of what is being proposed on the nature and quality of other programs delivered by the unit/division.
- Describe the expected impact of what is being proposed on programs being offered by other units/divisions.
- Describe any consultation with the Deans of Faculties/divisions that will be implicated or affected by the creation of the proposed program.

At UTM, all 18 academic units were consulted. The proposal was shared with the Faculty of Arts & Science (St. George campus) Dean's Office, who shared it with their Department of Computer Science, the Institute for History and Philosophy of Science and Technology, Book & Media Studies at St. Michael's College and Digital Humanities at Woodsworth College. The proposal was also shared with the Dean's Office at the Faculty of Information. Confirmation was received from their Associate Dean, Academic that the proposal was subsequently shared with the Bachelor of Information (BI) Director and noted that while the two undergraduate programs do share similarities, they will also offer "complementary opportunities for students without undue duplication or confusion." The Dean's Office at UTSC (Scarborough campus) was also sent the proposal for review. Constructive and encouraging feedback was received across the academic units. Comments and suggestions were considered by ICCIT and incorporated throughout this proposal as appropriate.

Relevant professional organizations: Girls Who Code; Canada's Association of Information Technology Professionals, Canadian Digital Media Network; RIC Centre. Members of these organizations work in the technology industry and have a strong knowledge of the skills required in this area. They also are places where ICCIT students currently receive work integrated learning opportunities and are familiar with the level of expertise offered at ICCIT.

10 Resources

10.1 Faculty

- Complete Table 3 below.
- Brief commentary, including:
  - Evidence of the participation of a sufficient number and quality of faculty who will actively participate in the delivery of (teach and/or supervise) the program.
  - Evidence of and planning for adequate numbers and quality of faculty and staff to achieve the goals of the program.
  - The role of any adjunct or contractual (e.g., stipendiary) faculty.
  - The provision of supervision of experiential learning opportunities, as appropriate.
  - If relevant, plans and commitment to provide additional faculty resources to support the program.
  - Planned/anticipated class sizes (connect this to delivery method, Section 8 and assessment methods, Section 9).
- Provide the CVs of all faculty who appear in Table 3, as evidence substantiating the above. The appendix should form a separate document with a table of contents and all CVs in alphabetical order. CVs should be submitted in a consistent format.

All required courses for the proposed major program will be covered with the current faculty complement. Existing faculty will also teach course options within the program and are currently doing so with the exception of one course, CCT286H5 Interactive Media Design. This course is currently taught by a sessional instructor but will be taken over by a new faculty in Design, who is expected to join UTM in July 2022. The Office of the Dean is committed to this new program and providing the necessary support for its success. One new faculty hire will happen in 2021-2022 in ICCIT, which is expected to be this hire in Design. With this new faculty hire, all faculty resources for this propose major will be in place.
As reflected in our existing courses — e.g., Critical Coding, Design Thinking, Fundamentals of User Interface Programming, Hacker Culture, Interactive Media Design, etc. Moreover, our interest in this program is reflected in the hires that we have made over the past five years, which includes tenure stream faculty members Deflanti, Packer, Karppi, Coleman and teaching stream faculty Steve Szigeti and Michael Nixon. These faculty members collaborated in the development of the TCS major proposal, identifying and designing a unique program that is complementary to existing programs, and fill needs for students who want to engage with more coding in technology and society courses. These faculty members join a larger

group of ICCIT faculty to teach courses in the new program (see p. 26 to 27), and have a deep intellectual commitment to the study of technology, taking historical, cultural and societal influences into consideration. With hundreds of publications and decades of corporate experience in technology companies among them, the program is built on the existing expertise of an interdisciplinary group of scholars, with skillsets in data analysis, software development, rhetoric and Human Computer Interaction.

Table 6 below provides the detailed listing of faculty committed to the TCS Major. Full CVs for all faculty are provided in the CV Compendium (Appendix H).

Table 6: Detailed Listing of Committed Faculty

Name	Academic Area	Unit of Primary Budgetary Appt and %	Unit of Other Budgetary Appt and % (if applicable)	Commitment to other programs (please list other programs in which the person routinely teaches/ supervises)	Nature of Contribution to This Program
Tenure Stream: Full					
Jeremy Packer	Media History; Mobility Studies; Military and Autonomous Technologies; Media Theory; Cultural Studies	ICCIT, 100%		CCIT, MI, PhD in Information	Course Instructor
Tenure Stream: Associate Professor					
Jeffrey Boase	Communication technology; Network analysis; Digital trace data; Cross-cultural research; Mobile communication	ICCIT, 100%		CCIT[18], MI[19], PhD in Information[20]	Course Instructor (CCT208H5)

[18] Communication, Culture, Information & Technology program offered through the ICCIT

[19] Master of Information program offered through the Faculty of Information

[20] Offered through the Faculty of Information

Name	Academic Area	Unit of Primary Budgetary Appt and %	Unit of Other Budgetary Appt and % (if applicable)	Commitment to other programs (please list other programs in which the person routinely teaches/ supervises)	Nature of Contribution to This Program
Brett Caraway	Media economics, Internet law, innovation studies, sustainability management, ecological economics	ICCIT, 100%		CCIT, MI, PhD in Information	Course Instructor
Nicole Cohen	Political economy of communication; Labour, work and organizing in media and cultural industries; digital journalism	ICCIT, 100%		CCIT, PWC[21], MI, PhD in Information	Course Instructor
Beth Coleman	Critical race theory, big data, game studies, media theory, transmedia art and design	ICCIT, 100%		CCIT, MI, PhD in Information	Course Instructor (CCT109H5)
Alessandro Delfanti	Science and Technology Studies; Technology and Labour; Hacking; Political Economy of Communication/Information; Scholarly Publishing	ICCIT, 100%		CCIT, PWC, MI, PhD in Information	Course Instructor

[21] Professional Writing and Communication program offered through the ICCIT

Name	Academic Area	Unit of Primary Budgetary Appt and %	Unit of Other Budgetary Appt and % (if applicable)	Commitment to other programs (please list other programs in which the person routinely teaches/ supervises)	Nature of Contribution to This Program
Rhonda McEwen	Social/New media; network analysis; mobile communication; information practices	ICCIT, 100%		CCIT, MI, PhD in Information	Course Instructor (CCT202H5)
Gabor Virag	Auction theory; economics of the internet; consumer and labour market search; political economy	Management, 51%	ICCIT	Department of Management; Rotman School of Management, graduate programs	Course Instructor (CCT322H5)
Tenure Stream: Assistant Professor					
Olga Bountali	operations management with a focus on stochastic modeling and complex decision-making under competition	ICCIT, 51%	Management 49%	Department of Management; Rotman School of Management, graduate programs	Course Instructor
Negin Dahya	Digital media and learning, refugee education and technology, feminist theory and methodology, critical race theory, postcolonial theory, science	ICCIT, 100%		CCIT, MI, PhD in Information	Course Instructor (CCT308H5)

Name	Academic Area	Unit of Primary Budgetary Appt and %	Unit of Other Budgetary Appt and % (if applicable)	Commitment to other programs (please list other programs in which the person routinely teaches/ supervises)	Nature of Contribution to This Program
	and technology studies, visual research methods				
Tero Karppi	Critical/cultural studies of social media platforms; affect theory; non-human theories; computational culture	ICCIT, 100%		CCIT, MI, PhD in Information	Course Instructor (CCT432H5)
Cosmin Munteanu	Human Computer Interaction, New Media, Mobile and Multimodal Interaction, Spoken Language Interaction, Intelligent and Natural User Interfaces, Assistive Technologies, Mixed Reality Systems, Personal Learning Assistants, Interactive Technologies to Support Older Adults	ICCIT, 100%		CCIT, MI, PhD in Information, PhD in Computer Science	Course Instructor (CCT380H5; CCT480H5)
Teaching Stream: Associate Professor, Teaching Stream					

Name	Academic Area	Unit of Primary Budgetary Appt and %	Unit of Other Budgetary Appt and % (if applicable)	Commitment to other programs (please list other programs in which the person routinely teaches/ supervises)	Nature of Contribution to This Program
Tracey Bowen	Visual Communications; experiential education; student identity construction	ICCIT, 100%			Course Instructor (CCT410H5)
Teaching Stream: Assistant Professor, Teaching Stream					
Michael Nixon	Al(agents), Human-computer interaction, Game design, Game studies	ICCIT, 100%			Course Instructor (CCT111H5; CCT211H5)
Steven Szigeti	Experiential education, design thinking, human computer interaction, data visualization, new media, game design	ICCIT, 100%			Course Instructor (CCT110H5)

11 TA Support

- Give details regarding the nature and level of TA support required by the program.

The continuation of current TA support for the existing ICCIT courses that will support this proposed new program is required. TA support will be monitored by both ICCIT and the Office of the Dean and reviewed on a regular basis to ensure any concerns and/ or anticipated changes are adequately addressed. The Office of the Dean is committed to maintaining the required TA support for this program and its courses.

12 Learning Resources

- Evidence that there are adequate resources to sustain the quality of scholarship and research activities of undergraduate and graduate students, including library support.
- Describe any resources that enhance the learning and teaching environment, including resources to promote student well-being and resiliency in the learning and teaching environment. Note: Standard appendices on the library and student support are always included in the proposal. You may also wish to highlight specific aspects of the following resources and supports as appropriate for the proposed program:
  - Library
  - Co-operative Education
  - Academic Advising (including international student advising)
  - Teaching and Learning Office
  - Technology Support for Teaching and Learning
  - Distance/Online Learning
  - Peer Learning Support
  - Disabilities/Accessibility Services
  - Student Academic Support Services
  - Academic Computing Services
  - Other unit- or program-specific supports/services

ICCIT has a team of dedicated academic advisors to support students with program planning. This is especially useful for international students who appreciate having a point of contact within the department. In addition, our ICCIT Peer Mentorship program, where upper-year students provide one-on-one mentorship of students entering the programs has proven to be highly successful and a source of peer learning support. TCS majors will be able to make use

of Accessibility Services as do all of ICCIT's students and including our undergraduate students in digital laboratories of our faculty researchers will be a mechanism to enhance teaching and learning outside of the classroom.

Please see the following appendices:
Appendix D: Library statement confirming the adequacy of library holdings and support for student learning.

Appendix E: Standard statement concerning student support services.

13 Space/Infrastructure

- Evidence that there are adequate resources to sustain the quality of scholarship and research activities of undergraduate and graduate students, including information technology support and laboratory access; address any unique requirements including renovations to existing space, new space, equipment, etc.
- Note: The requirements for physical facilities should be identified by providing information on the change in the number of people to be accommodated by type (i.e., faculty, students, administrative staff, etc.) as well as information on changes in equipment and activities requiring accommodation. The division/Faculty should state whether it plans to bring forward proposals for additional space; the renovation of existing space; or whether the current space allocation to the academic program will accommodate the new initiative.

One of the pedagogical aims of this program is to provide students with increased opportunities for hands-on learning activities; for this, many of the courses will meet the requirements of experiential learning. As such, a dedicated environment is required.
All lectures for the new program can be supported by existing IT and class infrastructure available on campus, primarily in the CCT building. The new experiential courses and tutorials required by this program will occur in CCT 3110, which is currently administered by the ICCIT. This room will serve as our IT-based laboratory for this program, and it has been identified as the ideal room for this purpose through consultation with the ICCIT Director and senior teaching and administrative staff. Having a dedicated IT-based laboratory is common in other programs with a significant hands-on component (e.g., Computer Science).

Our analysis indicates that CCT 3110 already has the IT infrastructure needed to support this, and due to this room being directly administered by ICCIT, additional upgrades are logistically

and financially feasible. In particular, we have identified that the room supports tutorial and practical sessions with up to 40 students using currently installed workstations. ICCIT has already allocated funds to increase the mobility of equipment (which will permit more experiential learning opportunities) through the expected purchase of laptops and tablet computers that students will be able to sign out. CCT 3110 already has a secure storage facility in place, specifically designed for this use. As such, our space and infrastructure analysis suggests that, with currently planned upgrades, the new program will enable students to engage in additional experiential learning activities (e.g., media production, high-performance data analytics, user experience design, interface evaluations, usability data analysis) without any additional physical or IT infrastructure burden on the university.

The completion of digital media laboratories currently in planning stages and the move to the Arts, Culture and Technology building (expected 2025) will provide additional facilities for the rich teaching and learning experiences offered within this new major.

14 Other Resource Implications

- For example,
  - Are there interdivisional teaching implications?
  - Will the new program affect any existing agreements with other institutions, or will require the creation of a new agreement to facilitate the new program (e.g., Memorandum of Understanding, Memorandum of Agreement, etc.). (Existing joint programs are offered with Centennial, Sheridan and Michener.)
  - If this is a new joint program, please indicate how future reviews of the program will be conducted in accordance with UTQAP 2.1: “Where a program is held jointly with an Ontario institution that does not have an IQAP that has been ratified by the Quality Council, the UTQAP will serve as the guiding document and University of Toronto will be the lead institution. Where a program is held jointly with an Ontario institution that does have an IQAP that has been ratified by the Quality Council, a lead institution will be selected. Program proposals specify how future reviews will be conducted.”
- Please consult with the Provost’s Office (vp.academicprograms@utoronto.ca) early regarding any resource implications described in this section.

Significant course enrolment increases are not expected as the courses for this TCS Major have already been integrated into the ICCIT curriculum and offered regularly over the past

two to three years. Interest and demand for this program is very much present at UTM with students eagerly waiting to take advantage of this opportunity. Course enrolments and waitlists for program courses will be monitored by ICCIT with course enrolment caps being increased as appropriate based on demand by qualified students. This will be done with the assistance of the Office of the Dean and the Office of the Registrar to ensure that resourcing is coordinated and approved as required.

This new program is not expected to affect any existing agreements with other institutions or require the creation of any new agreements.

15 Quality and Other Indicators

- Please describe the appropriateness of the faculty's collective expertise and how it contributes substantively to the proposed program. Define and use indicators to provide evidence of the quality of the faculty (e.g., qualifications, research, innovation and scholarly record).
- Please explain how the program structure and faculty research will ensure the intellectual quality of the student experience.
- Please describe any elements that enhance the program's diversity.

The faculty for the Technology, Coding, and Society major are experts in their fields in areas that contribute to this major. Many of these courses are already being taught by these faculty with great facility. All tenure stream faculty have strong scholarly records (including federal grants in their areas) and the recently hired teaching stream faculty have a combination of scholarly publishing and industry experience. Prof. Cosmin Munteanu teaches the greatest concentration of Human Computer Interaction courses among assistant professors (tenure track) at the University of Toronto. Prof. Alessandro Delfanti has written a text on media and communication, translated into Italian and is in its second edition). Profs. Cohen and Karppi are recent authors with award winning books in their field. Prof. Tracey Bowen is UTMs expert in experiential learning.

ICCIT is committed to a range of diversities, including those along race, discipline, cognitive abilities, and gender lines. At ICCIT our faculty intentionally seek even more equity and inclusion through recommendations from our Equity, Diversity & Inclusion (EDI) committee via curriculum review and complement planning. The TCS major will benefit from these existing mechanisms.

Faculty will bring their research expertise to the courses allocated to enrich the student experience by providing students with opportunities to learn through the sharing of case studies and other experiential opportunities as relevant to the course.
As a smaller cohort of students, the TCS majors will have a community of students with similar interests and classes with close interactions with instructors.

Appendix A: Academic Calendar Entry

Major Program ERMAJ#### Technology, Coding, and Society (Arts)

The Technology, Coding, and Society (TCS) major program focuses on the impact of technologies, including hardware, platform and associated software, on people and on society more generally. Students learn essential computer coding skills, are taught theories on the use of digital platforms from humanistic and social science perspectives, learn to analyze the data that digital platforms produce, and then apply these concepts through practical labs and through optional work-integrated learning opportunities. Since the TCS Major is within the Institute of Communication, Culture, Information and Technology (ICCIT), students can concurrently obtain a Professional Experience Certificate in Digital Media, Communication, and Technology from ICCIT.

8.0 credits are required including at least 4.0 at the 300/400 level. Program must be taken in combination with another major or two minors.

Limited Enrolment — Admission is based on academic performance (CGPA) in a minimum of 4.0 credits that must include CCT109H5, CCT110H5 and CCT111H5. Enrolment in this program is determined annually and is limited to students who have a CGPA of at least 2.4. **Tuition fees for students enrolling in any CCIT Specialist/Major programs will be higher than for other Arts and Science programs.**

First Year: (1.5 credits required)
CCT109H5, CCT110H5, CCT111H5

Second Year: (3.0 credits required)
CCT205H5, CCT208H5, CCT211H5, CCT212H5 and CCT285H5
0.5 credits from the following courses: CCT202H5 or CCT221H5 or CCT226H5 or CCT286H5

Third and Higher Years: (3.5 credits required)
CCT320H5, CCT380H5, CCT432H5, and CCT485H5
1.5 credits from the following courses: CCT308H5 or CCT382H5 or CCT383H5 or CCT410H5 or CCT416H5 or CCT480H5

Notes:

1. 300/400-level CCT courses are restricted to students in ICCIT programs only.
2. It is your responsibility to ensure that the prerequisites for courses listed in the calendar have been met. Students without the prerequisites can be removed at any time. **No waivers will be granted.**

Appendix B: Course Descriptions

Please note that all the courses listed below are existing.

CCT109H5 Contemporary Communication Technologies (SSc)

This course examines different information and communication technologies (ICTs) through the analysis of such genres as contemporary written, visual, oral, electronic and musical forms. It illustrates a range of theoretical perspectives that seek to explain the relationship between communication and technology. This course will also examine, briefly, the history of ICTs. [24L, 11P]

CCT110H5 Rhetoric and Media (SSc)

This course critically examines the written, visual, aural, and dynamic rhetoric as it pertains to communications for academic and other purposes across a range of digital and interactive media discourses. [24L, 11T]
Prerequisite: CCT109H5

CCT111H5 Critical Coding (SSc,EXP)

This experiential learning course introduces students to the practice and theory of coding, programming, and basic development of user-oriented software. The lectures illustrate a core range of software development concepts that provide the foundations needed for the practical coding of front-end applications such as mobile interfaces or of back-end software such as introductory artificial intelligence or social media analysis. The practicals are lab-based and focus on applying these theoretical skills to solving problems grounded in a critical understanding of the interaction between people, culture, and society, by developing software or apps in languages such as Java, Objective C, Swift, Python. [24L, 12P]
Corequisite: CCT109H5, CCT110H5

CCT202H5 Human-Machine Communication (SSc)

From voice responsive cars and virtual assistants to social robots and smart toys, people are increasingly and interacting with communicative technologies in their daily lives. In this course students will consider the implications of this evolution in communication practice — informing design, ethics, efficacy, privacy, and other implications. Human-machine communication is a specific area of study within communication encompassing human-computer interaction, human-robot interaction, and human-agent interaction. [24L]

Prerequisite: CCT109H5, CCT110H5

CCT205H5 Digital Innovation and Cultural Transformation (SSc)

An examination of the problems caused by the introduction of digital and computing technologies to modern culture. Topics range from the social and cultural outcomes of media convergence; effects of the digital revolution in communications technologies; the impact of miniaturization on the application of computing technologies; the relevance of virtual environments; the interplay between pre-industrial, industrial and information cultures. [24L, 12T]
Prerequisite: CCT109H5, CCT110H5

CCT208H5 Communications Research Methods (SSc)

The course is a critical survey of research methodologies in the field of communication and media. A central goal of the course is to train students to collect, manage, analyze and interpret social science research data. Each week students are required to attend a one hour in-class lecture and view a one-hour online lecture. The online lectures will be posted at least one week before the week in which they are assigned. [24L, 8T]
Prerequisite: CCT109H5, CCT110H5

CCT211H5 Fundamentals of User Interface Programming (SSc,EXP)

This experiential learning course introduces students to the practice and theory of coding, programming, and development of user interfaces. The lectures illustrate an advanced range of software development concepts needed for the practical coding of user interfaces across a variety of devices. The practicals are lab-based and focus on applying these theoretical skills to design, implementation, and testing of user interface software components. Students will have the opportunity to acquire project management and software engineering skills Scrum, Agile), programming languages (Java, Javascript, Objective C, Swift, and other mobile and web programming languages), and evaluation methodologies (unit testing, bug tracking). [24L, 12P]
Prerequisite: CCT109H5, CCT110H5, CCT111H5

CCT212H5 Hacker Culture (SSc)

By subverting and re-appropriating technologies, hackers influence both the evolution of computing and the politics of digital media. Hacking contributes to shaping the future of entrepreneurship, free speech, surveillance, and intellectual property. The course will examine

the cultural, social, and legal facets of hacking in fields ranging from software production to political activism and the hacker underground. It will be based on social science research on hackers as well as concrete examples of data re-appropriation and technology modification. [24L]

CCT221H5 Digital Marketing I (SSc)

Techniques for developing a comprehensive marketing strategy will be developed with particular emphasis on digital products and services. The nature of digital markets, approaches to advertising, pricing and such areas as versioning will also be discussed. [24L]
Exclusion: (MGT252H5 or MGT352H5) and CCT322H5
Prerequisite: CCT109H5 and CCT110H5

CCT226H5 Data Analysis I (SSc)

This course introduces students to the basic tools of data analysis, most particularly statistics and modeling that are critical for subsequent courses in Marketing and Data Analysis II. Students are introduced to basic principles of descriptive and inferential statistics with a focus on the types of data that they will typically encounter in a digital environment. [24L, 12P]
Prerequisite: CCT109H5, CCT110H5; MGM101H5, MGM102H5

CCT285H5 Immersive Environment Design (SSc)

Students will develop skills in the areas of bitmap/vector graphics, audio/visual production and editing, 2D/3D modeling and animation, and video game design. Students will produce immersive environments while addressing and engaging issues of remix culture and intellectual property. [24L, 12P]
Prerequisite: CCT207H5, CCT218H5

CCT286H5 Interactive Media Design (SSc)

This course provides students with the opportunity to learn the skills necessary to produce responsive web content. Students will develop skills in the areas of website design, interactive and animated web content, mobile app development, and mobile game development. [36P]
Prerequisite: CCT109H5, CCT110H5, CCT285H5

CCT308H5 Advanced Research Methodologies (SSc)

This course provides students with an in-depth study and critical analysis of research methodologies within the discipline of communications and new media. Students will learn to explicitly identify generalizable findings, ethical concerns, study limitations, and new

contributions to the field of knowledge using existing studies in qualitative, quantitative and mixed methodologies. Students will also gain experience in identifying and assessing problems within a research design and develop the ability to recommend revisions and/or new contexts and techniques for replicating the studies. [24L]
Exclusion: CCT309H5
Prerequisite: CCT208H5

CCT320H5 Communication, Technology, and Social Change (SSc)

This course offers students an opportunity to investigate the evolving relationship between cultural production, social order and the development of communication technology. Students will critically assess how a wide variety of technological-mediated practices have brought about significant social changes by affecting community structures and notions of individual identity, facilitating cultural exchanges and misunderstandings, impacting public opinion and enabling new modes of political organization and unrest. As part of that endeavour we will examine various theories of collective action, including collective behaviour theory, resource mobilization, new social movements, gift economies and class struggle. These theoretical perspectives will be evaluated based on their potential to inform our understandings of historical and contemporary examples of communities of practice. [24L]
Prerequisite: CCT210H5/222H5

CCT380H5 Human-Computer Interaction and Communication (SSc, EXP)

The emphasis in this course will be on theoretical, methodological and empirical issues in the study of Human-Computer Interaction. Intelligent interface designs, usability assessment, user modeling and the accessibility of the technology for the disabled are among the topics to be examined. Related behavioural investigations concerning the ease and efficiency of users' interactions with computerized environments will also be discussed. [36P]
Prerequisite: CCT109H5, CCT110H5

CCT382H5 Prototyping Digital Games (SSc)

This course explores the fundamentals of the process of game design through prototyping. It focuses on the contexts and components of game design, such as design iteration and user testing along relevant dimensions such as art style, narrative and game balance. Students will be introduced to design across different genres and types of digital games, including games for education, serious games, indie and AAA games. Working in collaborative groups, students will

learn and practice the appropriate methodology to design game mechanics, characters, art assets and other appropriate deliverables in order to create a game or high-fidelity prototype. [24L]
Prerequisite: CCT218H5

CCT383H5 The Interactive Society (SSc)

This course introduces students to the theoretical and practical study of how interactive digital media and systems affect, influence and reshape our society and what does it mean to be a "user" in the information-centric society. It will expose students to specific theoretical issues such as privacy by design, usable privacy, marginalized and at-risk user groups, the digital divide, behavioural modification (persuasion) through new media, ICT4D (info tech for development) and empowerment/alienation through intelligent interactive systems. Focus will be on developing skills that will enable students to propose changes (design, policy, framework) to existing and future envisioned interactive technologies that address the issues analyzed. [36P]
Prerequisite: CCT109H5, CCT110H5, minimum of 8.0 credits.

CCT410H5 CCIT Internship I (SSc,EXP)

This course is a practical internship and is available only upon application from students registered in the CCIT/DEM programs. Through a placement, students will apply the expertise in communication, culture, and information technology that they have gained through previous courses. Students must plan well in advance for the placement and work closely with the placement officer for CCIT to determine eligibility and suitability. A report and presentation will be required at the end of the placement. These, along with the employer's assessment, will provide the main part of the course mark. [14S]
Prerequisite: Completion of 13.0 credits; minimum CGPA 2.5; and permission of internship coordinator.

CCT416H5 Social Data Analytics (SSc)

This course highlights the research in analysis for social data and builds skills to undertake those analysis. It is a lab-intensive course intended to build up data analytic skills for novice and intermediate researchers. Students look at recent studies using "big data" which are primarily theoretical, including critiques of data analytics and concerns surrounding data ethics. Students learn a programming language — Python — and how to scrape social data, store and collect it,

run basic statistics, generate visuals and create a report based on a project of interest. [24P]
Prerequisite: CCT208H5

CCT432H5 Ethics and Code (SSc) **CAPSTONE**

A self-driving car should always protect pedestrians, even if that implies serious threat for the vehicle's passengers. Current ethical challenges within our computational cultures has brought forward dilemmas involving code such as designing killer robots, the use of technology to predict and prevent crimes before they happen and platform surveillance in social media. Students in this course will use theories and case based examples to examine questions such as what is meant with ethics in new media and critical computing, can we program computational systems according to ethical models, and does digital culture force us to rethink what ethics are? [24L]
Prerequisite: A minimum of 13.0 credits.

CCT480H5 User Experience Analysis (SSc)

The course investigates how people interact with digital systems to enable the production of quality design from the perspective of the user. The course examines how interactive systems are conceptualized, designed, implemented, and deployed to meet users' needs. Students will also acquire the capacity to evaluate systems and to critically assess different HCI methods and approaches. It begins by developing an understanding of usability and focuses on enabling students to acquire an understanding of the user-centred design process (e.g. user studies, prototyping, and evaluation. [36P]
Prerequisite: CCT382H5

CCT485H5 User Experience Design (SSc,EXP) **CAPSTONE**

The focus of the course is on understanding the experiences of users and their communities as affected by their interaction with digital technologies in information-centric societies. Students will learn the theoretical framework and practical aspects of advanced user-centred design principles (such as participatory design and techno-centric ethnographies). This course will represent an opportunity for students to enrich their understanding of the deep interconnections between human factors, human needs, interactive technologies, information, as projected on several dimensions: cultural, societal, ergonomic and economic. [36P]
Prerequisite: CCT380H5, minimum of 13.0 credits.

Appendix C: Comparator Programs

Institution	**University of Toronto**	**Degree/ Program**	**Bachelor of Information**
Division/ Faculty	Faculty of Information	**Website**	https://ischool.utoronto.ca/areas-of-study/bachelor-of-information/
Program Length	2 years (2nd-entry undergraduate degree program)	**Annual Program Tuition & Fees**	$12,894.86 CAD (domestic), $39,966.86 CAD (international) https://ischool.utoronto.ca/current-students/money-matters/fees/
Description	The Bachelor of Information (BI) considers the interactions between information technologies and social worlds, providing you with the conceptual tools and practical techniques necessary to understand and effect change in a data-intensive society. The BI program integrates design thinking, critical scholarship, and experiential learning. You will learn to: • Understand and assess the social, political, economic, and ethical entailments of information creation, ownership, stewardship and circulation. • Understand, critique, and use multiple techniques of data creation, manipulation and interpretation. Use current information and computing tools and strive to understand what similar tools may be developed in future. • Use the design process to understand, analyze and engage with complex questions of information practice. Work collaboratively and professionally to analyze, address emerging problems relating to information technologies and practices. • Apply your knowledge and skills in a manner that demonstrates ethical, cultural and legal awareness. • The BI consists of 11 full courses over 5 terms (fall/winter/summer/fall/winter).		

<table>
<tr><td>Admission Requirements</td><td colspan="3">The BI is a second-entry professional undergraduate program. Students must have completed at least 20 half university level courses to be considered for admission.

At least 10.0 FCE in University courses
At least 4.0 FCE in 200-level or above
Minimum of 70%/2.70 GPA in the last 5.0 FCE taken
At least 0.5 FCE with a C+ grade or higher in the following:
• Formal Systems (Calculus, Statistics, Formal Logic, Coding, or other math or science focused courses)
• Socio-cultural Systems (Media Studies, Cultural Studies, or other humanities or social science courses)
• Creative Practice (Design, Creative Writing, Performance or other art or design focused courses)</td></tr>
<tr><td>Institution</td><td>UC Irvine</td><td>Degree/ Program</td><td>Bachelor of Science in Informatics</td></tr>
<tr><td>Division/ Faculty</td><td>Donald Bren School of Information & Computer Sciences</td><td>Website</td><td>http://www.informatics.uci.edu/undergrad/bs-informatics/</td></tr>
<tr><td>Program Length</td><td>4 years</td><td>Annual Program Tuition & Fees</td><td>$15,643.23 USD (in-state), $44,635.23 USD (out-of-state)
http://catalogue.uci.edu/informationforprospectivestudents/expensestuitionandfees/#Undergradstudenttuitionandfees</td></tr>
</table>

Description	The B.S. in informatics is designed around a small set of core courses that introduce the fundamentals of informatics (human computer interaction, design), software (programming, requirements analysis) and human behavior (social analysis of computerization). From there, two specializations — human-computer interaction and organizations and information technology — enable students to focus their learning with more than three dozen courses from which they can choose. The major is inherently interdisciplinary, with courses ranging from sociology and psychology to management and public health, depending on the specialization chosen. Informatics majors complete one of four specializations: Human-Computer Interaction (HCI), Organizations and Information Technology (OIT), Health Informatics (HI), or Specialization in Individual Studies.
Admission Requirements	Students transferring into the major must satisfy the following requirements: Completion of one college-level mathematics course; courses equivalent to I&C SCI 6B Boolean Algebra and Logic , STATS 7 Basic Statistics or STATS 67 Introduction to Probability and Statistics for Computer Science are preferred as these courses facilitate scheduling after transfer to UCI. Completion of one year of transferable computer science courses involving concepts such as those found in Java, Python, C++, data structures, or other object-oriented or high-level programming language. Notes: 1. The introductory sequence in ICS is offered in Python. The Bren School of ICS strongly encourages all participants to become familiar with this programming language prior to matriculation. Additional computer science courses beyond the two required are strongly recommended, particularly those that align with the major(s) of interest. Java is used extensively in the curriculum; therefore, transfer students should plan to learn it by studying on their own or by completing a Java-related programming course prior to their first quarter at UCI.

Institution	**University of Pittsburgh**	**Degree/ Program**	**Bachelor of Science in Information Science**
Division/ Faculty	School of Computing and Information	**Website**	http://www.dins.pitt.edu/degrees/bachelor-of-science-in-information-science/
Program Length	4 years	**Annual Program Tuition & Fees**	$20,456 USD (in-state), $35,952 USD (out-of-state) http://ir.pitt.edu/undergraduate-tuition/
Description	The undergraduate program in information science will help you to understand how people seek and create electronic information; how to build, design, and evaluate effective information systems and how people ultimately transform information into useful knowledge. Core courses will provide you with essential skills in: • Programming • Database management • Networks • Systems analysis and human factors The user-centered design specialization provides the visual and human-computer interaction skills needed to design and build prototypes of information systems interfaces as well as to perform usability testing of these systems. INFSCI 1014 Graphics; INFSCI 1052 User-Centered Design; INFSCI 1059 Web Programming; INFSCI 1092 Special Topics: Systems.		

Admission Requirements	To be accepted into the undergraduate program in information science, a student must have: • Completed 55 credits (including current-term credits) • Strong evidence of academic achievement to include GPA, course grades, or recommendations. Note: Students who have a GPA less than 2.75 may be considered for provisional admission and should apply. • An information science GPA of at least 2.75 • Completed Intro to Information, Systems and Society (INFSCI 0010)		
Institution	**University of Washington**	**Degree/ Program**	**Bachelor of Science in Human Centered Design & Engineering**
Division/ Faculty	College of Engineering	**Website**	https://www.hcde.washington.edu/bs
Program Length	4 years (180 credits)	**Annual Program Tuition & Fees**	$11,465 USD (in-state) $38,166 USD (out-of-state) https://www.washington.edu/opb/tuition-fees/current-tuition-and-fees-dashboards/undergraduate-tuition-dashboard/
Description	Students in the Human Centered Design & Engineering Bachelor of Science program learn engineering principles rooted in a broad range of disciplines to investigate the interaction of people with technology and technical development. Human Centered Design & Engineering (HCDE) students graduate with an engineering degree and a strong foundation in designing user experiences and interfaces, creating information visualizations, conducting user research, designing for the web and building web technologies.		

Admission Requirements	Most students apply to the department in their second year at the University of Washington Students must have a minimum 2.0 cumulative GPA to be considered for admission Minimum of 5 credits of math: MATH 120 or MATH 124. One statistics course from list: STAT 220, STAT/SOC/CS&SS 221, STAT 311, STAT/MATH 390, IND E 315, QMETH 201, Q SCI 381. Two science courses from list: BIOL 118, BIOL 180, BIO A 201, CHEM 142, CHEM 152, PHYS 114, PHYS 115, PHYS 121, PHYS 122, or PSYCH 202. Minimum of 5 credits of first-year composition. Minimum of 4 credits of programming: CSE 142 or CSE 160.

Additional Programs That May Be of Interest

Institution	**University of Colorado Boulder**	**Degree/ Program**	**Bachelor of Science in Information Science**
Division/ Faculty	College of Media, Communication and Information	**Website**	http://www.colorado.edu/cmci/academics/information-science/bachelor-science-information-science
Program Length	4 years	**Annual Program Tuition & Fees**	$14,228 USD (type of student not specified) https://www.colorado.edu/bursar/costs/costs-fallspring/undergraduate-colorado-resident/media-communication-and-information-cmci

Description	As an undergraduate student in the Department of Information Science, you will learn to collect, analyze and interpret many different information sources to understand our world. You'll study how we interact with all things digital, including software, devices and algorithms. You will: • acquire skills in multiple forms information analysis, from small data to big data, from quantitative to qualitative, from data exploration to information exposition; • learn the computing skills you need to support information analysis, including prototype building and scripting for working with data; • master human-centered design and research design, leaving you able to craft solutions and evaluate their use; • understand social and ethical contexts of information and technology; and • understand how people interact with technology and with each other in technological contexts, including training in appropriate socio-behavioral theories. The BS in Information Science requires 54 credit hours within the major. Students will also complete the CMCI Core as part of their general education. A secondary area of concentration, which is also part of the CMCI Core, will be used to synthesize knowledge of Information Science with an application domain. The Portfolio & Professionalization as well as the Capstone courses are a critical part of cohort-building in the major and are designed to create a community of learners who are prepared to tackle ambitious projects together, individually and in preparation for internship and post-baccalaureate opportunities.
Admission Requirements	The primary factor in admission decisions is your academic achievement. CU Boulder focuses on your classroom performance in core academic courses, the rigor of your course selection and your best combination of scores on the SAT or ACT.

Institution	**Indiana University**	**Degree/ Program**	**Bachelor of Science in Informatics**
Division/ Faculty	School of Informatics and Computing	**Website**	https://informatics.indiana.edu/programs/bs-informatics/index.html
Program Length	4 years	**Annual Program Tuition & Fees**	$11,220 USD (in-state), $37,600 USD (out-of-state) https://studentcentral.indiana.edu/pay-for-college/cost-of-iu/estimated-cost.html
Description	In the B.S. in Informatics program and then in your career, you'll apply your tech knowledge to another area you're interested in—like business, human centered computing, security, or fine arts — to create new uses for technology and the way people interact with it. You'll learn logical reasoning, basic programming and data visualization, but also human-computer interaction design and other skills that will help you put technology to better use. And listen to this: Because employers rely on technology more and more every day, informatics grads are in great demand. More than half of informatics students complete internships — which are great tryouts for jobs — and you'll team up with classmates on a capstone project that'll showcase your skills to potential employers. If you want to enhance your basic computing and programming skills, consider one of our minors. The Bachelor of Science in Informatics program includes a minimum of 120 credit hours of coursework, including: • Core informatics courses (26 cr.) • Cognate area courses (15 to 18 cr.) in another discipline. Some of these courses may also fulfill requirements toward a minor in another field or general education requirements. • Capstone (6 cr.), a group project in which you apply what you've learned in this degree		

	• Informatics electives (12 cr.), your choice from among courses in informatics and related courses in business, cognitive science, computer science, journalism, public and environmental affairs, sociology, and media. • General education and distribution requirements (38-41 cr.), including electives		
Admission Requirements	• Admitted to Indiana University with either Computer Science B.S., Intelligent Systems Engineering B.S., or Informatics B.S. listed as intended major. • Have a minimum new SAT score of 1310 (critical reading and math only) or minimum ACT score of 28. Superscores are accepted for both the ACT and SAT. • Have a minimum cumulative GPA of 3.75 or higher on a 4.0 scale.		
Institution	**New Jersey Institute of Technology**	**Degree/ Program**	**Bachelor of Science in Human Computer Interaction**
Division/ Faculty	Department of Information Systems	**Website**	https://informatics.njit.edu/bs-human-computer-interaction
Program Length	4 years	**Annual Program Tuition & Fees**	$8,837 USD (in-state), $16,693 USD (out-of-state) https://catalog.njit.edu/undergraduate/admissions-financial-aid/tuition-fees/
Description	The BS in Human Computer Interaction provides necessary background to conduct design activities including: eliciting from the client, formulating, and articulating functional specifications; knowing how human factors and cognitive models influence design; knowing the principles of, and having experience with, communication design; understanding how implementation constraints influence design; and incorporating evaluation results into iterated designs.		

	The BSHCI curriculum provides a strong foundation in key Information Systems and Computing courses, such as Designing the Multimedia Experience, Evaluation Methods for the User Experience, Web-Enabled Mobile Applications and Design Studio for Ubiquitous Computing. In the Senior Capstone course, HCI students work on a team in a real-world environment with a corporate sponsor. As part of the BSHCI, students must choose four courses in one of the following options: Cognitive Psychology, Game Design and Production, Graphical Arts Design and Web & Multimedia Design.		
Admission Requirements	All students who apply to NJIT must submit an official high school transcript. When evaluating your application for undergraduate admission, we are interested in understanding how you challenged yourself relative to the curriculum that was available at your school and the trends in your performance — for example, if your grades improved between freshman and senior year. We also consider the GPA that is indicated on your high school transcript. We look for students in the top 25 percent of their class. For schools that don't use a ranking system, we consider a 3.0 GPA or higher to be equivalent. Partaking in rigorous curricula, such as Advanced Placement (AP) or International Baccalaureate (IB) classes, can give you an additional advantage. All freshman applicants must take the SAT and/or the ACT; the average composite SAT score for our enrolling freshmen is 1285 (2 part - Math and Critical Reading); the average ACT score for our enrolling freshmen is 26.		
Institution	**University of Illinois**	**Degree/ Program**	**Bachelor of Science in Computer Science**
Division/ Faculty	College of Engineering	**Website**	https://catalog.uic.edu/ucat/colleges-depts/engineering/cs/bs-cs-hcc-conc/
Program Length	4 years	**Annual Program Tuition & Fees**	$17,902.00 USD (in-state), $34,148.00 USD (international) https://admissions.uic.edu/undergraduate/tuition-financial-aid

Description	The human-centered computing concentration prepares students to pursue areas such as user interface design and development and computer graphics and animation. Applications of these skills might include video games, movie special effects, and visualization in science, engineering, and medicine. In addition to the fundamental areas of computer science — programming, data structures, discrete mathematics, algorithms, formal languages, computer architecture and operating systems — the concentration educates students in user-interface design, computer graphics, visual media and natural language processing.
Admission Requirements	In high school, applicants should have completed: • 4 years of math coursework; • 3 years of laboratory science coursework; • in addition to UIC requirements for coursework in English, social sciences, and electives as outlined at admissions.uic.edu. AP credit is available; visit the Academic Standing section of the course catalog (go.uic.edu/catalog) for more information.

Appendix D: Library Statement

University of Toronto Libraries Report for the Major in Technology, Coding, and Society (TCS), UTM, 2020

Context: The University of Toronto Library (UTL) system is the largest academic library in Canada and is currently ranked third among academic research libraries in North America.[22] The UTL has an annual acquisition budget of $39 million. Its research and special collections comprise over 12.3 million print volumes, 5.6 million microforms, over 10,000 print journal subscriptions, and rich collections of manuscripts, films, and cartographic materials. The system provides access to more than 2.4 million electronic books, 150,000 electronic journals, and rich primary source materials.[23] Numerous, wide-ranging collections, facilities and staff expertise reflect the breadth of research and instructional programs at the University, and attract unique donations of books and manuscripts from around the world, which in turn draw scholars for research and graduate work.

Major North American Research Libraries					
	2013-2014	**2014-2015**	**2015-2016**	**2016-2017**	**2017-2018**
ARL Rank	**University**	**University**	**University**	**University**	**University**
1	Harvard	Harvard	Harvard	Harvard	Harvard
2	Yale	Yale	Yale	Yale	Yale
3	**Toronto (3rd)**	Columbia	Michigan	Michigan	**Toronto (3rd)**
4	Columbia	**Toronto (4th)**	Columbia	Columbia	Columbia
5	Michigan	Michigan	New York	New York	Michigan
6			**Toronto (6th)**	**Toronto (6th)**	

[22] As per Association of Research Libraries Statistics.

[23] Figures as of August 2019

Top 5 Canadian Universities in the ARL Ranking of Major North American Research Libraries				
2013-2014	**2014-2015**	**2015-2016**	**2016-2017**	**2017- 2018**
Rank/University	**Rank/University**	**Rank/University**	**Rank/University**	**Rank/University**
3/Toronto	**4/Toronto**	**6/Toronto**	**6/Toronto**	**3/Toronto**
22/British Columbia	27/Alberta	31/Alberta	29/Alberta	29/Alberta
26/Alberta	31/British Columbia	35/British Columbia	37/British Columbia	33/British Columbia
35/McGill	43/McGill	42/McGill	40/McGill	38/McGill
36/Montreal	49/Calgary	63/Calgary	75/Calgary	69/Manitoba

Space and Access Services: The UTL's 42 libraries are divided into four administrative groups: Central, Departmental/local, Campus (UTM & UTSC) and Federated and Affiliated College Libraries. The UTL provides a variety of individual and group study spaces for students. Study space and computer facilities are available twenty four hours, five days per week at one location, Robarts Library, while at the University of Toronto Mississauga (UTM) Library study spaces and computer facilities are available 7 days a week with extended hours (twenty-four hours, seven days per week) in effect during exam periods. Web-based services and electronic materials are accessible at all times from campus or remote locations.

Teaching, Learning and Research Support: Libraries play an important role in the linking of teaching and research in the University. To this end, information literacy instruction will be offered to assist in meeting TCS degree level expectations in the ability to gather, evaluate and interpret information. Librarians collaborate with instructors on assignment design, provide student research consultations, and offer just-in-time student research help in person, by phone, or through online chat. These services align with the Association of College and Research Libraries (ACRL) *Framework for Information Literacy for Higher Education*.[24] As well, the Robert Gillespie Academic Skills Centre (RGASC) and its specialists in academic support provide services to undergraduate and graduate students.

Program Specific Instruction: Instruction will occur at a variety of levels for students in TCS and will be provided by the faculty liaison librarian to the Institute of Communication, Culture, information and Technology (ICCIT). Currently, the Library facilitates formal instruction integrated into the class schedule and hands-on tutorials related to course assignments in

[24] Association of College & Research Libraries. Framework for Information Literacy for Higher Education. ACRL, 2016. http://www.ala.org/acrl/sites/ala.org.acrl/files/content/issues/infolit/Framework_ILHE.pdf

courses such as CCT109 Contemporary Communication Technology, CCT111 Critical Coding, and CCT331 Media and Society. The Library, through its liaison librarians, customizes feeds of library resources which appear prominently in Portal/Blackboard course pages.

Collections: Many college and campus libraries collect materials to support the TCS program, with significant collections located at the UTM, Robarts, and Gerstein libraries. Substantial online collections are available 24/7 from all campuses and offline. Collections are purchased in all formats to meet the variety of preferences and styles of our current students and faculty. The University of Toronto Libraries are committed to collecting both print and electronic materials in support of TCS at the University of Toronto.

Journals: The program is multidisciplinary in nature. The most important journals in areas such as communication technologies, digital innovation and cultural transformation and media design are currently accessible through the University of Toronto Library System, mostly in electronic format. To support the program, the liaison librarian will consult with ICCIT faculty to ensure the University of Toronto Library subscribes to the most important journals in the field.

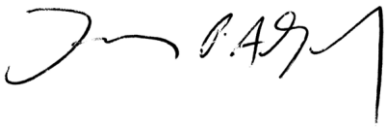
Monographs: The UTL maintains comprehensive book approval plans with 51 book vendors worldwide. These plans ensure that the Library receives academic monographs from publishers all over the world in an efficient manner. Individual librarian selectors and the UTM liaison librarian also select unique and interesting scholarly material overlooked by approval plans. These selections include special requests from faculty, individual e-books and e-book packages, including complete collections of e-books from the following publishers: Oxford University Press, Cambridge University Press, major US university presses and Canadian university presses.

Preservation, Digitization and Open Access: The UTL supports open access to scholarly communication and research information through its institutional research repository (known as T-Space), its Downsview print repository, its open journal services, subscriptions to open access publications, and support for preservation of research materials in all formats In addition to acquiring materials in support of TCS, the Library has digitized its monograph holdings published before 1923. These books are available without charge to any Internet user.

Key Databases: Communication Abstracts, Social Science Abstracts, Business Source Premier, ACM Digital Library, Scopus, Web of Science.

Prepared by: Shelley Hawrychuk, Chief Librarian, UTM Library, July 2020

Submitted by: Larry Alford, Chief Librarian, University of Toronto Libraries, Date July 2, 2020



Appendix E: Student Services Statement

Student Service Information for Quality Assurance Framework — UTM

All University of Toronto undergraduate and graduate students have access to student services on all three campuses, Mississauga, St. George (downtown Toronto), and Scarborough, regardless of their 'home campus'. The services and co-curricular educational opportunities provide a complement to the formal curriculum by engaging and challenging students to reach their full potential as learners, leaders and citizens. At the University of Toronto Mississauga these services are organized by Student Affairs & Services, the Registrar's Office, the Academic division and its departments, and the School of Graduate Studies. These services support the success of our students from the time they are admitted through degree completion and beyond.

Academic advising at UTM links students with content experts. The Registrar's Office helps new and graduating undergraduate students understand program and degree requirements, and provides specialized support to students at academic risk and those seeking special academic consideration due to unusual circumstances. Services are delivered one-on-one, through small group advising sessions, and in workshops. Individual academic departments at the undergraduate and graduate levels focus on individual academic advising with students in their particular areas of study.

Career development is primarily offered by the UTM Career Centre, with service areas including career counselling and work search support. Services are delivered in a variety of modes, including one-on-one advising and counselling, workshops, online tools and large-scale employment and service events. UTM also supports internships, externships, job shadowing, volunteer registries and recognition, and other career development opportunities through a broad range of academic departments and other services' offices.

Disability-related accommodations are facilitated by UTM's Access*Ability* Resource Centre, which works to match qualified students to appropriate sources for academic accommodation of physical, sensory, learning and mental health disabilities.

Student housing is available through 1,500 on-campus residence rooms under the Student Housing and Residence Life department. Housing options include traditional dormitories,

suites/apartments and townhouses, with distinct communities and programming for new undergraduates, upper-years undergraduates, graduate and professional students, and students with families. Support for off-campus housing is provided through a UT tri-campus partnership which hosts a matching service for off-campus housing opportunities and for roommates.

Learning skills development is a primary focus of the Robert Gillespie Academic Skills Centre, which offers workshops, seminars and individual consultations to help students identify and develop skills for success in their studies. The ASC also benefits students by educating instructors and teaching assistants on best practices in teaching and learning.

International experience is encouraged through the International Education Centre. The IEC serves students from abroad who benefit from its immigration support, social opportunities and educational programming on transition issues. The centre also supports domestic/Canadian students seeking international experiences through travel and study abroad opportunities.

Physical and mental health care, including health promotion initiatives, are provided by the Health & Counselling Centre. This service utilizes a comprehensive range of health professionals, including nurses, physicians, psychiatrists, personal counsellors and social workers, a nutritionist and health educators. Services include physical exams, first aid, immunizations and allergy injections, pregnancy testing, sexually transmitted infection information and testing, birth control counselling and specialist referrals. A sports medicine clinic is also available on campus.

Financial aid and awards are supported through the Office of the Registrar, assisting students with OSAP, UTAPS, scholarships and other sources for financing their education, while assisting them in learning/strengthening budgeting skills.

Student clubs and activities are supported through the Student Engagement office for student governments and clubs and the Office of the Dean and its academic departments for academic societies. Matching funds are offered by the Academic Dean for many activities that encourage individual and small-group interactions between instructors and students. A range of programming is offered by departments across campus, including new student orientation, leadership development, volunteer service, and educational programs. The Office of Student Transitions, a partnership between the Academic Dean and Dean of Student Affairs' offices, supports the transition of new students into university studies and the developmental

transitions of students moving through their years of study, through graduation and into their early years as alumni.

Physical well-being is supported by the Department of Physical Education, Athletics & Recreation, offering individual and team-based recreational and sport activities from casual use through high-performance sport.

Support for student-families is offered through an on-campus licensed child care centre, including financial support for students through Region of Peel subsidies and grants funded by the student population; through UT's Family Care Office, providing workshops and individual consultations on family care matters; and through on-campus family housing options available from UTM Student Housing & Residence Life.

Equity issues, both broad and specific to sexual and gender diversity, ethnicity and culture, disability, family status, and other student identities facing barriers, are supported through a local network of UTM departments and referrals to UT-wide equity officers.

Inter-campus transportation is readily available, with shuttles circulating between the UTM and St. George (downtown Toronto) campuses every 20 minutes on weekdays during most of the year. This service is fare-free for UTM students, and at a fare comparable to public transit for non-UTM-students.

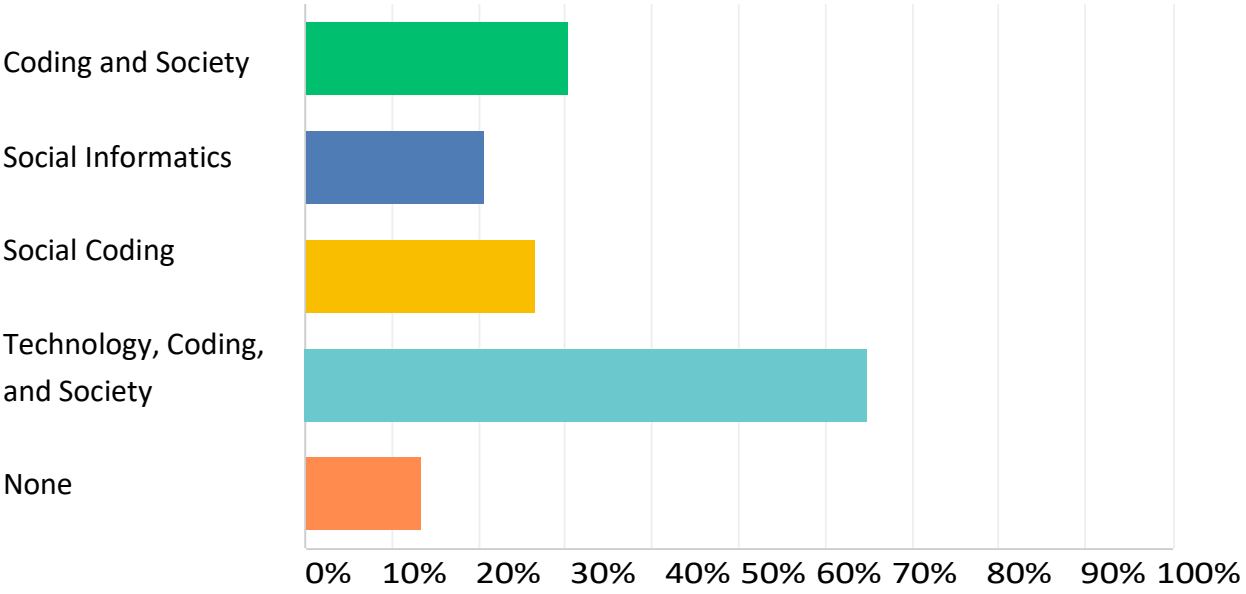
Additional specialized services are provided for **international students** (orientation, advising, cross-cultural counselling), **Indigenous students** (academic support, financial counselling) and **lesbian, gay, bisexual and transgender students** (counselling, referrals, equity outreach and engagement).

Participation in **campus life** and **experiential learning** are facilitated through the Centre for Student Engagement (clubs, committees, events), the Experiential Education Office (service learning and volunteer opportunities in community settings) and Student Affairs & Services (interfaith dialogue, events, leadership development, orientation, recognition and support for student groups, activities.)

Appendix F: Student Survey

Q5. Which of the following program titles would you associate with a major program that teaches students to design and develop digital platforms? Select all that apply.

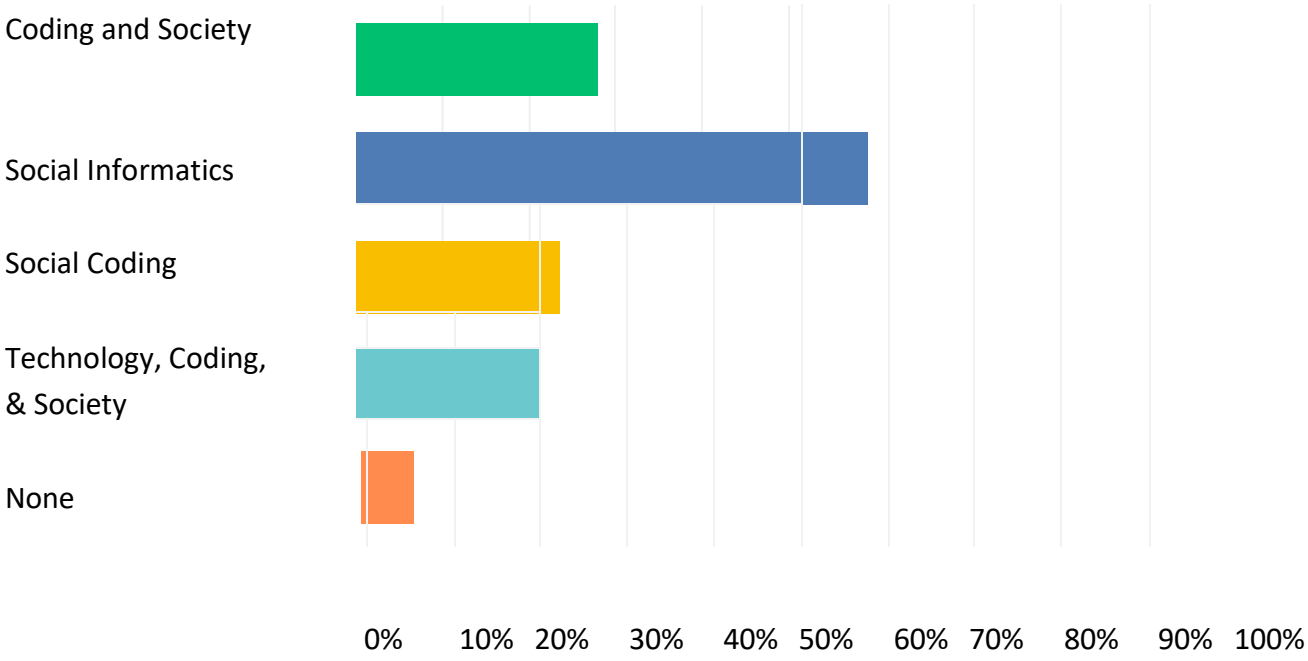
Answered: 357. **Skipped: 24.**



ANSWER CHOICES	RESPONSES	
Coding and Society	30.25%	108
Social Informatics	20.73%	74
Social Coding	26.61%	95
Technology, Coding, and Society	64.99%	232
I do not associate any of these titles with this	13.45%	48
Total Respondents: 357		

Q6 Which of the following program titles would you associate with amajor program that teaches students to analyze the data that digital platforms produce? Select all that apply.

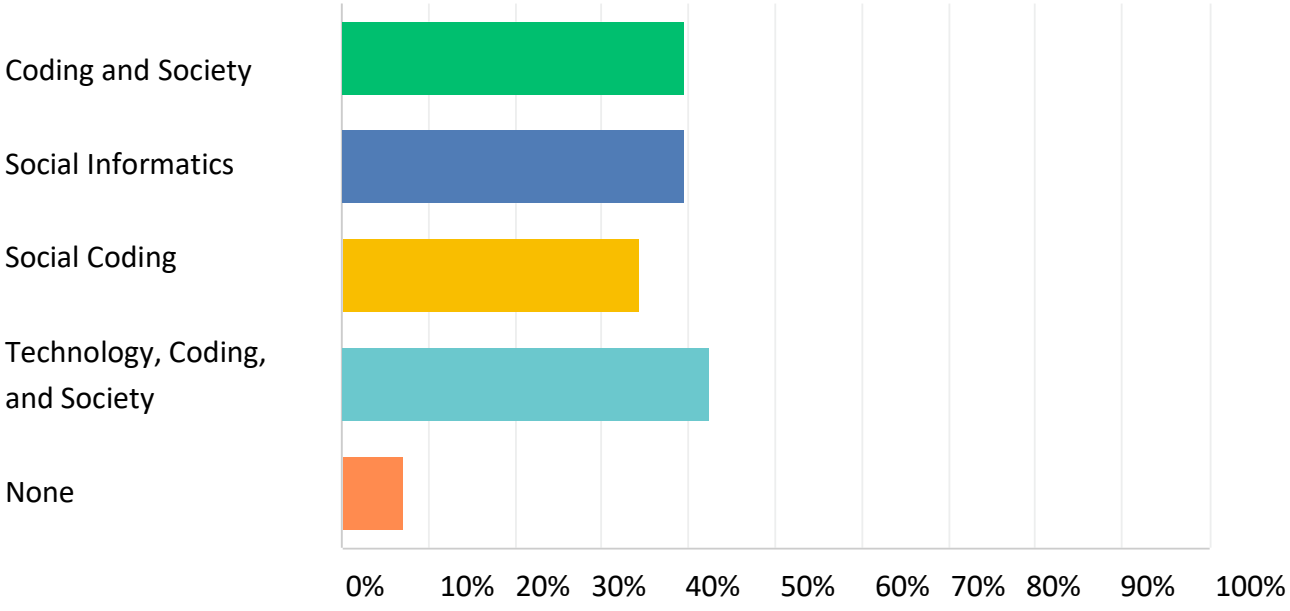
Answered: 356. **Skipped: 25.**



Answer Choices	Responses	
Coding and Society	28.09%	100
Social Informatics	59.27%	211
Social Coding	23.60%	84
Technology, Coding, and Society	29.49%	105
I do not associate any of these titles with this	6.18%	22
Total Respondents: 356		

Q7 Which of the following program titles would you associate with a major program that teaches students to theorize the use of digital platforms from humanistic and social science perspectives. Select all that apply.

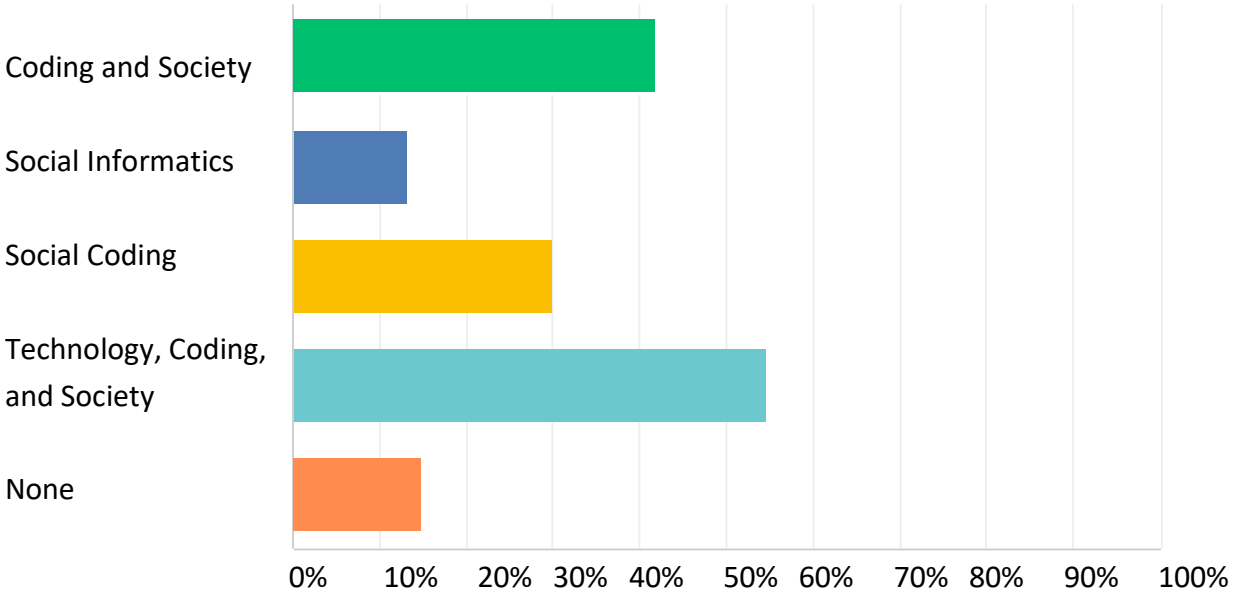
Answered: 356. Skipped: 25.



Answer Choices	Responses	
Coding and Society	39.61%	141
Social Informatics	39.61%	141
Social Coding	34.27%	122
Technology, Coding, and Society	42.42%	151
I do not associate any of these titles with this	7.02%	25
Total Respondents: 356		

Q8 Which of the following program titles would you associate with amajor program focused on developing basic computer coding skills? Select all that apply.

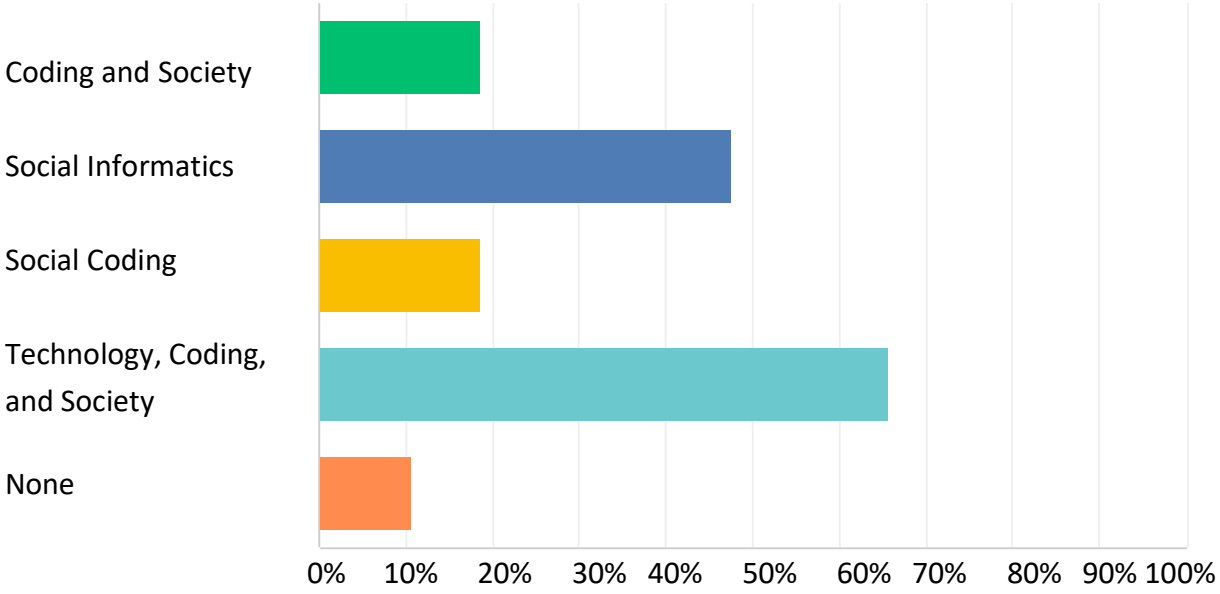
Answered: 357. Skipped: 24.



Answer Choices	Responses	
Coding and Society	41.74%	149
Social Informatics	13.17%	47
Social Coding	29.97%	107
Technology, Coding, and Society	54.62%	195
I do not associate any of these titles with this	14.85%	53
Total Respondents : 357		

Q9 Which of the following program titles do you believe wouldbe attractive to employers? Select all that apply.

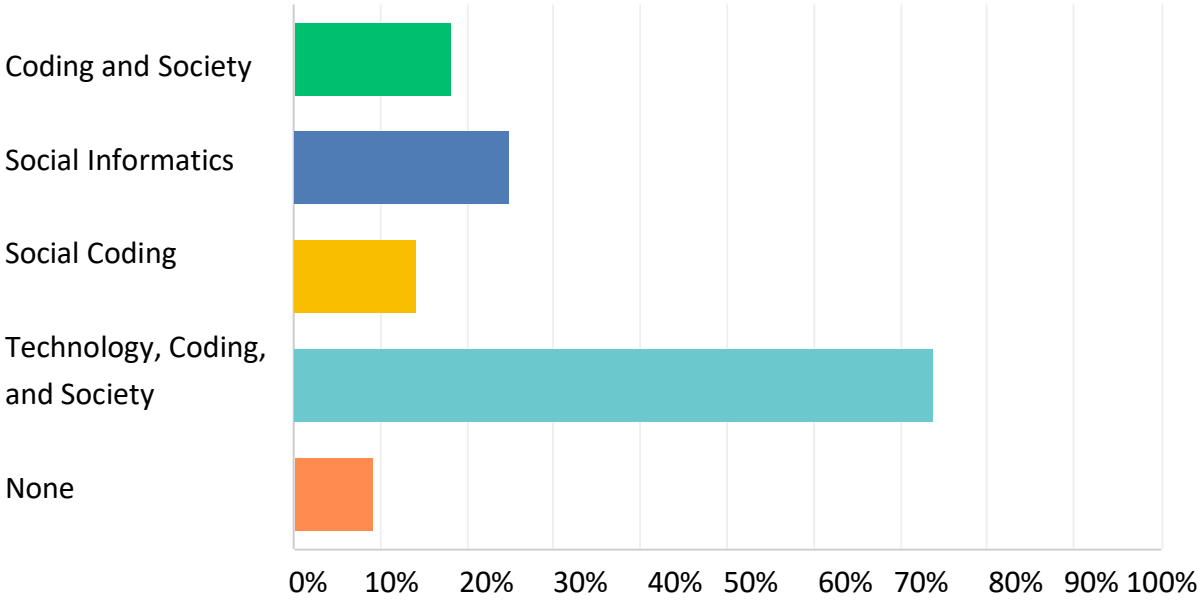
Answered: 356. Skipped: 25.



Answer Choices	Responses	
Coding and Society	18.54%	66
Social Informatics	47.47%	169
Social Coding	18.54%	66
Technology, Coding, and Society	65.73%	234
I do not think any of these titles are attractive to employers	10.67%	38
Total Respondents: 356		

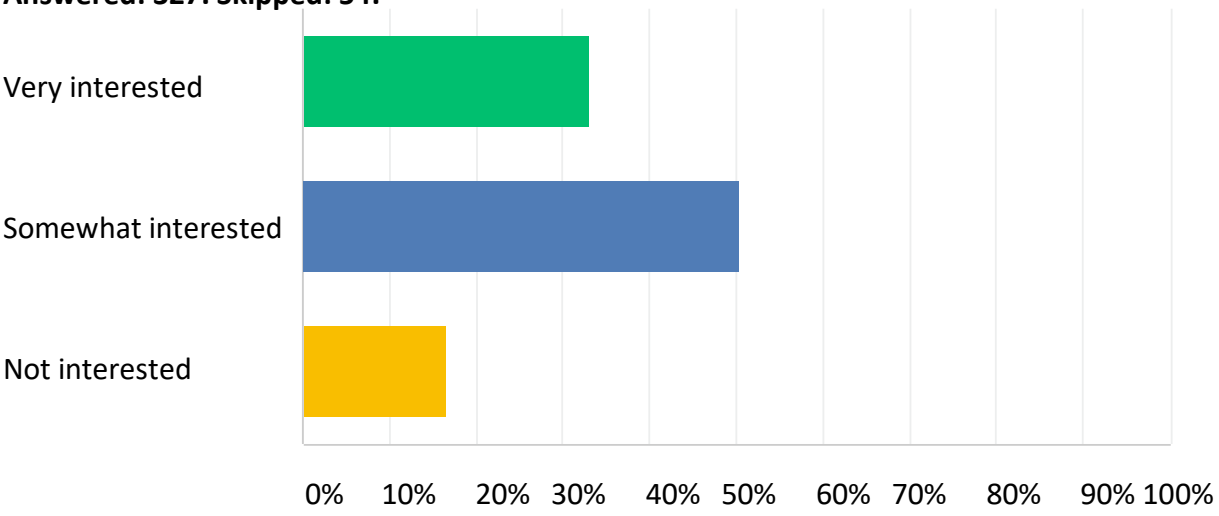
Q11 Based on the above program description, which of the followingtitles best fit this program? Select all that apply.

Answered: 329. Skipped: 52.



Q13 Major programs are typically 7 to 9 credits and require the completion of either another major program or two additional minors. If you were a new student at the UTM, how interested would you be in enrolling in this major program?

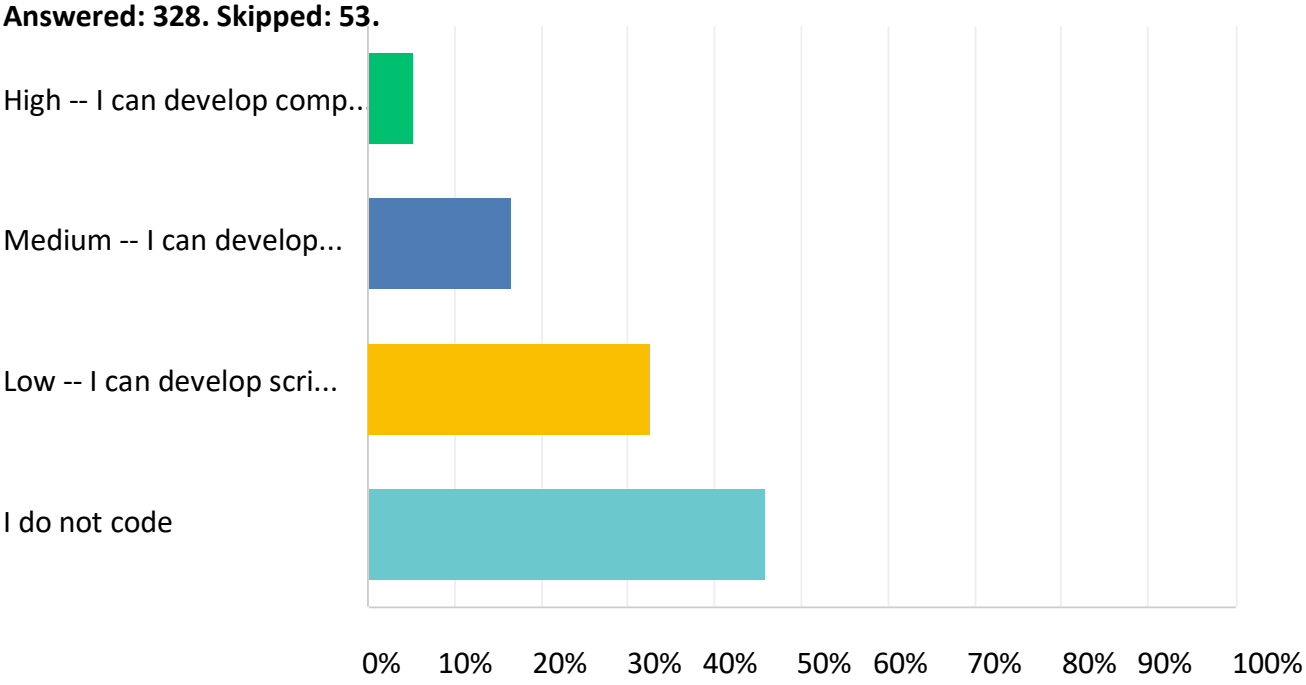
Answered: 327. Skipped: 54.



Answer Choices	Responses	
Very interested	33.03%	108
Somewhat interested	50.46%	165
Not interested	16.51%	54
Total		**327**

Q14 How skilled are you at computer coding?

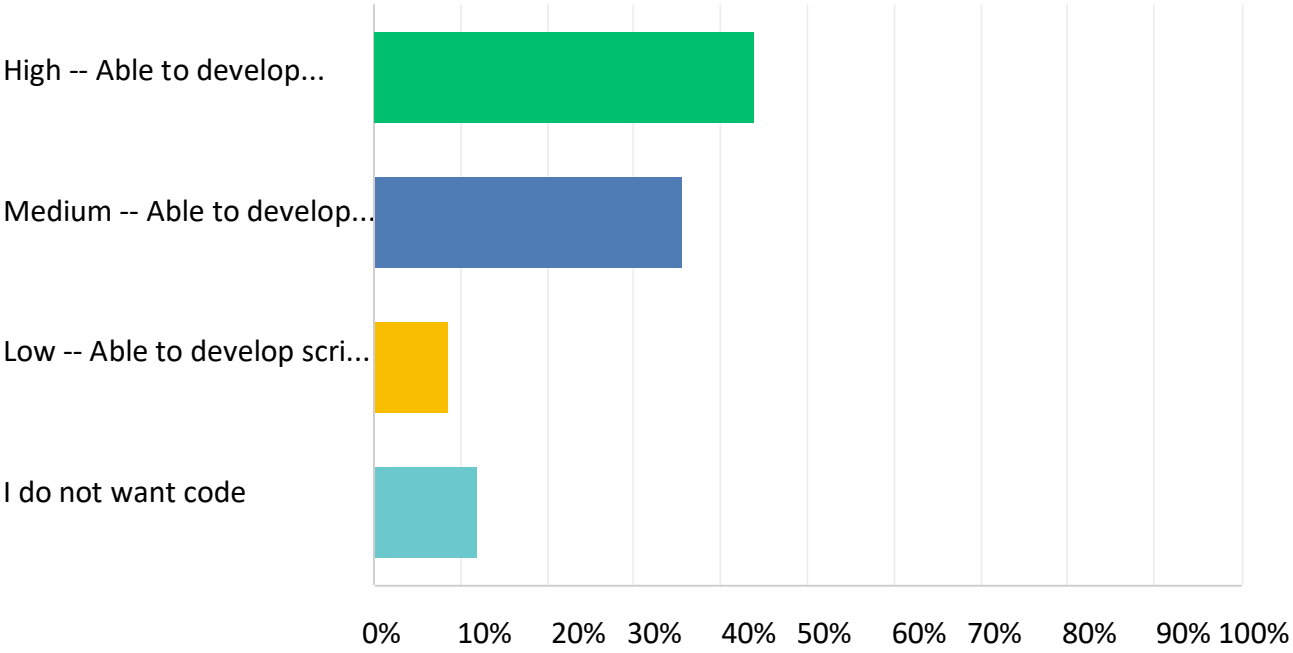
Answered: 328. Skipped: 53.



ANSWER CHOICES	RESPONSES	
High -- I can develop complex apps	5.18%	17
Medium -- I can develop basic apps	16.46%	54
Low -- I can develop scripts that complete simple tasks and hacks	32.62%	107
I do not code	45.73%	150
Total		**328**

Q15 How skilled would you like to be at computer coding?

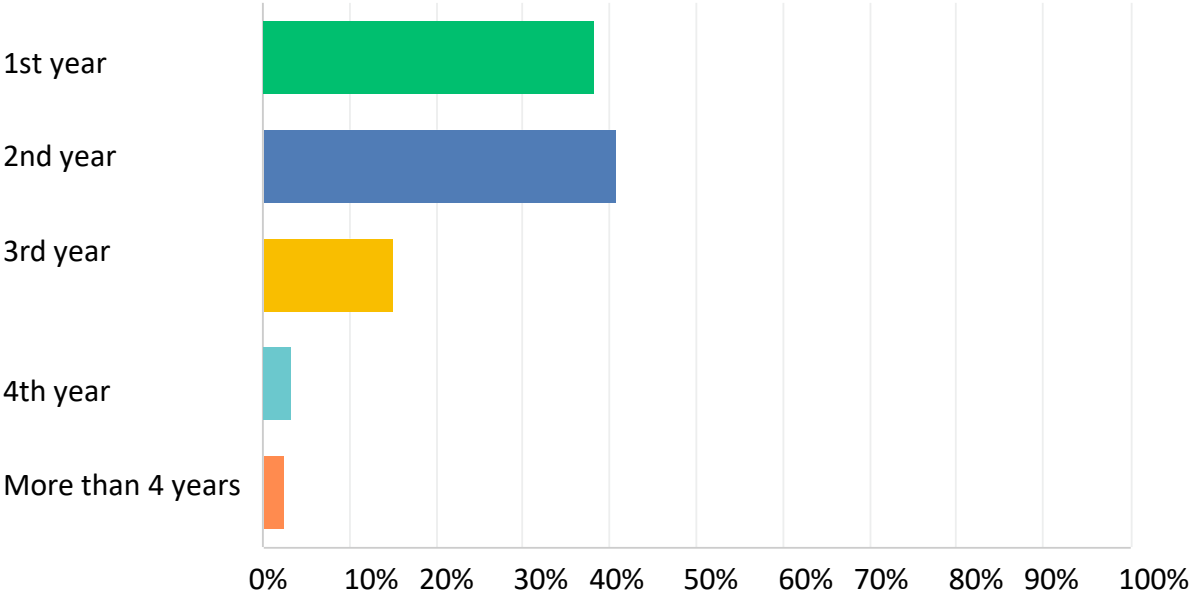
Answered: 327. Skipped: 54.



Answer Choices	Responses	
High -- Able to develop complex apps	44.04%	144
Medium -- Able to develop basic apps	35.47%	116
Low -- Able to develop scripts that complete simple tasks and hacks	8.56%	28
I do not want code	11.93%	39
Total		**327**

Q17 What year are you in right now?

Answered: 326. Skipped: 55.



Answer Choices	Responses	
1st year	38.34%	125
2nd year	40.80%	133
3rd year	15.03%	49
4th year	3.37%	11
More than 4 years	2.45%	8
Total		**326**

Appendix G: Program Learning Outcomes & Curriculum Map

Technology, Coding, and Society Program Learning Outcomes

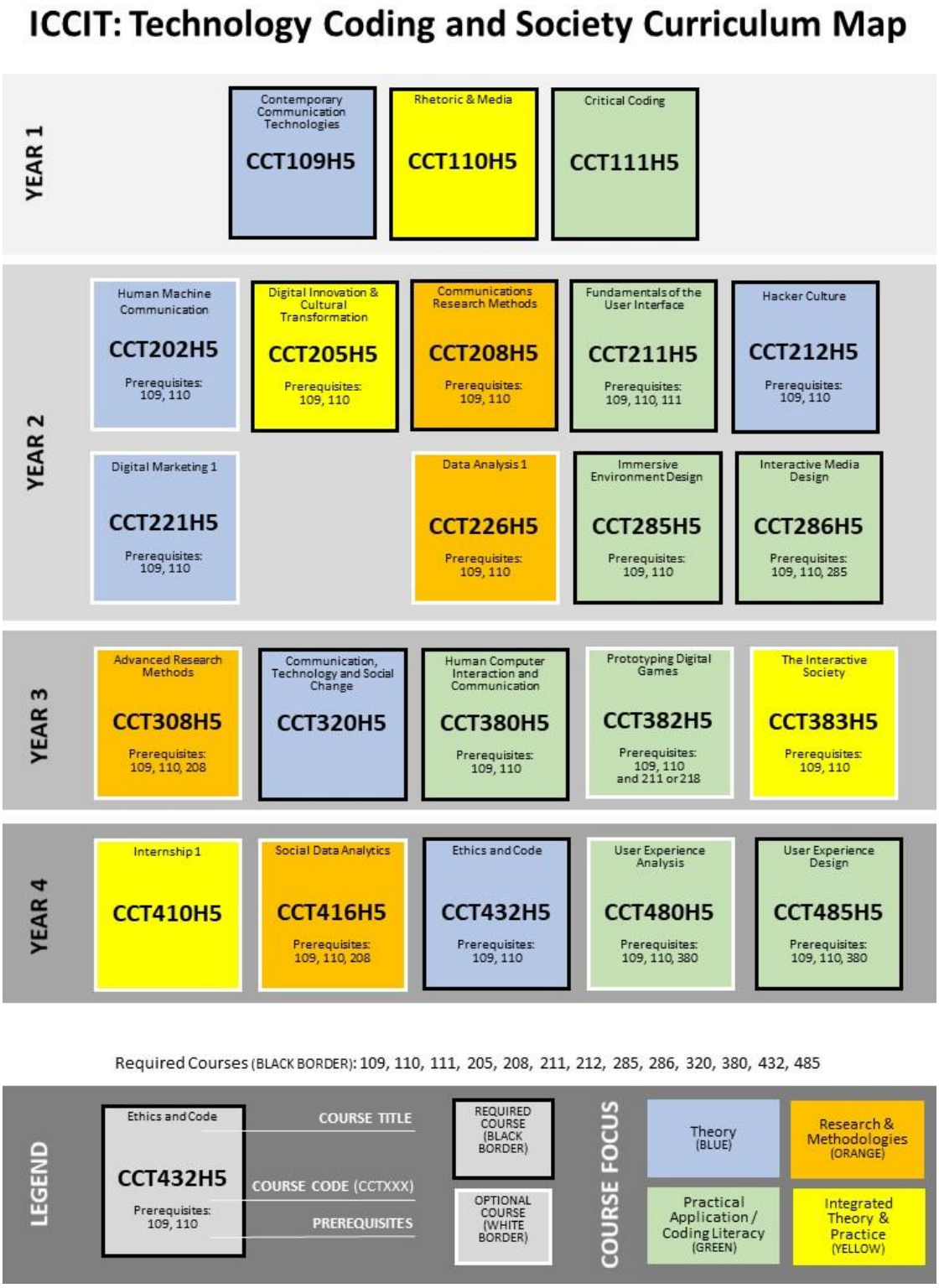
(corresponding UDLE noted in italics)

Technology, Coding, and Society graduates will:

PLO1 Identify and describe the social, political, economic and ethical contexts of digital technologies and practices. *(Breadth & Depth of Knowledge.)*
PLO2 Describe and critique foundational theoretical approaches in communication, sociology and media studies. *(Breadth & Depth of Knowledge.)*
PLO3 Develop fluency in foundational programming skills for current digital platforms and computing tools and have skills appropriate to learning any similar tools that may be developed in future. *(Knowledge of Methodologies.)*
PLO4 Apply the primary data collection methods and analytic approaches used in social sciences. *(Knowledge of Methodologies and Application of Knowledge.)*
PLO5 Identify and apply new approaches to digital trace data collection and analysis. *(Depth of Knowledge, Knowledge of Methodologies and Application of Knowledge.)*
PLO6 Analyze design problems relating to digital platforms, systems and applications (Knowledge of Methodologies, Application of Knowledge, Awareness of Limits of Knowledge).
PLO7 Work collaboratively and professionally on interdisciplinary teams or independently to create solutions and implementation strategies for problems relating to design in the digital and interactive media domains. *(Autonomy & Professional Capacity, Communication Skills.)*
PLO8 Identify, critique and apply multiple techniques for data analysis in relation to technology design and user experience. *(Depth of Knowledge, Knowledge of Methodologies, Application of Knowledge, Awareness of Limits of Knowledge, Communications skills.)*

The following visualization of the Technology, Coding, and Society curriculum map illustrates courses that are primarily theory based, courses that focus primarily on technical skills and coding literacy, courses that emphasize the integration of theory and practice and courses that focus on research methodologies used in design, implementation and analysis of digital and communication technologies and practices. A chart outlining individual course learning objectives and their corresponding DLEs is also included.

Figure 3: Visual of the Technology Coding, and Society Curriculum Map



Existing Course	Course Learning Outcomes	TCS Program Learning Outcomes
CCT109H5 Contemporary Communication Technologies	• Introduce students to the basic ways of studying new media and digital culture. • Identify particular social, political, economic, and cultural conflicts in new media societies. • Analyze the underlying beliefs and power relationships between new media and society. • Demonstrate a good understanding of information and communication theories. • Critically discuss the course topics in tutorials. • Learn to use the 6th edition of the Publication Manual of the American Psychological Association citation style to reference derivative works.	PLO1, PLO2. Breadth & Depth of Knowledge
CCT110H5 Rhetoric and Media.	• Students will hone critical academic skills (namely research, critical analysis and argumentation) as they relate to communication, digital and interactive media environments. • Students will develop skills in understanding and producing content in a variety of rhetorical contexts (including a podcast, an opinion piece, a visual communication campaign and presentation and a research paper). • Students will engage in team writing and explore social media content throughout the term.	PLO1, PLO2, PLO7. Breadth & Depth of Knowledge. Communications Skills.
CCT111H5 Critical Coding	• Develop a practical understanding of the role technology serves in mediating communication between people or between people and information. • Learn how to propose, design, implement and test basic communication technologies such as mobile apps.	PL01, PL03, PL06. Breadth & Depth of Knowledge. Knowledge of Methodologies.

Existing Course	Course Learning Outcomes	TCS Program Learning Outcomes
	• Select appropriate software engineering approaches to solve a socially relevant problem. • Evaluate the completeness of a software product with respect to addressing a problem. • Basic app development. • Basic scripting code development. • Develop knowledge of core programming language such as Java, Objective C, Swift, or Python (subject to change as industry standards evolve). • Scrum and Agile development. • Learn basic software design. • Learn to critically analyze a socially relevant problem. • Identify problems and propose software design solutions. • Learn to conduct software testing and troubleshoot solutions. • Basic project management skills as applicable to software projects.	Application of Knowledge. Awareness of Limits of Knowledge.
CCT202H5 Human-Machine Communication	• Consolidate foundational knowledge about human-human communication from prior courses and expand to contexts to human-machine communication • Learn about the sensori-motor, perceptual, cognitive and social psychology views of how and why humans communicate. • Machines: Understand models in the design of machines that communicate with humans. • Gain insight into technology considerations and how human-machine communication is influenced by perception. • Consider cultural and ethical issues arising in the discourse around HMC.	PLO1, PLO2, PLO7. Breadth & Depth of Knowledge. Communications Skills.

Existing Course	Course Learning Outcomes	TCS Program Learning Outcomes
	• Understand the relationships between perceptual limitations (disabilities model) and human-machine interaction.	
CCT205H5 Digital Innovation and Cultural Transformation	• Research and analyze the phenomenon of how digital technology has changed our world. • Identify methods of adaptation to new expectations. • Describe how digital technology has altered the way we perceive the world - including ourselves. • Develop case studies that engage with the following range of topics: the social, economic and cultural outcomes of new media; the impact of the digital revolution upon privacy, surveillance and political activity. • Reflect on their own work practices and continually evaluate their competencies within communication fields.	PLO1, PLO2. Breadth & Depth of Knowledge. Communications Skills.
CCT208H5 Communications Research Methods	• Gain a strong understanding of several quantitative and qualitative techniques. • Learn how to search for scholarly articles and use them to formulate an argument. • Learn how to collect social media data and use it to address a research question that they have developed. • Clearly articulate the limitations and strengths of a quantitative approach used in a study that they have selected themselves.	PLO4. Knowledge of Methodologies. Application of Knowledge. Awareness of Limitations. Communications Skills.
CCT211H5 Fundamentals of UI Programming	• Learn how to propose, design, implement and test software interfaces that implement practical solutions that support users' communications as well as interaction with digital information.	PL03, PL06, PL07, PL08. Application of Knowledge.

Existing Course	Course Learning Outcomes	TCS Program Learning Outcomes
	• Select appropriate software engineering approaches to solve a socially relevant problem. • Evaluate the completeness of a software product with respect to addressing a problem. • Advanced mobile and web-based user interface development. • Commanding knowledge of UI programming languages such as Java, Objective C, Swift, Javascript, CSS, PHP or Ruby. • Learn Scrum and Agile development. • Learn Software design and testing. • Identify problems and propose software design solutions. • Conduct software testing and troubleshoot solutions. • Learn basic project management skills as applicable to software projects.	Awareness of Limitations.
CCT212H5 Hacker Culture	• Identify the technological and political significance of hacking. • Understand hacker cultures and practices. • Analyze the role of hacking in the history of computers and the digital economy. • Experiment with hacking of public data.	PLO1. Breadth & Depth of Knowledge.
CCT221H5 Digital Marketing I	• Research and prepare a classical marketing plan, and create this plan in the context of IT products and services.	PLO6, PLO7. Depth of Knowledge. Application of Knowledge. Communication Skills.
CCT226H5 Data Analysis I	• Compute and interpret the mean, standard deviation, correlation and line of best fit computed from a random sample.	PLO4, PLO5, PLO6.

Existing Course	Course Learning Outcomes	TCS Program Learning Outcomes
	• Choose the appropriate method to make inferences regarding population means and proportions. • Develop proficiency in the use of spreadsheets to perform statistical analysis. • Develop confidence in the use of numerical methods. Collaborate with partners.	Knowledge of Methodologies. Application of Knowledge. Awareness of Limitations.
CCT285H5 Immersive Environment Design	• Develop technical skillsets relevant for employment in the creative industries. • Develop an understanding of the social, cultural, economic and legal institutions implicated in the production, distribution and application of digital media. • Cultivate a deeper understanding of a variety of theoretical approaches to the study of immersive virtual environments.	PLO1, PLO3, PLO6, PLO7. Depth and Breadth of Knowledge. Application of Knowledge. Communication Skills. Autonomy and Professionalism.
CCT286H5 Interactive Media Design	• Designing effective interactive communication. • Analyze the usability of digital media. • Apply the basics of HTML, Cascading Style Sheets and JavaScript. • Engage in team design and prototyping of a mobile application	PLO3, PLO5, PLO7. Breadth & Depth of Knowledge. Communication Skills.
CCT308H5 Advanced Research Methods	• Develop and apply survey design and analysis skills. • Describe various parts of the research life cycle, and a sound understanding of terms commonly used in research projects. • Administer and report on the findings of a questionnaire, based on an experiential exercise.	PLO2, PLO4, PLO8. Knowledge of Methodologies. Application of Knowledge.

Existing Course	Course Learning Outcomes	TCS Program Learning Outcomes
	• Demonstrate an appreciation of the ethical issues that arise in the study of information and communication.	Awareness of Limitations. Communication Skills. Autonomy & Professionalism.
CCT320H5 Communication, Technology and Social Change	• Recognize the role of communication technologies in historical and contemporary instances of social change. • Apply a broad range of theoretical approaches to the study of communication and social change. • Evaluate how digital media can be harnessed to current and future projects of political and social change. • Appreciate the contradictory role of digital media in instances of contemporary social change, as tools of both resistance and repression. • Improve your communication, collaborative, writing, public speaking and research skills.	PLO1, PLO2, PLO7. Breadth & Depth of Knowledge. Application of Knowledge. Awareness of Limitations. Communication Skills.
CCT380H5 Human-Computer Interaction and Communication	• Learn the foundations of how humans interact with technology and how technology supports human-to-human communication Learn what are the human factors of interacting with computing systems. • Learn what makes interactive systems user friendly. • Learn about designing interactive systems that are usable. • Learn about designing digital technologies that mediate human communications. • Learn about evaluating interactive systems. • Conduct independent research into a problem space.	PLO3, PLO6, PLO7, PLO8. Knowledge of Methodologies. Application of Knowledge. Awareness of Limitations. Communication Skills.

Existing Course	Course Learning Outcomes	TCS Program Learning Outcomes
	• Envision and design user-centered interactive technologies. • Collect and analyze data about human behaviours. • Work in teams. • Publicly present their argument and defend their proposal.	Autonomy & Professionalism.
CCT382H5 Prototyping Digital Games	• Describe aspects of game design including art style, narrative, and mechanics and how they interact. • Integrate game user research and playtesting results into future design iterations. • Collaborate effectively in groups to create a digital game within a chosen genre and theme for a specific audience. • Use digital tools to create appropriate media (e.g. art assets, code) • Explore design strategies such as paper prototypes, wireframes, etc.	PLO3, PLO6, PLO7, PLO8. Knowledge of Methodologies. Application of Knowledge. Awareness of Limitations. Communication Skills.
CCT383H5 The Interactive Society	• Identify challenges that affect large groups on a social and economical dimension. • Motivate the need to construct an argument for addressing that challenge. • Research literature, identify current technological solutions and conduct a critical assessment of the challenges. • Propose changes to current or envisioned technologies to better address societal needs. • Conduct independent research into a problem space. • Identify real-world problems. • Write critical analyses of such problems. • Publicly present their argument and defend their proposal.	PLO3, PLO5, PLO6, PLO8. Knowledge of Methodologies. Application of Knowledge. Awareness of Limitations. Communication Skills. Autonomy & Professionalism.

Existing Course	Course Learning Outcomes	TCS Program Learning Outcomes
CCT410 Internship I	• Assess your skill sets and identify your strengths and weaknesses. • Identify what you don't know and how you can acquire that information and increase your knowledge base. • Identify your problem solving strategies and recognize how you can apply those strategies to other contexts. • Apply theoretical concepts to practical industry problems and situations. • Effectively articulate and communicate your work practices and the implications of your actions. • Produce professional quality writing. • Use networking skills to develop industry contacts.	PL02, PL06, PL07. Application of Knowledge. Awareness of Limitations. Communication Skills. Autonomy & Professionalism.
CCT416H5 Social Data Analytics	• Understand the "social capital" and how it operates within the social world. • Identify potential social data sources to answer some social scientific questions. • Collect data sources for use in analysis. • Transform data into a usable format. • Analyze data using standard social scientific methods. • Visualize data in informative ways.	PL01, PL04, PL05, PL06, PL08. Knowledge of Methodologies. Application of Knowledge. Awareness of Limitations.
CCT432H5 Ethics and Code	• Identify key questions and problems related to Ethics and Code. • Identify technologies and fields where ethics is increasingly relevant. • Critically analyze the current computational landscape and technologies. • Work in a group and present publically.	PL01, PL02, PL06, PL07. Breadth & Depth of knowledge. Application of Knowledge.

Existing Course	Course Learning Outcomes	TCS Program Learning Outcomes
		Awareness of Limitations. Communication Skills.
CCT480H5 User Integrated Design for Interaction	• Learn the foundations of how humans interact with technology and how technology supports human-to-human communication. • Learn what are the human factors of interacting with computing systems. • Learn what makes interactive systems user-friendly. • Learn about designing interactive systems that are usable Learn about designing digital technologies that mediate human communications. • Learn about evaluating interactive systems. • Conduct independent research into a problem. • Envision and design user-centered interactive technologies. • Collect and analyze data about human behaviours. • -Apply statistical methods and tools to interpret data and provide evidence to support a hypothesis. • -Work in teams. • -Publicly present their argument and defend their proposal.	PLO3, PLO5, PLO6, PLO7, PLO8. Knowledge of Methodologies. Application of Knowledge. Awareness of Limitations. Communication Skills. Autonomy & Professionalism.
CCT485H5 User Experience Design	This course's learning objectives complement and extend particularly those acquired in CCT380 or CCT480. These learning objectives extend beyond the design and implementation of interactive interfaces, and offer students hands-on training in engaging users and other stakeholders to ensure that any interactive technology is properly designed, implemented, and updated according to (often changing) human factors, cultural aspects, and environmental considerations. In particularly,	PLO3, PLO4, PLO5, PLO6, PLO7, PLO8. Depth of Knowledge. Knowledge of Methodologies.

Existing Course	Course Learning Outcomes	TCS Program Learning Outcomes
	students will learn how to conduct contextual analyses, participatory design, techno-centric ethnography, controlled experiments (AB testing), and longitudinal evaluations. At the end of the course (and complementing CCT380 or CCT480), students will be prepared to become true "user experience" designers or managers that are well grounded in a cultural, societal, economical, and human understanding of how we interact with information and with digital technologies.	Application of Knowledge. Awareness of Limitations. Communication Skills. Autonomy & Professionalism.

Appendix H: Faculty CV (separate document)

Appendix I: Appraisal Report

UNIVERSITY OF TORONTO MISSISSAUGA

Major in Technology, Coding & Society

New Program Appraisal Report

Date of Appraisal:
Tuesday, March 9, 2021 & Thursday, March 11, 2021

Name & Contact of Appraisers:
Professor Jeff Hancock
hancockj@stanford.edu

Professor Katie Shilton
kshilton@umd.edu

1. Objectives

Consistency of the program with the institution's mission and academic plans

The proposed TCS program is impressively consistent with UTM's mission and ICCIT's academic plans. The TCS major is the evolution of a key component of ICCIT's last academic strategic plan. We were impressed that the new major provides a clear academic path for students who are interested in combining technical skills with larger theoretical questions about the interaction of technology and society. Indeed, the new major's focus on integrating social and technical knowledge to educate well-rounded user experience designers, managers, and researchers is directly relevant to UTM's goal of educating leaders in the global knowledge economy. Knowledge workers increasingly need not only technical skills, but also understanding of the ways that social factors, norms, and policy influence the ways technologies are developed, deployed, used, and evaluated. The TCS major is designed to provide students with an education that integrates understanding of social factors alongside technical skill development.

We note that UTM and ICCIT value learning and accomplishment both inside and outside the classroom, and found that these values are well articulated in the TCS program. The TCS program includes both diverse course offerings and scaffolding for relevant internships, and the major seems poised to become a magnet for industry, government and other organizations that seek to hire students with the core skills provided in TCS. Indeed, there appear to be plentiful opportunities to strengthen collaborations with government and NGOs for the betterment of society. As planned, these include student internships. This remains an area that the program can strengthen and diversify, especially as new faculty and staff, with connections to industry, government and NGOs join, and as students graduate and create an alumni network.

The program reflects ICCIT and UTM's core values of equity, diversity and inclusion. The program was designed with principles of accessibility and inclusive design to appeal to students with a broad diversity of backgrounds and skill sets. The major also includes core coursework on topics of race, gender, and technology.

Clarity and appropriateness of the program's requirements

The program's requirements are clear and appropriate. The required courses are nicely balanced between technical skills, design skills, and social contexts, and are supplemented by a diverse range of electives. Though the proposed program is largely classroom-based, most courses include hands-on labs or workshops. An elective internship course in the fourth year provides an opportunity for real-world applications of the skills learned throughout the program.

The program's learning outcomes are appropriate and well-suited to the program's structure. However, there is some lack of clarity about the ways that "social"

learning outcomes are defined, particularly with regard to depth and breadth of "social" knowledge. In the current learning outcomes, the nomenclature of "core field(s) of study" is used without definition. This is a challenging problem without a clear solution; after all, the core fields of study for the social contexts of technology could incorporate dozens of disciplines. Currently, the efforts to define core fields of study seem to be faculty-led, with reliance on current expertise in media, communication, and HCI (human-computer interaction), which is an appropriate strategy for meeting this challenge. The program might want to think about naming and defining that expertise a bit more precisely, in order to set student expectations for what traditionally "social" disciplines or areas of knowledge they might gain through the program.

Appropriateness of the degree or diploma nomenclature

The degree nomenclature - Technology, Coding, and Society - was chosen through a careful process in consultation with current undergraduate students. It clearly and appropriately signals the content of the degree, with a joint focus on the skills needed to both use and critique technology in a variety of social contexts.

2. Admission Requirements

The TCS program's admissions requirements are appropriate for the learning outcomes established for the completion of the program. Students will be required to take prerequisite courses (Contemporary Communication Technologies, Rhetoric & Media and Critical Coding) and maintain a minimum GPA of 2.4, demonstrating proficiency in both coding skills and a basic understanding of the social contexts of communication technologies and digital media.

3. Structure

The program's structure is appropriate to meet the specified program learning outcomes and degree-level expectations, providing both depth and breadth in coding and social contexts; cultivating knowledge of diverse design and computational methodologies; guiding students to apply their knowledge of both design and social contexts; improving student communication skills; and fostering awareness of the limitations of coding and design knowledge. The structure begins with a core set of three first year courses that emphasize communication theory and coding skills, advancing both depth and breadth expectations. In addition, the critical nature of each of these courses introduce awareness of the limitations of both technical and design knowledge. Second-year courses delve into method and design, fulfilling methodology outcomes. Third and fourth-year required courses deepen the focus on design methodologies, and add required courses on ethics and social change, which further discuss the possibilities and limits of design and technical knowledge. Later years also include elective courses in advanced research and analysis methods. And throughout the program, applied courses based on faculty-led expertise, such as courses on hacktivism, respond to both depth and breadth requirements. Courses at all levels build student communication

skills by requiring written essays, critical analyses, case studies, usability reports, critical reflections, data analysis reports, individual and group oral presentations, podcasts, debates, and internship experiences.

Program's reflection of universal design principles

The faculty focused on universal design principles such as ensuring the appropriate size and space, equitable use, and flexibility in design of the program. Course sizes, especially for higher-level courses, are small, enabling hands-on work and frequent student/faculty interaction. Flexibility is reflected in the sufficient number of elective courses included in the major.

4. Program Content

The curriculum merges discipline and areas of study, so rather than addressing the current state of any one discipline, it uses multiple disciplinary perspectives (primarily communication, interaction design, and computational social science) to explore tensions and intersections between these areas of knowledge. By exploring at least three disciplines, and the connections between them, the program content will enable students to understand both the possibilities and limits of each discipline, and to embark on careers that demand skills that cross disciplinary boundaries. We found the content and approach put forth in the program to be cutting edge and represents some of the most current approaches to teaching this content that we've seen.

Unique curriculum or program innovations

The TCS program plans include a variety of unique curricular innovations. These include an internship component, which will enable students to put both the theoretical perspectives and concrete skills they have learned into practice. ICCIT also provides a number of certificate options that will be available to TCS students who wish to increase their skills in applied areas such as professional experience in digital media. ICCIT also facilitates industry and government partnerships through its Advisory Council. ICCIT faculty also provide access to numerous research opportunities for undergraduates. Finally, the major features a large number of project-based courses.

5. Mode of Delivery

The faculty and staff have thought extensively about modes of delivery for the wide variety of course types. Although most of the courses in the TCS program are planned for in-person delivery, the pandemic and its demands for distant learning has obviously temporarily disrupted those plans. The faculty and staff reported a relatively positive experience transitioning to remote learning, and upon the return of in-class teaching the program will include an appropriate mix of delivery modes, including in-person teaching for technical courses requiring production, making or

specialized equipment, as well as for social science and humanities courses that require conversation and interaction. The proposed modes of delivery also include distance learning online, mixed-mode or non-standard forms of delivery, such as experiential workshops, to meet the intended program learning outcomes and Degree-Level Expectations.

Suggested changes

Some faculty were interested in doing virtual courses and experimenting with novel modes of delivery. Other faculty expressed an interest in more team teaching. Given the program's interdisciplinary emphasis and technological sophistication, we believe the program should be more explicit in its support of faculty to develop novel modes of delivery (e.g., VR) and team teaching.

6. Assessment of Teaching and Learning

The TCS proposal has an impressively detailed assessment of program learning outcomes (PLOs) and degree-level expectations (DLEs). The program lists 6 DLEs, including *Depth and Breadth of Knowledge, Knowledge of Methodologies, Application of Knowledge, Communication skills, Awareness of Limits of Knowledge and Autonomy of Professional Capacity*, that fit well onto the goals of the program and are sensitive to key challenges, such as achieving depth and breadth of knowledge for such an interdisciplinary major. Within each DLE were several specific PLOs that tracked specific outcomes and in our view were both comprehensive and well-tailored to the DLEs. We were impressed with how the program design mapped on to these learning outcomes and the extent to which courses, workshops and certificate programs supported these goals. Indeed, the program makes excellent use of extant courses and programs to support these outcomes.

The range of learning assessment techniques was also appropriately broad and diverse, and include not only traditional assessments such as tests and projects, but also more novel assessments that fit the program goals, in particular more experiential learning, case studies, prototyping and maker projects, and additional emphasis on group work, group presentations, and critical reflection. The assessment tools mapped well onto the PLOs, and they appeared sufficient to assess depth, or competence, in the three main areas of study for TCS.

Necessary changes

One area that could be improved, or at least highlighted, is assessment tools that assess students' breadth and integration across core areas. Given the emphasis on the integrative aspects of TCS, it is less clear what tools will be used for assessing breadth and integration. We asked for more evidence of this kind of breadth and synthesis assessment, and the program provided a description of their capstone courses. There are four TCS capstone courses, two of which are required (one with

a theoretical emphasis, and one with a technical and design emphasis), along with two elective courses that are research and project-focused. These capstone courses are excellent assessment tools for breadth, and we appreciated that two of them are required. Additional evaluations could be derived from experiential aspects of the program, including internships and other project-based activities that require students to pull diverse aspects of their program learning together.

A second recommendation concerns the annual review of the program, which as planned is relatively robust with an annual review that includes curriculum mapping and an alumni survey to be conducted every four years. Our concern, however, is that the planned feedback mechanisms are not sufficiently timely. The full evaluation cycle (including alumni assessment) as planned is approximately 4 years for evaluation plus 1 year to implement changes. Given a) the rapidly evolving nature of this program, both in terms of the academic environment and the industry context, and b) the student's explicit concerns shared with us that course content stays current (especially technical skills), we believe that 5 years is too long between evaluation cycles. More frequent and regular assessment is required, especially for such a new and dynamic program. Possible options include yearly exit surveys and interviews with graduating students, bi-annual meetings with student groups (e.g., student councils), and some form of regular feedback from industry partners. Along with these more frequent, and potentially lightweight evaluations, some form of mechanisms for change is required. This mechanism should clarify how needs for change identified in these reviews will be implemented by administration, faculty and staff.

Suggested changes

An area that could be improved are the plans for documenting and demonstrating the performance of students. Given the digital nature of many of the outputs from classes, workshops and internships for this major, it seems like an opportunity to document, and indeed celebrate, student performance would be making these digital outputs publicly available through the major's website, youtube channel, or other outlets (e.g., digital portfolios). This would also further demonstrate ways that the program meets breadth and depth requirements in the program's degree-level expectations.

7.Resources

Adequacy of resources and participation of faculty
ICCIT has planned for adequate numbers of faculty and staff to achieve the goals of the TCS program. ICCIT's use of existing human resources is excellent. The TCS major takes advantage of a number of existing courses, and draws on the strengths of existing faculty. The institutional commitment to supplement those resources to support the program is also strong. ICCIT plans to hire a tenure-stream faculty member to add expertise in the design and technical skills the program requires. Together, this ensures participation of a sufficient number of faculty who are competent to teach and/or supervise in the program. The faculty qualified to teach in the program are also of very high quality, with strong teaching experience and research trajectories. The program will make minimal use of adjunct and part-time faculty.

There are adequate resources to encourage quality scholarship and research activities among undergraduates in the program. The major has clear support from two dedicated library staff who provide support for both coursework and research activities, and several information technology staff who provide laboratory and technical support.

Planned/anticipated class sizes

Planned class sizes are appropriate for the goals of the program. While introductory courses in the major are quite large, this shows the demand for sociotechnical courses on campus. ICCIT has chosen to restrict the major cohort to a small size (a maximum of 42 students per cohort) to enable frequent one-on-one interactions with faculty and to facilitate student cohesion.

Support for experiential learning opportunities

The TCS major will support experiential learning opportunities in the form of an optional internship, advanced project, or research project for fourth-year students. These will all be supported as courses taught by existing faculty.

Suggested changes
Some faculty mentioned concerns with how the technical support and space resources will scale as the program grows. As noted the program plan currently appears well resourced, and the program's purposefully slow plan to scale over the first four years (to 45 majors) should ameliorate this concern, but the planned ability to scale these resources with growth should be clarified given the shared sense that the program will become very popular.

We also got the sense from faculty, students, staff and administrators that this program is likely to be very popular, and that 45 majors is likely to be low, especially

in the longer term. We understand and appreciate the program's approach to deliberately slow growth, but some articulation for the longer term expected enrollment in the program would help provide some clarity in how the program will be resourced in the longer term.

8. Quality and Other Indicators

Our overall impression of the quality of the proposed program and the faculty and staff that will support it is very high. The faculty are highly interdisciplinary, productive and collegial, with excellent leadership in the current Director, an enthusiastic and connected group of lecturers, excited and engaged students, and a dedicated and committed staff. The faculty are productive and engaging in some fascinating research that maps well onto the major's main areas, and they all are committed to interdisciplinary study, which is a hallmark of this major. The junior faculty all have exciting research programs and scholarly records while the senior faculty have already established national and international reputations for strong research, innovation, and for tackling important societal problems around technology. We are confident that the quality of the faculty will translate into intellectual rigor in the student experience, and support the challenging demands of depth and breadth around technical skills and social theory that this major will require of students. Despite being highly interdisciplinary the faculty also appear to get along well, respect one another, feel that their voices are heard, and overall there is a collegial climate. The staff similarly appeared collegial and excited for the major to be implemented.

Recommended changes
Finally, the program does not include any explicitly articulated elements to enhance the diversity of the students, staff or faculty. While this should be rectified in the program proposal, diversity of thought is inherent in this major given the breadth requirements across technical skills, social science, and humanities courses and research. Further, the staff and faculty had diverse backgrounds and lack of diversity was not an issue raised by anyone in our conversations. Nonetheless, the program should make its diversity goals and means to support them more clear.

Appendix J: Decanal Administrative Response

UNIVERSITY OF TORONTO MISSISSAUGA

OFFICE OF THE DEAN

April 14, 2021

Professor Mark Schmuckler
Vice-Provost, Academic Programs
Simcoe Hall
University of Toronto

Dear Professor Schmuckler:

We are writing to provide an administrative response to the Appraisal Report of UTM's proposed new Major in Technology, Coding & Society Program in the Institute of Communication, Culture, Information & Technology (ICCIT), which was held (virtually) on March 9, 2021 and March 11, 2021. The external appraisers were Professor Jeff Hancock, Professor of Communication at Stanford University and Professor Katie Shilton, Associate Professor at the College of Information Studies, University of Maryland.

It was our pleasure to receive such a positive and supportive appraisal report for the Technology, Coding & Society (TCS) Major Program. In particular, the appraisers found the program structure and design mapped well onto the stated learning outcomes and UTM's degree level expectations, "providing both breadth and depth in coding and social contexts." They were particularly positive about the program and faculty's attention to universal design principles in the development of this program. The content of the TCS major was deemed "cutting edge" and representative of current teaching approaches. Additionally, the appraisers found the program curriculum to be innovative, utilizing a variety of contemporary pedagogical techniques, such as internships, research opportunities, and project-based courses.

Below, we provide a brief discussion about the recommendations made by the appraisers in their report. This response was developed in consultation with the Director of ICCIT and the main faculty proponents of the proposed program via the Director's Administrative Response submitted by Professor Rhonda McEwen, Director of ICCIT.

Student internships

The appraisal report, while praising the value placed on learning and accomplishment outside of the classroom within ICCIT and the TCS program proposal, did offer a recommendation to broaden and diversify internships and look to increase government and non-government collaborations. Currently, more than one-third of ICCIT internships are already with not-for-profit organizations, such as Doctors Without Borders and faith-based organizations. Diversification and expansion in the variety of internship opportunities is an ongoing goal of ICCIT (and UTM). To support this, ICCIT already has a long-standing relationship with the Experiential Education Unit within the Office of the Dean with an assigned Experiential

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Education Officer who supports both the maintenance of current partnerships and the development of new collaborations.

To facilitate the expansion of internship experiences for students, the appraisers further suggested the creation of an alumni network for TCS graduates. ICCIT currently maintains a robust alumni network across all their program offerings and graduates of the TCS Major will be welcomed into this already successful network. ICCIT also engages regularly with their Advisory Board.

In response to the appraiser's comments, the program proposal has been updated in section 4, Need and Demand (pp. 19-20) to highlight the points discussed here.

"Social" Learning

The appraisers stated that while "[t]he program's learning outcomes are appropriate and well-suited to the programs' structure", there is an opportunity to better define the "social" learning outcomes of the program. They encouraged ICCIT to better define "traditionally 'social' disciplines" within the context of the TCS program. ICCIT describes the branches of academic study that deal with human behavior in its social and cultural aspects as the traditionally social disciplines – these include anthropology, sociology, psychology, political science, and economics. ICCIT emphasizes the word "traditionally" because technology can disrupt these definitional boundaries, and, design, engineering, and coding contribute to "social" learning. For example, designing a user interface includes an understanding of who the users are, and knowledge of how to manipulate hardware and software to achieve the desired outcomes – therefore, combining the traditionally social disciplines with other knowledge bases. As a result of the appraisers' observations, the TCS major' first program learning outcome has been updated to better support and articulate this interpretation of 'social' learning. This is reflected in Table 5, DLEs Program Learning Outcomes and Requirements (p. 30) of the proposal.

Mode of Delivery

In acknowledgement of "the [ICCIT] faculty and staff [who] have thought extensively about modes of delivery for the wide variety of course types", the appraisers encouraged further support in the development of new modes of delivery within this program. ICCIT has always been a leader in pedagogical innovation at UTM and will continue to look for and experiment with new modes of delivery in their courses. ICCIT agrees that the proposed TCS program is an appropriate platform to launch some of these initiatives and changes to mode of delivery will be considered in the future as the program evolves. Naturally, the Dean's Office also agrees and will provide support as needed and appropriate.

Assessment of Teaching & Learning

The appraisal team recommended that ICCIT find more ways to document and demonstrate assessment of "students' breadth and integration across core areas." As the appraisers

observed, the two required capstone courses in the program (CCT432H5 Ethics and Code and CCT485H5 User Experience Design) accomplish this by providing students the opportunity to demonstrate and integrate their learning across the core areas and be formally assessed on their work. An additional two capstone courses that are research- and project-based are available as degree electives to students. A further opportunity for formal assessment of breadth and integration is provided through the (optional) internship course. Section 7, Assessment of Teaching (p. 46) has been updated to reflect this.

Given the digital nature of the outputs from these courses and the pedagogical innovation within ICCIT, the appraisers noted that there is an opportunity here to display the strengths of ICCIT and recognize their students. ICCIT is in agreement with this suggestion. Currently, ICCIT provides their students with access to Acadiate (a portfolio platform), offers training/ workshops on how to build an effective project-based portfolio, and supports student-initiated platforms that showcase their work (such as a student-led journal as well as case competitions). Further to this, ICCIT will investigate opportunities to leverage the use of online platforms such as YouTube, Instagram, Tik Tok and other options as the program launches and grows (i.e. in the first two years of the program). Postings to these platforms will provide an outlet for students to showcase their in-course work, further explore the breadth and depth of their learning, as well as serve as additional evidence of integration through such extra- and co-curricular work.

Program Review

The appraisers noted that, given the "rapidly evolving nature of this program" as well as student concerns that the program and course content remain current (i.e. with respect to technical skills), the need for "[m]ore frequent and regular assessment is required." In response to this, ICCIT will look to solidify their existing collaborations with the ICCIT Student Council by setting regular and formal meetings and prioritizing feedback on program content. Work with their alumni network is already underway and there is a plan to include TCS graduates in their alumni surveys, which will also include program-specific questions related to the TCS major. Industry partners provide feedback through the Advisory Board, which includes representation from not-for-profit organizations and secondary school educators. This feedback will be presented annually to the ICCIT Curriculum Committee for review. Changes that can be made through minor modifications of courses and program requirements will be done during the regular Divisional Undergraduate Curriculum Review Cycle and implemented in the Fall of the next calendar year. Section 7, Assessment of Learning (p. 47) of the proposal has been updated to reflect this.

Resources

The appraisal report noted the relatively conservative rollout for the proposed program and suggested more clarity around resourcing should demand for the program be strong. As noted in the proposal, the expected enrolment of 45 students per year has been planned strategically to ensure sufficient resourcing in the first 4-5 years. Once the proposed Arts, Culture &

Technology (ACT) building is completed (currently expected to be post-2025), expansion of the TCS Major can be more thoroughly considered. ICCIT is scheduled to undergo an external review in the 2023-2024 academic year, at which point, more accurate information on the demand of the TCS Major as well as the ACT building will be available. It is expected that these concerns will be addressed during this external review process.

Quality & Other Indicators

A final recommendation from the appraisers suggested that "while diversity of thought is inherent in this major given the breadth requirements across technical skills, social science, and humanities courses and research", the proposal would benefit by making "its diversity goals and means to support them more clear." Equity, diversity, and inclusion has always been a vital component to all our programming at UTM and we intentionally strive to improve this at all times. We are grateful to the appraisers for highlighting this and welcome the opportunity to make this more explicit. Section 15, Quality and Other Indicators (p. 59) of the TCS Major proposal has been updated accordingly.

Please let us know if you have any questions about this response.

Sincerely,

Amrita Daniere
Vice-Principal, Academic & Dean

Heather M.-L. Miller
Vice-Dean, Teaching & Learning

Amrita Daniere
Vice-Principal, Academic & Dean

Heather M.-L. Miller
Vice-Dean, Teaching & Learning

Enc: Director's Response to the Major in Technology, Coding & Society, New Program Appraisal Report (UTM)

CC: Rhonda McEwen, Director, Institute of Communication, Culture, Information & Technology

Appendix K: Provostial Administrative Response

UNIVERSITY OF TORONTO

OFFICE OF THE VICE-PROVOST, ACADEMIC PROGRAMS

April 14, 2021

Amrita Daniere
Vice-Principal, Academic & Dean
University of Toronto Mississauga

Re: Appraisal Report, Proposed New Major in Technology, Coding and Society

Dear Amrita,

I am very pleased to receive the appraisal of the proposed Major in Technology, Coding and Society (TCS). Your administrative response to the appraisal nicely summarizes the report and highlights the specific suggestions made by the appraisers for consideration.

The appraisers noted that graduates would be well poised to work in industry, government and non-governmental organizations and that the program might consider strengthening and diversifying connections to these organizations, perhaps though an alumni network. Your response indicates that students in the Institute of Communication, Culture, Information & Technology (ICCIT)'s programs currently complete internships with these types of organizations. As well, ICCIT cultivates the expansion of internship opportunities through the UTM Experiential Education Unit, its existing alumni network and its Advisory Board. To make this clearer, the proposal has been updated to highlight the existing connections and the support ICCIT draws on.

The appraisers recommended that the program name or define what is meant by the traditionally "social" disciplines within the context of the program. Your response clarifies that ICCIT describes the branches of academic study that deal with human behaviour in its social and cultural aspects as the traditionally social disciplines. It emphasizes the word "traditionally" because technology can disrupt these definitional boundaries, and design, engineering and coding contribute to "social" learning. To make this more transparent in the context of the program itself, the proponents have rearticulated program learning outcome 1.

The appraisers encouraged further support in the development of new modes of delivery within this program. Your response noted that ICCIT is deeply engaged in pedagogical innovation and it will continue to explore new modes of delivery in its courses. Changes in this area will be considered as the program evolves.

In the area of assessment of teaching and learning, the appraisers suggested the program consider assessment tools specifically geared to assessing students' breadth and integration across core areas. Your letter indicates that the appraisers recognized this is embedded in the program's two required and two elective capstone courses, and you note that another opportunity for this type of assessment is through the optional internship course. The proposal has been updated to clarify this information. The

appraisers also suggested, given the digital nature of program activities, there is an opportunity to document student performance by making the digital outputs publicly available. In your response you indicate the program agrees with this suggestion.

Appraisers recommended, given the evolving nature of the area, building in more timely review of the program. In response to this recommendation, ICCIT will formally engage with its Student Council to receive feedback on program content. It will also work with its alumni network to include TCS graduates in their alumni surveys and gather industry partners to provide feedback through its Advisory Board. This feedback will be presented annually to the ICCIT Curriculum Committee for review. The proposal has been updated to reflect these methods of collecting feedback.

In the area of resources, the appraisers suggested the program was likely to be popular and it would be good to anticipate how this would be managed in the long term. You confirmed that enrolment will be limited to 45 students per year for its first four years, and the program will consider expansion when it undergoes its first review.

Finally, the appraisers recommended adding the program's diversity goals and how they will be supported in the proposal. Your letter confirms that this has been done.

I will be very pleased to recommend this new undergraduate program to governance for approval, following approval at the Divisional level.

Sincerely,

Mark Schmuckler
Acting Vice-Provost, Academic Programs

cc:

Rachel Hughes, Executive Assistant to the Dean, Office of the Vice-Principal Academic and Dean, UTM

Heather Miller, Vice-Dean, Teaching & Learning, Office of the Vice-Principal Academic and Dean, UTM

Fiona Rawle, Associate Dean, Undergraduate, Office of the Vice-Principal Academic and Dean, UTM

Yen Du, Program & Curriculum Officer, Office of the Vice-Principal Academic and Dean, UTM

Daniella Mallinick, Director, Academic Programs, Planning & Quality Assurance, Office of the Vice-Provost, Academic Programs

Jennifer Francisco, Coordinator, Academic Change, Office of the Vice-Provost, Academic Programs