DIGITAL TRANSFORMATION AND INNOVATION (DTI)

The following courses are offered by the Faculty of Engineering.

DTI 5100 Introductory Seminar (1.5 unit)
Course Component: Lecture

DTI 5115 Communication Ethics (3 units)
Emphasis on the significance of ethical principles and responsibilities of public communicators, as well as sanctions faced when communicators fail to uphold these principles. Critique of self-regulation of the media. Analysis of argumentation. Study of legal precedents with respect to defamation.
Course Component: Seminar

DTI 5124 Internet Technologies and Mobile Commerce (3 units)
An examination of current Internet technologies, protocols and wired and wireless infrastructures. Analysis of current Internet-based businesses and consumer applications and services. Discussion of mobile commerce business models and strategies and their relevant technologies. Hands-on experience with discussed technologies and applications. Students will complete a project demonstrating and analyzing how an Internet-based application or service could be applied in their field of graduate study.
Course Component: Seminar

DTI 5126 Data Science Applications (3 units)
Analysis and design of various data cleaning, wrangling, blending, and visualization, statistical inference, classification, clustering, regression, and content analysis methods. Use of machine learning algorithms to extract meaningful information from data to make decisions. Formulating analytics problems for business and developing, evaluating, and maintaining machine learning models. Analyzing, generating, and communicating insights on the models. Hands-on experience with an integrated set of current data analytics, data mining, and machine learning tools.
Course Component: Lecture
The courses DTI 5124, GNG 5124 cannot be combined for units.

DTI 5125 Data Science Applications (3 units)
Analysis and design of various data cleaning, wrangling, blending, and visualization, statistical inference, classification, clustering, regression, and content analysis methods. Use of machine learning algorithms to extract meaningful information from data to make decisions. Formulating analytics problems for business and developing, evaluating, and maintaining machine learning models. Analyzing, generating, and communicating insights on the models. Hands-on experience with an integrated set of current data analytics, data mining, and machine learning tools.
Course Component: Lecture
The courses DTI 5124, GNG 5124 cannot be combined for units.

DTI 5126 Fundamentals for Applied Data Science (3 units)
Essential data science concepts relevant to practical applications are covered including: problem formulation; data acquisition; data pre-processing, modeling and statistical analysis. Hands-on experience with data science tools and techniques including: supervised and unsupervised machine learning; presentation of results; applications in areas such as accounting, finance, marketing and supply chain management.
Course Component: Lecture
The courses DTI 5126, DTI 5125, MIA 5126 cannot be combined for units.

DTI 5127 Mobile Commerce Technologies (3 units)
Course Component: Lecture

DTI 5389 Electronic Commerce Technologies (3 units)
Course Component: Lecture
The courses DTI 5389, DTO 5389 cannot be combined for units.

DTI 5310 Ethics for Design, AI, and Robotics (3 units)
Artificial Intelligence technologies are becoming ever more present in applications like: automated vehicles and mobility-as-a-service (e.g. driving and system-level control algorithms); business intelligence (e.g. predictive resource allocation); consumer electronics (e.g. social robots and smart speakers); healthcare (e.g. image classification in medical imaging); the justice system (e.g. recidivism prediction and sentencing); and weapons systems (e.g. targeting and kill decision-making). Many of these applications are raising significant ethical concerns. A range of topics in applied technology ethics are examined through the lens of contemporary philosophy and applied ethics texts and popular media articles. Practical frameworks, methodologies and tools for anticipating, and addressing, ethical issues are introduced through hands-on, group-based design thinking workshops and projects.
Course Component: Lecture
The courses CSI 5195, DTI 5310, DTO 5310 cannot be combined for units.

DTI 5380 Systems and Architectures for Electronic Commerce (3 units)
Course Component: Lecture

DTI 5501 Fondements de gestion pour les affaires électroniques (3 crédits)
Volet : Cours magistral

DTI 5502 Fondements des technologies de l'information pour les affaires électroniques (3 crédits)
Volet : Cours magistral

DTI 5503 Fondements des statistiques pour les affaires électroniques (3 crédits)
Volet : Cours magistral

DTI 5902 Projet de stage en entreprise / Industry Internship Project (6 crédits / 6 units)
Projet encadré par un expert de l’industrie et un professeur qui supervise le projet. Les projets internationaux (emplacement ou expert du secteur) sont autorisés. / Project mentored by an industry expert and a professor who co-supervise the project. International projects (location or industry expert) are permitted.
Volet / Course Component: Recherche / Research
Préalable : GNG 5301. Les cours DTI 5902, GNG 5902 ne peuvent être combinés pour l’obtention de crédits. / Prerequisite: GNG 5301. Courses DTI 5902, GNG 5902 cannot be combined for units.

DTI 5990 Études dirigées / Directed Readings I (1.5 crédit / 1.5 unit)
Volet / Course Component: Recherche / Research

DTI 5991 Études dirigées / Directed Readings II (1.5 crédit / 1.5 unit)
Volet / Course Component: Recherche / Research

DTI 6102 User Experience Principles and Practices (1.5 unit)
User experience (UX) facets including functionality, usability and desirability as key success factors for technology adoption and acceptance; Human-computer interaction (HCI) theories; UX frameworks and patterns for interface design, information design, and visual design; UX management best practices; UX design methods and tools; UX evaluation and usability engineering.
Course Component: Lecture
The courses DTI 6102, DTI 6103, DTO 6106 cannot be combined for units.

DTI 6103 User Research (1.5 unit)
Understanding users’ behaviours, needs, motivations and challenges in user experience (UX); Common user research methods including interviews, surveys, focus groups, contextual inquiries; Principles and guidelines for generative & evaluative research; methods in qualitative and quantitative user research; Tools and techniques for in-person and remote research, and moderated vs automated approaches; heuristic evaluations and usability testing.
Course Component: Lecture
The courses DTI 6103, DTI 6102, DTO 6106 cannot be combined for units.

DTI 6104 Interaction Design (1.5 unit)
Principles of interaction design (iXD); Usability heuristics for user interface (UI) design; iXD tools and techniques including sketching, wireframing, and prototyping; UI design patterns for navigation, landing pages, search, and e-commerce; iXD best practices for mobile application design.
Course Component: Lecture
The courses DTI 6104, DTI 6105, DTO 6107 cannot be combined for units.

DTI 6105 Design Thinking (1.5 unit)
Design thinking as a collaborative creative process for problem-solving and designing human-centered solutions. Design thinking for driving business innovation, new product development, and customer experience. Best practices for design inspiration, ideation and implementation; essential design research skills for empathy, listening, collaboration, observation, critical analysis, and experimentation. Design Thinking tools and techniques including visualization, mapping, storytelling, rapid prototyping, and testing.
Course Component: Lecture
The courses DTI 6105, DTI 6104, DTO 6107 cannot be combined for units.

DTI 6130 Web Services (1.5 unit)
Web services business models and strategies. Enterprise Application Integration and Service Oriented Architectures. Web services technology standards. Consumer and enterprise adoption of web service technologies and platforms such as Mashups and Cloud Computing.
Course Component: Lecture

DTI 6160 Cyber Security Systems and Strategies (3 units)
Course Component: Lecture
The courses DTI 6160, MIA 6160 cannot be combined for units.

DTI 6180 Strategic Knowledge Management (1.5 unit)
Leveraging a firm’s intellectual capital to enhance organizational performance. Business analysis frameworks, strategy roadmaps and enterprise architectures relevant to the planning and execution of knowledge management initiatives in organizations. Using the web to maximize knowledge acquisition and sharing among employees.
Course Component: Lecture
The courses DTI 6180, MIA 6180 cannot be combined for units.

DTI 6210 Electronic Commerce Architecture (1.5 unit)
Course Component: Lecture

DTI 6220 Data Analytics and Business Intelligence (1.5 unit)
Introduction to business data collection, data pre-processing, data warehouses, data marts, and online analytical processing. Data mining tasks including classification, clustering and association rules. Data mining model building, tools and techniques including decision trees, neural networks, and regression analysis. Application of these techniques in business including CRM, target marketing, credit scoring, churn, survival analysis, and fraud detection.
Course Component: Lecture

DTI 6230 Business Process Management and Performance Measurement (3 units)
Hands on introduction to Business Process Management Technologies. Review of the latest concepts for using technology to improve performance of business processes. Analysis of advances in Internet-enabled B2B and enterprise business models with emphasis on service-oriented and event-driven architecture. Introduction to current performance measurement tools and the role of data science in business process management. Example applications such as supply chain management, order processing, and health care process management will be studied.
Course Component: Laboratory, Lecture

DTI 6240 Mobile Commerce (1.5 unit)
Course Component: Lecture
DTI 6250 Document Engineering for Digital Transf. and Innovation (1.5 unit)
Digital Transf. and Innovation from a Document Engineering Perspective.
E-documents as the basis for DTI relationships. Modelling DTI documents
and Processes. XML as a vehicle to defining a formal structural and
semantic definition for electronic documents. XML syntax, styles and
transformations, Document Type Definitions, and schema languages.
XML Vocabularies for DTI. XML standards, specifications, and software
architectures for DTI. E-documents within the enterprise. E-document
exchanges for multi-company business activities.
Course Component: Lecture

DTI 6260 Integrated Networks for the Enterprise (1.5 unit)
OSI reference model. LAN characteristics. Interconnecting LAN.
Interconnecting with TCP/IP. Routing protocols. IPv6. WAN options.
Security protocols. VPN. Enterprise-Wide Solutions.
Course Component: Lecture

DTI 6300 Topics in Digital Transformation and Innovation (3 units)
Recent and advanced topics in the field of Digital Transformation and
Innovation and its related areas. Topics vary from year to year.
Course Component: Lecture

DTI 6301 Topics in Digital Transformation and Innovation (1.5 unit)
Recent and advanced topics in the field of Digital Transformation and
Innovation and its related areas. Topics vary from year to year.
Course Component: Lecture

DTI 6302 Topics in Applied Data Science (3 units)
Recent and advanced topics in the field of Applied Data Science and its
related areas. Topics vary from year to year.
Course Component: Lecture

DTI 6303 Topics in Applied Data Science (1.5 unit)
Recent and advanced topics in the field of Applied Data Science and its
related areas. Topics vary from year to year.
Course Component: Lecture

DTI 6304 Topics in User Experience Design (3 units)
Recent and advanced topics in the field of User Experience Design and its
related areas. Topics vary from year to year.
Course Component: Lecture

DTI 6305 Topics in User Experience Design (1.5 unit)
Recent and advanced topics in the field of User Experience Design and its
related areas. Topics vary from year to year.
Course Component: Lecture

DTI 6402 Affective and Persuasive Computing (3 units)
Overview of human affective models and affect modalities. Design
and development of affect estimation algorithms using artificial
intelligence. Modality fusion and multimodal affect estimation.
Persuasive technology and its applications. Persuasion design and
persuasive strategies. Application of persuasive strategies in serious
gaming. Current challenges in the fields of affective computing and
persuasive technology.
Course Component: Lecture

DTI 6700 Thèmes choisis en affaires électroniques (3 crédits)
Sujets actuels et avancés en affaires électroniques et disciplines
connexes. Les sujets varient d'une année à l'autre.
Volet : Cours magistral

DTI 6701 Thèmes choisis en affaires électroniques (3 crédits)
Sujets actuels et avancés en affaires électroniques et disciplines
connexes. Les sujets varient d'une année à l'autre.
Volet : Cours magistral

DTI 6900 Stage international / International Work Term (3 crédits / 3 units)
Expérience pratique dans un milieu de travail international. Noté S
(satisfaisant) / NS (non satisfaisant) selon les résultats de rapport écrit
et l'évaluation de l'employeur. / Practical international experience.
Volet / Course Component: Cours magistral / Lecture

DTI 6950 Lectures dirigées / Directed Readings (1.5 crédit / 1.5 unit)
Volet / Course Component: Cours magistral / Lecture

DTI 6997 Projet de recherche / Research project (6 crédits / 6 units)
Le sujet de recherche, ainsi que le professeur qui va le diriger, doivent être
approuvés par la direction du programme avant l'inscription à la troisième
session. Le sujet peut être de nature théorique (par exemple, une
evaluation de la documentation ou une étude de la littérature scientifique)
ou appliquée (par exemple, des études de cas). Un mémoire, d'une
cinquantaine de pages, doit être rédigé et approuvé par le professeur
qui le dirige ainsi qu'un autre professeur. / The research topic and the
professor who will direct it must be approved by the program director
prior to registration in the third session. The topic can be theoretical
(for instance, based on a documentation assessment or a review of
the scientific literature) or applied (based on case studies). A research
paper, about 50 pages long, must be written and approved by the project
director and another professor.
Volet / Course Component: Recherche / Research

DTI 7100 Research Methods in Digital Transf. and Innovation (3 units)
Experimental Research. Modeling principles: analytical modeling and
simulation. Measurement and scaling. Sampling. Hypotheses testing and
statistical significance. Multivariate Analysis. Mathematical properties
of computational problems: decidability and computability. Qualitative
methods. Writing a Research Manuscript. Presentation of research
results.
Course Component: Lecture

DTI 7101 Research Workshop in Digital Transf. and Innovation (1.5 unit)
Writing a Research Project proposal including problem formulation
and work plan. Essentials of graduate report writing, information
management, literature search techniques and reference management.
Research ethics including academic integrity and avoiding academic
fraud.
Course Component: Lecture

DTI 7102 Interdisciplinary Research Methods in Digital Transf. and
Innovation (1.5 unit)
Writing a Thesis Proposal. Research design. Introduction to positivist
and interpretive approaches, behavioral and design science research,
qualitative and quantitative research methods, and sampling strategies
and techniques.
Course Component: Lecture

DTI 7103 Visual Literacy and User Experience Design Principles (3 units)
Fundamentals of visual, interaction and motion design theories and
principles as they relate to User Experience Design (UXD). A series of
hands-on workshops and assignments focus on building visual literacy
through guided observations, visual design critiques, and visual redesigns
of existing screen-based digital products (i.e. website, interactive kiosk
interface, mobile app etc.). Students will complete a design project.
Students will conduct research and scholarship in visual literacy, and
UXD and justify their design decisions in writing.
Course Component: Lecture
The courses DTI 7103, DTO 7103 cannot be combined for units.

DTI 7990 Proposition de thèse / Thesis Proposal
Volet / Course Component: Recherche / Research
DTI 8101 Interdisciplinary Doctoral Seminar in Digital Transformation and Innovation I (3 units)
Recent developments in Digital Transformation and Innovation research. Critical analysis of theories, models, and methods. Critical synthesis of the field literature from different perspectives. Students will write a systematic survey paper of the literature relevant to their research in one of the three fields of the program. The paper must be in a different field from that selected for the paper in DTI 8102. Course reserved for students in the Digital Transformation and Innovation PhD program.

Course Component: Seminar

DTI 8102 Interdisciplinary Doctoral Seminar in Digital Transformation and Innovation II (3 units)
Recent developments in Digital Transformation and Innovation research. Critical analysis of theories, models, and methods. Critical synthesis of the field literature from different perspectives. Students will write a systematic survey paper of the literature relevant to their research in one of the three fields of the program. The paper must be in a different field from that selected for the paper in DTI 8101. Course reserved for students in the Digital Transformation and Innovation PhD program.

Course Component: Seminar

DTI 9997 Projet de thèse doctoral / Doctorate Thesis Proposal
Volet / Course Component: Recherche / Research

DTI 9998 Examen général de doctorat / Comprehensive Exam
Volet / Course Component: Recherche / Research