Architectural Technologies
Student Program Document

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Welcome to SAIT

Thank you for taking an interest in the Architectural Technologies Program here at SAIT.
In this document you will find a brief overview of what the program is and what is entailed for you to successfully complete the program.

At SAIT:

- We believe in excellence as demonstrated by fresh thinking, best practices, entrepreneurial initiatives, bold solutions to new opportunities and fiscal responsibility.
- We believe in Collaboration and we work together as a learning community to serve you and your future career partners.
- We believe in Fairness modelled by honest and ethical dealings in our relationships with you, your peers and your instructors.[i]

We promise to give you our very best. We will be realistic as we reach for our goals and seize emerging opportunities. To realize our vision and honour our beliefs, we will focus on five strategic priorities: sustainable growth, your success, employee success, applied education innovation and partnerships.

So welcome and thank you for looking into our program!

Architectural Technologist Defined

The profession of architectural technology is creative, innovative and essential to the design of buildings and structures. Underpinned by science and engineering, architectural technology is essential to achieve optimum functionality, efficiency and effectiveness in construction of robust, durable and sustainable design solutions that perform over time.[ii]

Architectural Technologists usually work within multidisciplinary teams with particular responsibility for the preparation of production information such as working drawings, schedules and specifications as well as site surveys, administrative procedures to do with building regulations, fire safety certificates, planning applications, the building contract, among others.[iii]

Architectural technologists and technicians may work independently or provide technical assistance to professional architects and civil design engineers in conducting research, preparing drawings, architectural models, specifications and contracts and in supervising construction projects. Architectural technologists and technicians are employed by architectural and construction firms, and governments.[iv]

Architectural Technologists are key members of the design team. They play a vital role in turning the design ideas of architects and engineers into practical, workable buildings. Architectural Technologists help research and prepare architectural drawings using special drafting software. They may also research building codes, test building materials for suitability, calculate cost estimates, building models based on architects' designs, and oversee construction projects by monitoring and inspecting the work of builders.[v]

In this role one can expect to negotiate and manage various elements of the development of a construction project. One should be prepared to specialise in the application of building science and technology to architectural and construction projects and be prepared to negotiate and mange many aspects of the various contracts used in the construction industry.[vi]

'the professional technologist is a technical designer, skilled in the application and integration of construction technologies in the building design practice' and that 'architectural technologists are trained to know what each profession does and to know what each project needs from other professionals'[vii]

Scope of Work

The manner in which buildings are realized is complex and requires the coordination and integration of multiple disciplines. Architectural Technologists need to be able to facilitate **project delivery that integrates people, systems, business structures, and practices into a process that collaboratively harness the talents and insights of all project participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication and construction**[viii]

The roles and responsibilities of the Architectural Technologist have expanded to meet this need resulting in an increasingly wide scope and breadth of roles in the Architecture, Engineering and Construction Industry (AEC). Architectural Technologists are expected to be more independent and able in a wide variety of disciplines in the construction industry. The following list is a broad overview of some of the duties one can expect to perform:

Architectural Drawing

- Create, analyse, and modify construction documents including drawing and specifications.
- Create and demonstrate graphic information using current codes, regulations, and appropriate drawing elements, symbols, and conventions.
- Generate hand-drawn sketches delineating plans, sections, elevations (facades), plan details, section details, and elevation details.

Building / Sustainable /Structural Design

- Apply principles of noise abatement, colour, and lighting in design of interior spaces, acoustics, and human perception of architectural space in relation to colour and light.
- Apply Universal Design Standards and barrier-free design principles, as defined by building codes and impact on cost, additional areas needed, and fire risk.
- Evaluate climatic factors and principles and their influence on building design and detailing.
- Interpret and analyze municipal, provincial, and federal regulations that pertain to the environment.
- Select and evaluate green design strategies.
- Research and interpret the environmental impact of various building techniques and materials.
- Design structural elements such as beams, columns, walls, and floor systems, and formwork / false work designs and assess their conformity with design practices and applicable codes.

Stakeholder Communication

- Interpret, prepare, communicate, and defend technical drawings and architectural models.
- Communicate technical information to diverse groups with varying interests and limited technical knowledge.
- Generate proposals and contract documents using technical writing.

Building Science

- Evaluate and apply processes used in design, layout, and construct projects.
- Resolve and anticipate technical problems in project design, detailing and construction using systematic approaches.
- Design and detail construction problems applying knowledge of building materials, methods, building envelope, and environmental controls.

Equipment and Materials

- Evaluate and apply performance properties, potential, and limitations of equipment and materials.
- Evaluate and apply operational safety and accuracy of equipment repairs.

Bid / Contract Documents

- Interpret and apply basic legal principles affecting the review and administration of contracts.
- Interpret types and elements of contracts, contract offers, and acceptance.
- Validate specifications with drawings.

Building Systems

- Apply relevant architectural, structural, mechanical, electrical, and environmental theory and scientific (applied) research when assisting in designing, detailing and implementing, and evaluating construction projects.
- Analyze and coordinate role of and relationship between architectural, structural, mechanical, electrical, and environmental disciplines as they relate to construction projects.
- Validate clearances, locations, and interferences between architectural, structural, mechanical, electrical, and environmental, and electrical services.

Codes, Bylaws and Regulations

- Interpret and apply the function and organization of applicable codes.
- Analyze and design gross building areas.
- Interpret, analyze, and apply the principles behind code regulations with respect to the protection of occupants, emergency assistance providers, and property.

Renovations / Restoration

- Generate field measurements of existing buildings.
- Create measured drawings of existing buildings.
- Interpret, plan, and coordinate the collection of field data.

Estimating

- Evaluate and create different types of cost estimates and schedules of profitable costs.
- Create and appraise cost plans, elemental estimates, budget forecasts, and project estimators applying principles of cost accounting.
- Plan and organize measurement and recording of quantities.

CAD Systems

- Demonstrate currency with changes in technology that effect architectural and engineering work.
- Evaluate and utilize electronic communications effectively to access and share information.
- Solve construction problems by selecting, interpreting, and applying computers and application software.

Project Management

- Assess, record, and report progress of construction projects.
- Generate and monitor project schedules.
- Assess projects comparing activities and results to data from a variety of sources, including reports, minutes, field data and field notes, site inspections, established criteria, site and weather demands, schedule, projected cost estimates and actual costs.

3-D Computer Graphics

- Create solid, surfaced, and meshed models of complex / detailed architectural forms.
- Apply materials to architectural computer models, using material libraries, custom created materials, and material mapping.

- Design complex / detailed buildings and produce contract documents of those buildings using BIM software.

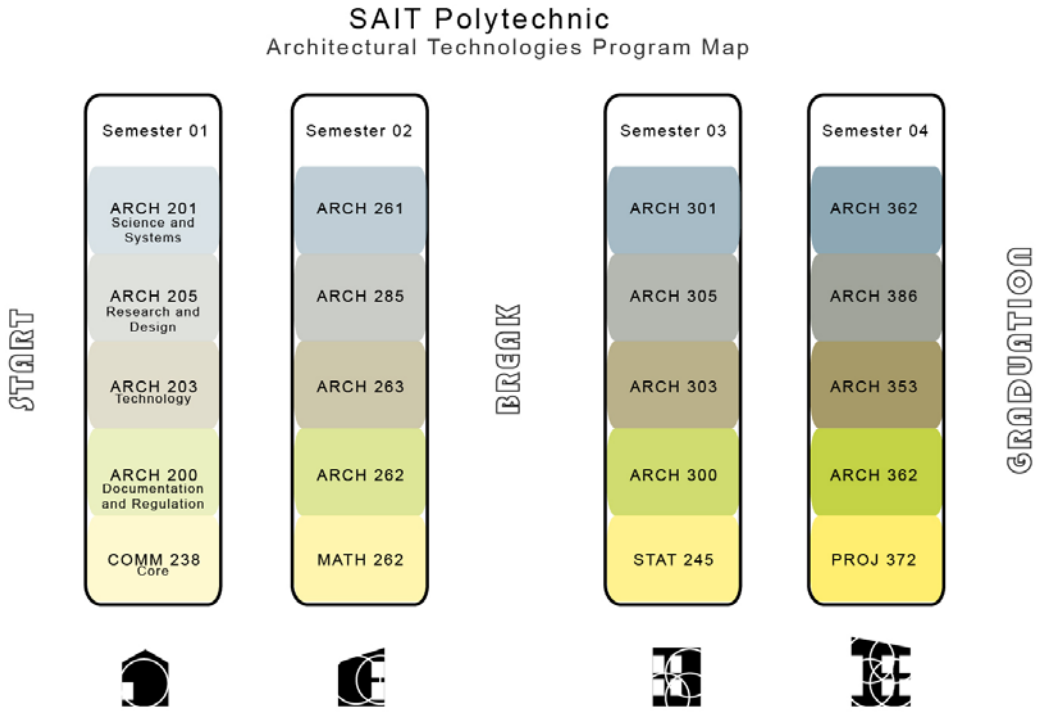
Program Outline

Applied education is our strength.[ix] Innovation in applied education is our leadership advantage characterized by bold thinking and innovation. The Architectural Technologies programme offers a program highly focused on experience-oriented training. Multi-disciplined and industry responsive, the programme provides you with the required knowledge and skills for a rewarding career.

The Architectural Technologies Programme is a Faculty that sits within the School of Construction. This School offers more than 20 full-time programs that are continuously reviewed and updated by expert advisory committees.

The Architectural Technologies program is designed to provide you with the essential skills, knowledge and abilities required to work as an Architectural Technologist for architectural firms, residential builders and many other companies involved in the construction industry. The purpose of the program is to enable (not qualify) graduates to be able to perform and manage the fundamental duties of a junior architectural technologist.

This Diploma program is two years in length, consisting of four 15-week semesters. The first three semesters are common to all students in the program. In the fourth semester, you refine your skills in a comprehensive Capstone project.

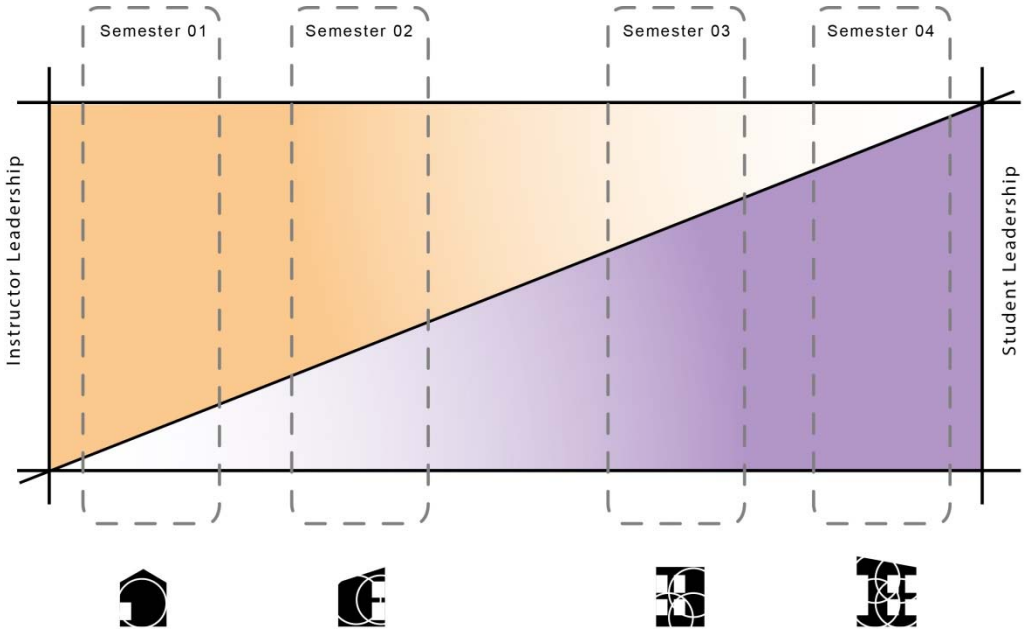


1. Compare commercial building systems with residential systems

Applied and Integrative Approach

The Architectural Technology program is learner centered. We believe that students learn best when they construct knowledge and meaning from a collaboration between their learning experiences and their ideas. This type of applied experiential education means the development of the hand and mind through innovation, relevant content, engaged instructors and students who want to create meaningful careers.[x]

This means that you have a much more active role in the learning process than you may have had before. You play an active role as a participant and have a great deal of individual responsibility in attaining your success.



In each successive semester students are given more responsibility and leadership

The program employs a Project Based Learning (PBL). This means that the “single subject inputs and assignments all relate to, and support the project work.”[xi] In this applied education model the repeated practice of going through a project enables you to build up a repertoire of significant experiences. A critical feature of the program is the focus on blending the science and practice of architectural technology[xii]

You will learn by undertaking projects that simulate work practices in an educational setting modeled on a real world environment. It is a setting where you get to practice. Semesters are typically organized around a manageable core or central project. These projects will involve both individual and group based work. In both instances collaborative learning and teaching is practiced. In all cases there is an emphasis on learning by doing.

This helps you become a critical thinker. It helps you practice at confronting uncertainty. It allows you see unfamiliar situations as familiar and this in turn allows you to have a feel or approach to problems that do not conform to rules.[xiii]

Personal & Professional Values

As a student in the program, you are responsible for your learning. Part of your educational growth is learning who you are, how you learn and how you relate to your studies. This program allows for you to continually evolve and develop meaningful personal and professional values. This program emphasizes that you learn to take initiative and be accountable for your own success. Additionally, you will learn to translate these values into many other aspects of your life.

Architectural Technologists do work that brings many different elements together to make one thing. It often requires creating something that has never been seen before. This is a process with multiple variables and constraints. Some of these are known at the outset of a project, often they are discovered as one works through the project. One needs to fully appreciate that an Architectural Technologist is one who 'converts indeterminate situations into determinate ones."[xiv]

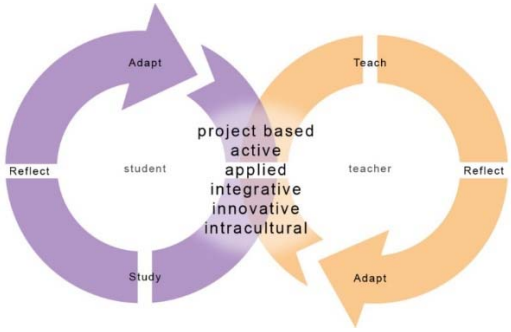
The complexity, uncertainty and at times conflicting nature of architectural work requires a practitioner who has cultivated a robust approach in order to exemplify competent practice. One must create an image of competence, appreciate and hone a relation to it and create a map on how to get there. One must appreciate that there are many implicit and explicit aspects to being professional. It must be recognized that one's personal values shape ones present and future.

Collaborative Learning Environment

Collaborative learning requires that students and instructors participate and share accountability toward a common goal or problem. Nurturing and strengthening one's collaborative skillset is an excellent means to develop competency in managing complexity.

Learning to develop the fundamental skills of collaboration requires a culture committed to it. This culture requires that both you and your instructor(s) build the culture together. A collaborative environment is emphasized because this is the common environment in which much work is performed in the construction industry. Collaboration is a powerful means through which individuals can increase their learning capacity. Collaboration also relies on critical communication skills.

The instructors are primarily coaches and mentors who demonstrate, advise, question and offer critique. Their role is not to provide answers per se. They are there to help you frame questions, identify the resources required, help verify your findings and help you synthesize resolutions. Learning and teaching is something that is done together.



Globalization

We know that in a globalized world, the future will be built by those with the skills needed to deliver value in an increasingly competitive environment. At SAIT`s core is a shared commitment to providing applied education and applied research opportunities that contribute to the success of you and your future industry peers.[xv] We know skills developed in an applied education environment give you an advantage in a competitive global labour market.[xvi]

Becoming a global citizen is no longer an option for those individuals who wish to be successful in their careers. Adaptability to the diversity of embedded in technology, culture and economics is a day to day reality. Competent practitioners in any field must be able to do the following:[xvii]

1. Determine the deeper meaning or significance of what is being expressed.
2. Connect to others in a deep and direct way, to sense and stimulate reactions and desired reactions.
3. Proficient at thinking and coming up with solutions and responses beyond that which is rote or rule-based.
4. Operate in different cultural settings
5. Translate vast amounts of data into concepts and to understand data based reasoning.
6. Critically assess and develop content that uses new media forms, and to leverage these media for persuasive communication.
7. Possess literacy in and ability to understand concepts across multiple disciplines. Able to represent and develop tasks and work processes for desired outcomes.
8. Discriminate and filter information for importance, and to maximize cognitive functions.
9. Work productively, drive engagement, and demonstrate presence as a member of a virtual team

Program Structure

We take the future of our graduates seriously. To that end we have rigorously aligned our program with the Canadian Technology Accreditation Canada (CTAC). Thus, our program places great emphasis on learning outcomes. At a National level the Architectural Technologies program is comprised of eight fundamental Program General Learning Outcomes. These outcomes are a necessary requisite for you in order to be eligible for certification or professional membership in appropriate Provincial Professional Associations.[xviii]These national learning outcomes create the benchmark against which the Architectural Technologies program has been designed and is measured against.

The Architectural Technologies program recognizes that you must possess the proper awareness, knowledge, understanding and abilities before you may begin practice as an Architectural Technologist; at SAIT they have been divided into Student Graduate Outcomes. These outcomes are at the core of everything we teach. The Architectural Technologies program places a priority on developing these practical knowledge, skills and abilities for success in addition to the technical abilities specific to your studies.

Built into the Program Discipline Learning Outcomes are many indicators and themes critical to the practice of architectural technology. These are complimentary, interwoven, occur simultaneously and are revisited may times.

Program Learning Outcomes

The CTAC Program Discipline Learning Outcomes specific to the SAIT AT program are the following:[xix]

Architectural Drawings: *Create complete sets of architectural drawings for residential and commercial construction / renovation projects.*

Building Design: *Apply basic architectural principles in building design and detailing.*

Stakeholder Communication: *Communicate effectively with clients, contractors, and other building professionals, and municipal authorities.*

Sustainable Design: *Interpret and analyze sustainable design and building*

Building Science: *Assess, design, and detail construction projects applying principles of building science and construction engineering.*

Equipment and Materials: *Evaluate methods employed and equipment and materials utilized in implementing and completing construction/renovation projects.*

Bid / Contract Documents: *Interpret, analyze and create bid/contract documents.*

Building Systems: *Analyze and coordinate relationship between architectural, structural, mechanical, electrical, and environmental building systems.*

Codes, Bylaws, and Regulations:
Interpret and apply applicable codes, zoning bylaws, and regulations.
Renovation / Restoration: *Evaluate existing buildings and prepare renovation restoration proposals.*
Estimating: *Prepare preliminary and final cost estimates*
CAD Systems: *Select, interpret and apply computer software programs including word processors, CAD, database, electronic messaging, and information / data.*
Project Management: *Plan, schedule, and monitor architectural and construction projects.*
Structural Design: *Design and analyze structural components and systems necessary for construction engineering including wood, steel, concrete, and foundations.*
Computer Graphics: *Create computer generated 3-dimensional virtual models, still renders, animations, and Building Information Modelling (BIM) documents for residential and commercial projects.*

Knowledge, Skills and Abilities

Specifically the AT program aligns all of the core program outcomes with the following[xx]:

Knowledge

- Knowledge and understanding of the professions principles, theories and methods of management, design, planning and execution of complex construction tasks, and can reflect on the application of the aforementioned theories and methods in different situations
- Knowledge of the profession relevant knowledge concepts and theoretical methods
- Knowledge of relevant communication theories and methods for dissemination of professional issues, including digital media, within both the building profession and general profession areas
- Knowledge of professional principles and models for business creation, operation and organization
- Knowledge of societal and technological factors that influence the construction process, including issues in relation to energy, the work environment and sustainability in a local and global perspective
- And managerial, social, linguistic, cultural and ethical aspects of design and cooperation in construction projects.

Skills

- Assess and apply the appropriate methods of the profession for management, design, planning and execution of complex construction projects, including digital programmes and systems
- Select the appropriate method and justify its choice within the professions area
- Evaluate, combine and integrate relevant research knowledge in solving complex technical construction issues
- Disseminate knowledge of construction research and development to the relevant parties through appropriate media
- Assess the business and organizational issues , and
- Assess and understand the social and technological conditions in the design of buildings, including the aspects of energy, the work environment and sustainability

Abilities / Competences

- Manage, design, plan and execute complex construction tasks independently and in collaboration with other professionals.
- Identify their own knowledge and learning needs and acquire new knowledge and translate this into practice in relation to the profession
- Handle communication between users, developers, consultants, designers and contractors about the technical design, procurement and execution of complex construction works
- Handle administrative tasks and project management within the construction sector
- Deal with societal and technological aspects in the design and processing of construction projects
- Address social, cultural and ethical issues in the design and processing of construction projects, and participate in management and collaborative relationships with others who have different educational, linguistic and cultural backgrounds.

Program Details

The main learning approach is experiential. In this we use a lot of Project Based Learning. This means we base the education on a range of specific projects. These range from basic single family houses, basic light duty industrial and more complex multi-storey multi use buildings. This means that all the content delivered in varied course all relate to or directly support the project work. Each semester builds on the last. Semesters increase in scale and complexity with expected levels of skill to be mastered before you move on.

Semester One

This is the critical introductory semester. Here you will be introduced to many of the program themes, the program process and nature of the work involved. Additionally, you will learn how to learn. You will understand the fundamental principles required to become successful. You will be introduced to the various resources and systems employed by the program so that you can access the information, interact with the online systems and involve yourself with the school at large. In this preparatory module you will gain a clear idea of what is expected from you in the program.

Project work emphasizes resolving small scaled projects.

Knowledge: At the end of the 1st semester you should have learned the following:

- Understand common building systems and practices relevant to the semester projects.
- Understand basic regulatory criteria relevant to the project work.
- Understand the fundamental methods of communication, tools and standards relevant to the project work.
- Identify and gather data from multiple disciplines as it pertains to the project
- Reflect upon the basic theoretical and technical aspects as it relates to project work.

Skills: At the end of the 1st semester you should:

- Have a general understanding into the building process relevant to the project.
- Be able to perform basic planning and design strategies for a basic structure.
- Have acquired the basic skills required to collect and analyse information pertinent to the project work.
- Be able to competently interpret and communicate the problem to peers and professionals.

Abilities: At the end of the 1st semester you should:

- Be able to prepare the relevant construction documentation for the project.
- Understand how the various course subjects and themes interrelate.
- Be able to identify what knowledge, skills and abilities need attention and development.

Semester Two

Semester two builds upon on the foundational work of the first semester. The second semester projects are more complex in nature. The thematic content in the second semester is more inter-related. The nature of the projects requires that you take more initiative.

Project work involves resolving a project of increased scale and complexity.

Knowledge At the end of the 2nd semester, you must:

- Demonstrate the general design, planning, technical specification and documentation for a 2 storey building.
- Have knowledge of the building systems and building science of the projects.
- Demonstrate a fluent understanding of the various regulatory parameters of the project.

Skills At the end of this semester you should:

- Apply methods and tools for collecting and analyzing information.
- Be able to perform basic planning and design strategies for a basic dwelling.
- Be able to competently interpret and communicate the problem to peers and professionals.

Abilities At the end of this semester you should:

- Individually and with others be able to implement the planning and design of a building in relation to the various themes.
- Have the ability to use skills and knowledge acquired through the themes in order to document, analyse and identify the relevant technical issues of the project.

Semester Three

The scale and complexity of the project increases again. Emphasis also shifts to building performance, systems integration and regulatory requirements. Critical thinking and the ability to synthesize multi-faceted problems increase.

Project work in this semester expands to larger scale projects that may incorporate commercial building ystems.

Knowledge At the end of the 3rd semester, you must:

- Demonstrate the general design, planning, technical specification and documentation for a light commercial or industrial building.
- Have knowledge of the building systems and building science of the project.
- Demonstrate a fluent understanding of the various regulatory parameters of the project.

Skills At the end of this semester you should:

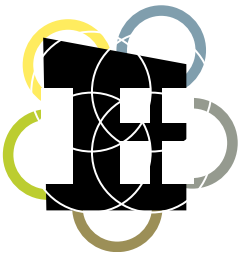
- Apply methods and tools for collecting and analyzing information.

- Be able to perform professional planning and design strategies for industrialized construction.
- Be able to competently interpret and communicate the problem to peers and professionals.

Abilities At the end of this semester you should:

- Individually and with others be able to implement the planning and design of a building in relation to the various themes.
- Be able to create new solutions within the parameters of the project work undertaken
- Have the ability to use skills and knowledge acquired through the themes in order to document, analyse and identify the relevant technical issues of the project.
- Be able to professionally document and convey all work problems to the pertinent construction agencies.

Semester Four



The 4th semester is a based around a Capstone project. In this semester you will think critically, solve challenging problems and further develop and refine much of you have learned to date. This semester requires that you apply skills or investigate issues across many different subject areas. You are encouraged to connect yourr projects to community issues or problems.

The Capstone work is predominantly self-directed with the aim of integrating and synthesizing your collective experience to date.

Knowledge[xxi] At the end of the 4th semester, you must:

- Have a basic understanding of such principles, theories, and methods used when designing, planning and executing architectural projects of moderate complexity.
- Be able to reflect upon these in a critical manner.

- Be current regarding these theories and methods and be able to inform others of their relevance to the profession.
- Be competent with the theories and methods used in the dissemination of technical issues pertaining to the profession. Particularly, the use of digital media used within the building profession and in general.
- Be aware of some of the social and technological issues which may affect the construction process, including such issues as energy, work environment and sustainability locally and globally.
- Be aware of some managerial, social, linguistic, cultural and ethical aspects of design and

Skills[xxii] At the end of this semester you should:

- Be able to assess and use relevant methods for management, design, planning and execution of complex construction and civil engineering tasks, including the use of relevant digital programmes and systems
- Be able to select relevant method and be able to justify the selection based on professional
- considerations
- Be able to assess, combine and integrate relevant research knowledge into the solving of complex construction issues
- Be able to assess and understand the social and technological conditions influencing the design of buildings, including such aspects as energy, work environment and sustainability

Abilities[xxiii] At the end of this semester you should:

- Have the ability to identify his/her own needs for knowledge and learning and be able to acquire new knowledge and to transform this knowledge into practice with respect to the profession
- Have the ability to handle communication between multiple stakeholders
- Have the ability to handle project administrative tasks.
- Have the ability to deal with multiple technological aspects with respect to the design and processing of construction
- Have the ability to address social, cultural and ethical issues occurring during the design and processing of construction projects, and enter into managerial and collaborative relationships with others who have different educational, linguistic and cultural backgrounds

Notes

[i] *Think Big Think Applied Education 2015-2020 Strategic Plan. Accessed May 15, 2017*

ii http://www.prospects.ac.uk/architectural_technologist_job_description.htm Accessed Jan 06, 2016. +. Accessed Jan. 5, 2016.

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v http://www.aibc.ca/membersite/wp-content/uploads/sites/5/2013/08/AT_Career_Opportunities.pdf. Accessed Jan. 08, 2016.

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[vii] *Emmitt, Stephen. Architectural Technology: Research and Practice. John Wiley & Sons, Oxford. 2013.*

[viii] *Emmitt, Stephen. Architectural Technology: Research and Practice. John Wiley & Sons, Oxford. 2013.*

[ix] *THINK BIG THINK APPLIED EDUCATION 2015-2020 STRATEGIC PLAN. P32.*

[x] *THINK BIG THINK APPLIED EDUCATION 2015-2020 STRATEGIC PLAN. P10.*

[xi] *http://en.via.dk/programmes/technology-and-construction/architectural-technology-bachelor*

xii http://www.ciat.org.uk/en/the_institute/about-ciat/ciats-charter/CIAT_Charter.cfm. Accessed Jan. 07, 2016.

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[xiv] *Schon, Donald. Educating the Reflective Practitioner. Toward a New Design for Teaching and Learning in the Professions. San Francisco: Jossey-Bass Publishers. Basic Books, 1987. P. 42.*

xv THINK BIG THINK APPLIED EDUCATION 2015-2020 STRATEGIC PLAN. P10.

[xvi] *THINK BIG THINK APPLIED EDUCATION 2015-2020 STRATEGIC PLAN. P28.*

[xvii] *http://cdn.theatlantic.com/static/front/docs/sponsored/phoenix/future_work_skills_2020.pdf*

xviii Canadian Technology Accreditation Criteria (CTAC). PROGRAM GENERAL LEARNING OUTCOMES 9PGLO) Common to all Technologist Disciplines. Technology Accreditation Canada (TAC). © 2015 Copyright Technology Accreditation Canada / Agrément en Technologie du Canada. Pg 2.

[xix] *Canadian Technology Accreditation Criteria (CTAC) PROGRAM GENERAL LEARNING OUTCOMES (PGLO) Common to all Technologist Disciplines Technology Accreditation Canada (TAC). and Canadian Technology Accreditation Criteria (CTAC) ARCHITECTURAL, BUILDING AND CONSTRUCTION ENGINEERING TECHNOLOGY - TECHNOLOGIST (PGLO) Common to all Technologist Disciplines Technology Accreditation Canada (TAC).*

[xx] *http://en.via.dk/programmes/technology-and-construction/architectural-technology-bachelor*

xxi http://en.via.dk/programmes/technology-and-construction/architectural-technology-bachelor

xxii http://en.via.dk/programmes/technology-and-construction/architectural-technology-bachelor

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