

# Micro Mobility Workforce Development Report

Pathways and Policy for Bicycle Industry Development and Bicycle Mechanics Training



Prepared by The Centre for Active Transportation for the City of Toronto



the centre for  
active transportation

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the centre for  
active transportation

## About The Centre for Active Transportation

The Centre for Active Transportation (TCAT) at Clean Air Partnership (CAP) has a vision of vibrant cities with clean air, a healthy population, and a transportation system that prioritizes walking and cycling. Our mission is to advance knowledge and evidence to build support for safe and inclusive streets for walking and cycling. We believe that active transportation plays a critical role in creating environmentally and economically sustainable cities.

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# Executive Summary



Increasing bike ridership and growing the local bike industry are two key objectives for the City of Toronto to achieve as it works towards its climate, transportation, and economic development goals. To increase ridership, the City of Toronto is building more protected and connected bike infrastructure as well as promoting bike safety, skills and confidence through the Be Safe Campaign, Bicycle Safety Campaign, and Please Slow Down Lawn Sign Campaign. As bike ridership grows, the City of Toronto is also working to ensure the local bike industry and workforce grows with it, supporting strategies that can attract and train mechanics who will sell and service a growing number of bikes over their lifetime. Currently, the local bike mechanic workforce faces major issues of attraction, retention, and skill development.

To overcome these issues, the City of Toronto has convened stakeholders into a Micro-Mobility Workforce Industry Development Committee (MMWIDC) to look at the needs of the bike industry, support bike mechanic training organizations in improving their programs, and develop strategies that can increase interest in careers in the bike industry.

As part of this work, The Centre for Active Transportation (TCAT) developed this report which provides insight on several key areas related to the bike mechanic workforce in Toronto:

- 1. How locally available bike mechanic training programs are currently delivered.**
- 2. Barriers preventing new people from joining the industry.**
- 3. Barriers preventing consistent skill development for those joining the industry.**
- 4. National and international approaches to bike mechanic workforce training.**
- 5. Opportunities for technical training pathways in Ontario.**

Research for this report was gathered through targeted interviews with four bike mechanic training organizations, a comprehensive scan of 59 bike mechanic training programs from Canada and around the world, and a review of the technical training pathways commonly used in Ontario, including the considerations and processes for delivering training through skilled trade apprenticeship programs, college programs, modular training and association training.

There are many key challenges and barriers that are preventing the local bike mechanic workforce from growing and retaining workers, including low industry wage standards, limited job availability, the parttime nature and seasonality of work, non-inclusive industry culture, and generally low perceptions and/or knowledge about the profession.

To help address these challenges and attract more people to the workforce, TCAT recommends that the City of Toronto and the MMWIDC implement several immediate and ongoing strategies. These strategies should be implemented in collaboration with industry partners and stakeholders and other levels of government including the Government of Ontario and Government of Canada (where appropriate).

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## **1. Increase expectations and perceptions of bike mechanics as a career path.**

To increase expectations and perceptions of bike mechanics as a career path, the City of Toronto and MMIWDC should launch a collaborative, concerted, industry-wide media campaign that promotes the benefits and opportunities of a career in bike mechanics. The City of Toronto should also work with the local bike industry to find ways to increase wage standards to attract and retain workers. Another important strategy in attracting a larger talent pool is for the City of Toronto and MMIWDC to build relationships with primary and secondary schools, community support service organizations, and organizations working with equity-deserving groups to encourage new generations and communities to join the city's cycling culture. Research should also be updated regularly to stay current on the public's expectations and perceptions of the bike mechanic career path, which should inform ongoing workforce growth strategies.

## **2. Keep bike mechanic training accessible and barrier-free.**

For people to consider a career in bike mechanics, training programs must be as accessible and barrier-free as possible. When supporting the development and delivery of standardized bike mechanic training, factors of cost, length of training, program flexibility, location of programs, teaching methods, and paid education opportunities all need to be considered. This is important for attracting a wide pool of participants and for remaining competitive with other careers.

## **3. Centre equity within bike mechanic programs.**

As part of its work to advance equity in other areas of the city, the City of Toronto should also support the delivery of free bike mechanic programming to equity-deserving communities. It should also ensure that program curriculums incorporate lessons on equity, diversity and inclusion (EDI) to improve industry culture and practices and ensure that bike mechanic programs themselves integrate EDI into program delivery so everyone feels comfortable participating.

## **4. Support local industry to grow job opportunities.**

To support the growth of job opportunities in bike mechanics, the City of Toronto should give, and advocate for other levels of government to give supports to employers to help them grow and expand their hiring capacity and create supports for entrepreneurs. The City of Toronto should also ensure that City-owned bikes such as Toronto Bike Share, the City of Toronto bike fleet, and the Toronto Police Service bike fleet are tapping into local bike mechanic training programs and employing local mechanics. They should also be encouraging large bike retailers such as Walmart and Canadian Tire to consider this as well. In a convening role, the City of Toronto should encourage local employers and training programs to align themselves, timing programs ahead of the hiring season and developing a centralized jobs board to connect employers with job seekers.



## 5. Continue developing the MMIWDC to support industry workforce development.

The City of Toronto has convened key industry stakeholders to form the MMIWDC. It should continue leading the MMIWDC to grow into a collaborative industry association which can govern the development and delivery of standardized and industry-accredited training. As part of this work, the MMIWDC should develop a governance strategy and strategic plan, develop curriculums for 3 tiers of training, and create standards for program delivery. The MMIWDC should also carefully consider the various models for training delivery, including through a skilled trade apprenticeship program, modular program, and association training program, the processes, and considerations for which are provided in this report. Lastly, the City of Toronto and MMIWDC.



A close-up photograph of a person with long dark hair, wearing a light blue denim shirt, working on the rear wheel of a blue bicycle. The person's hands are positioned near the hub and spokes of the wheel. The background is blurred, showing what appears to be a wooden structure. A white rectangular box is overlaid on the upper portion of the image, containing the number '2' in a dark blue circle and the word 'Background' in a large, bold, dark blue font.

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# Background

The City of Toronto is betting big on bikes. To help meet its climate, transportation, and economic development goals, the city is looking to boost bike ridership significantly over the next several years.

To achieve this shift, the City of Toronto implemented the Cycling Network Plan, which seeks to build, connect and grow the network of cycling routes and improve road safety. It is also rolling out campaigns to promote cycling confidence, project such as Vision Zero to increase safe road use behaviour and expanding its bike share system.

The City of Toronto also recognizes that with increased bike use, a local skilled bike mechanic workforce needs to be available and trained to service and sell bikes over their lifetime. This is especially important as e-bike use and ownership continues to grow. Bike shops are already experiencing challenges in attracting employees to the industry, and for those who are entering the industry, bike shops are seeing a shortage or inconsistency in mechanics skills. Bike shops have reported receiving job applications from people with no mechanic skills at all, and a [2021 survey](#) by the City of Toronto confirmed this experience, with local bike shops citing challenges in hiring qualified staff.

This issue is not unique to Toronto. In Montreal for example, the bike shop and training facility CycloChrome reported “a lack of standards, of knowledge, a lack of sharing of this knowledge too, and a lack of employees as well.” With the growth of bike ridership in Montreal, volume of repair activity jumped by 67% in one year, which has led to “almost unmanageable growth”. As a result, the company is expected to grow from 95 to 115 employees by the summer of 2023, but hiring has been difficult ([Trend Detail News, 2022](#)).

In fall 2021, the City of Toronto conducted a series of consultations with bike manufacturers, repair shops, and other supporting services, and determined that to keep at pace with the targeted growth in bike ridership, the local bike industry would have to grow by 10-20% per year. To facilitate this growth, the City of Toronto, and the local bike industry will need to focus on two main objectives:

- 1. Workforce attraction:** Develop strategies to attract people to the profession and grow the industry.
- 2. Workforce skill development:** Provide the necessary skill training to meet the needs of accelerated industry growth.

To achieve these objectives, the City of Toronto has convened the MMIWDC and contracted TCAT to gather knowledge and research which can support a targeted workforce growth and skill development strategy.

A person wearing a green and white checkered shirt and blue jeans is working on a bicycle in a workshop. The bicycle is mounted on a red stand. The person is adjusting the rear wheel and chain. The background shows a workshop with various tools and equipment.

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# Purpose and Scope

The purpose of this report is to provide the City of Toronto with best-practice research and recommendations that can encourage the growth and skill development of the local bike mechanic workforce. This report provides:

1. An overview of four locally available bike mechanic training organizations and summarizes the barriers they have witnessed in scaling and skilling up the local bike mechanic workforce.
2. Findings from a national and international bike mechanic program scan which examined bike mechanic curriculum topics, program development, delivery, and governance models, as well as government policies targeted at increasing the scale and skillset of bike mechanic workforces around Canada and the world.
3. Research on the processes and considerations for delivering technical training through common training pathways in Ontario to inform how bike mechanic training might best be delivered.

The report also provides recommendations on how the City of Toronto can encourage growth in the bike mechanic workforce and recommended pathways to developing standardized bike mechanic training programs.



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# Methodology



At project initiation, TCAT divided bike mechanic training programs into 3 skill-based tiers. These tiers were defined through discussions with the City of Toronto and the MMIWDC and were confirmed as an appropriate way to understand and organize bike mechanic training programs. The tiers are:

### **Tier 1: Basic beginner do-it-yourself maintenance program**

Tier 1 programs provide basic bike maintenance skills to bike-owners and hobbyists so they can do adjustments, small repairs, preventative maintenance, and parts replacement on their own bikes.

### **Tier 2: Professional bike mechanic essentials program**

Tier 2 programs provide participants with comprehensive knowledge and skills in bike assembly, maintenance, and repair and prepare them for jobs in the bike mechanic workforce (e.g., repair shops, manufacturers, etc.).

### **Tier 3: Advanced topics for established professional bike mechanics**

Tier 3 programs provide opportunities for professional bike mechanics to deepen their knowledge and skills on a particular bike part, system, or brand (e.g., suspension, wheel building, e-bikes, etc.).

The research in this report was conducted in three stages:

## **4.1 Interviews with locally available bike mechanic training organizations**

TCAT conducted 1–2-hour interviews with four locally available bike mechanic training organizations to gather information about their bike mechanic programs. Discussions explored topics each training programs covers, how training curriculum are developed and delivered, what partners are involved in their development and delivery, and how they are promoted. TCAT also asked interviewees for their perspectives on the barriers preventing local bike mechanic workforce growth and skill development and the potential solutions needed to support bike mechanic programs, attract more people to the industry, and grow the capacity of the bike mechanic workforce. Information about each of the programs are presented in 2-page overviews found in Appendix A - D.

TCAT also interviewed one Toronto-based organization which offers a cargo bike courier training program. Information about this program is also captured in a 2-page overview in Appendix E, however, it is not summarized below as this report is focussed specifically on bike mechanic workforce growth and skill development.

## 4.2 National and international bike mechanic program scan

TCAT looked at 59 bike mechanic training programs in other jurisdictions in Canada and around the world to gather information that could be compared with the local bike mechanic programs. This included curriculum topics, themes and teaching methods. It covered how programs were developed, delivered, and governed. The scan also looked at program length, cost to participants, the certification awarded to participants, and any additional information of interest that could inform the recommendations of this report. Most of the programs scanned are based in the United Kingdom, United States, Australia and Quebec. These jurisdictions were selected based on their comparability to Toronto, Ontario in terms of the social, economic, and political environment around bikes, level of bike industry development, and bike ridership rates.

## 4.3 Research into technical training delivery in Ontario

TCAT researched and corresponded with representatives from the Ministry of Labour, Immigration, Training and Skills Development (MLITSD) and Skilled Trades Ontario (STO) to gather information about the processes and considerations for delivering technical skills training through common pathways such as skilled trades apprenticeship programs, college programs, modular training, and association training.







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# **Bike Mechanic Training Organization Findings**

Interviews with the four locally available bike mechanic training organizations helped build an understanding of how Tier 2 bike mechanic training programs are currently being developed and delivered locally. The bike mechanic training organizations and their programs that were interviewed were:

- 1. CultureLink - Bike to the Future Program**
- 2. Charlie's FreeWheels - Pre-Employment Bike Mechanic Training Program**
- 3. Learning Enrichment Foundation (LEF) - Bicycle Assembly and Maintenance (BAM) Program**
- 4. Canadian Electric Bike Association (CEBA) - E-Bike Technician Certification Training**

An interview was also conducted with Cycle Toronto regarding their cargo bike courier training program. Information about this program is captured in a 2-page overview in Appendix E.

Overall, the four programs on bike mechanics provide a comprehensive curriculum of essential skills needed to succeed as a professional bike mechanic. Charlie's FreeWheels and LEF focus solely on standard, non-electric bikes, while CEBA focuses solely on electric bikes. CultureLink offers training on both electric and non-electric bikes.

To develop curriculum topics, Charlie's FreeWheels and LEF referenced using other industry recognized curriculums such as [Park Tool Big Blue Book of Bicycle Repair](#) or [Barnett's Bicycle Repair Manual](#) to support their training development and delivery. As an industry association, CEBA works closely with e-bike brands and manufacturers to develop their curriculum.

All programs cover important health & safety topics. LEF provides 28 hours of instruction on First Aid, Workplace Hazardous Materials Information System training (WHMIS) and health & safety. Charlie's FreeWheels provides 6 hours on shop safety information, workspace familiarity and safe use of tools. The first week (30 hours) of CultureLink's Bike to the Future Program focusses on bike shop introduction, safety, expectations, and tool use. Safety is one of the most important concepts in CEBA's E-Bike Technician Certification program as improper use or maintenance of electric batteries and motors can result in serious injury or death.

Another important outcome of these programs is teaching employment skills. For example, LEF provides resume and interview preparation support as well as a 35-hour job placement opportunity. Similarly, CultureLink's Bike to the Future Program spends 9 hours (30% of program time) on teaching soft skills needed to succeed in the job market. Charlie's FreeWheels' Pre-Employment Bike Mechanic Program provides 2 hours (5% of program time) on job interview training.

Connecting program graduates to permanent employment opportunities is the one of the most important outcomes for these training delivery organizations. To this end, LEF offers

their program from September to February, which means students are trained and ready for employment just as the springtime bike mechanic hiring season commences. LEF has also developed a jobs board which connects employers with job seekers. CultureLink and Charlie's FreeWheels are also well connected to local bike shops around Toronto who often hire program participants. In terms of teaching methods, all four programs require hands-on learning, working directly with tools and mechanical parts. LEF supplements hands-on instruction with some theory textbook work, instructional videos, and online teaching tools. Charlie's FreeWheels ensures there are 2 full-time mechanics for every 10 participants, in an effort to provide a supportive learning environment.

All programs are taught in-person apart from CEBA's E-Bike Technician Certification Training, which transitioned to a 100% online format in 2020 due to the COVID-19 pandemic. CEBA students receive all tools and mechanical parts by mail and receive instruction through live video training. This approach has been reported to be extremely effective by CEBA and has allowed it to increase capacity for students.



In regard to the organizations that govern and deliver these Tier 2 curriculums, two of them – CultureLink and Learning Enrichment Foundation – are charitable community service organizations, which offer a variety of services and programs beyond bike mechanic training, including employment, settlement and cultural services. Charlie's FreeWheels is a charity as well, however its mission is to support community specifically through bike-related programming. All three of these charitable organizations are often supported by other community-based non-profit and charitable organizations and all levels of government. Another important feature of these organizations is that they centre equity in program delivery, whether by offering the program to equity-deserving groups such as at-risk-youth, newcomers, racialized communities, or people with learning disabilities. Additionally, LEF's BAM program is partially funded by Employment Ontario and Ontario Works which allows participants to take the training for free, while Charlie's FreeWheels' and CultureLink's funding partnerships allow them to pay participants to take the training. The strength of these organizations is their focus on delivering no-cost, accessible, equity-focused bike mechanic skills training, being rooted in the communities they serve, and being connected to employers across the GTA. Their charitable status also gives them the ability to fundraise and access government funding opportunities.

CEBA is a national industry association with a mission to unite consumers, retailers, distributors and electric bike interests across Canada. The strengths of this organization are its ability to reach participants around the world with its online program delivery and the relatively short curriculum length.

Some of the key organizations and program features are summarized in table 1, below.

Overviews of each of the bike mechanic training programs, along with their supporting documentation, are provided in Appendix A-D.

	<b>CultureLink - Bike to the Future Program</b>	<b>Charlie's FreeWheels - Pre-Employment Bike Mechanic Training Program</b>	<b>LEF - Bicycle Assembly and Maintenance (BAM) Program</b>	<b>CEBA - E-Bike Technician Certification Training</b>
Tier level	Tier 2	Tier 2	Tier 2	Tier 2 (for e-bikes)
Bike Type	Standard bikes & electric bikes	Standard bikes	Standard bike	Electric bikes
Hours of programming	240	36	218	12
Teaching methods	Hands-on training, verbal instruction, theory reading & writing	Hands-on training	Hands-on training, verbal instruction, theory reading & writing, 35-hour job placement	Hands-on training, verbal instruction
Delivery type	In-person	In-person	Hybrid - In-person / Video lessons	Virtual
Delivery organization type	Local charitable community services organization	Local charitable community bike organization	Local charitable community services organization & private career college	National industry association
	Certificate of Completion	Certificate of Completion	Certificate of Completion, WHMIS Certificate, First Aid Certificate	CEBA E-Bike Technician Certification

**Table 1: Key features of locally available Tier 2 programs**

Overall, these four locally available bike mechanic training organizations provide examples of how to deliver comprehensive, practical, flexible, equity-based, and affordable training that leads to employment opportunities. The lessons learned from these programs help to inform the recommendations later in this report.

## 5.1 Barriers to workforce growth

Several barriers to workforce growth were identified by the training organizations.

### **Low industry wage standards:**

Wages offered to entry level bike mechanic positions are generally low, and this is likely one of the main factors contributing to bike mechanic shortages and employee turnover.

### **Seasonality of jobs:**

Bike mechanic jobs are aligned with the biking season which is between spring and fall. The seasonality of these jobs tends to discourage people seeking permanent jobs.

### **Limited data on job availability:**

There is currently not enough data on new jobs being created to attract people to the profession. LEF estimated that throughout Toronto, there are 45-50 bike mechanic jobs available every year. Others estimated the number to be closer to 90-100. This limited data on job availability could prevent potential candidates from entering the workforce and will likely grow as a barrier as the City of Toronto plans to grow the use of bikes as a viable transportation method.

### **Low expectations and perceptions of bike mechanics as a career path:**

Bike mechanics are often not seen as a legitimate career path compared to other professions and trades such as auto mechanics, carpenters, and electricians. Even those who have participated in the bike mechanic training programs sometimes view the skills they have learned as stepping stones to another career, rather than a vocation in and of itself.

### **Unknown or perceived cost to join the bike mechanic workforce:**

While the cost of tools, training and time investment are less intensive for bike mechanics as compared to many other trades, the unknown or perceived costs to entry may discourage people from joining the workforce.

### **Discrimination within the industry:**

Black, Indigenous and People of Colour, women, and people in the LGBTQ community have reported being discriminated against as patrons of bike shops or as employees in the bike industry. While this by itself poses a significant barrier to equity-deserving communities joining the bike mechanic workforce, these issues should be examined and understood within the context of the many structural issues faced by equity-deserving groups in both mobility, and the labour market.

## 5.2 Barriers to workforce skill development

Four barriers to workforce skill development were identified and discussed by the training organizations.

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### **Lack of integration of manufacturer standards into existing bike mechanic programs:**

Maintenance guidelines for bikes can vary widely depending on the manufacturer. Even within a single manufacturer, different bike brands can have very different maintenance regimes and requirements. Current bike mechanic program curriculums are currently unable to take these differences into account. As a result, bike mechanics enter the workforce without these specialized knowledge areas, requiring individual bike shops to train mechanics on the fly.

### **Lack of integration of employee soft skills into programs:**

Employers have identified the lack of skills such as communication skills, time-management, conflict management and working under pressure. Bike mechanic programs tend to teach mechanic skills but sometimes leave out important topics like these.

### **Lack of standardization across bike mechanic training programs:**

Local bike mechanic training programs often teach different skills and topics as there is no unified training curriculum to follow.

### **Lack of knowledge about training opportunities:**

Prospective bike mechanics and mechanics who want to upgrade their skills might not know if or where training programs are available. The lack of industry-accredited, publicly recognized, and widely publicized training programs could mean that a prospective participant does not access training.





6

# National and International Bike Mechanic Program Scan Findings

This project reviewed 31 bike mechanic training curriculums which are delivered through 59 bike mechanic training programs in Canada and around the world. These programs are located in jurisdictions including Ontario, Quebec, British Columbia, England, Scotland, California, Colorado, Oregon, Australia, and South Africa. In some cases, one curriculum is delivered through multiple training organizations. For example, the curriculums for the Quebec Bike Mechanic certificate, Cytech Technical 1, and Cytech Technical 2 are delivered through multiple trade schools, vocational teaching centres, and bike workshops. This scan explored the various curriculum topics, development, delivery and governance models, curriculum lengths, program costs, and certifications being offered to participants looking to develop skills in bike mechanics. Based upon publicly available information, each program was sorted into the three predetermined Tiers of training.

Tier	Number of Curriculums	Number of Programs
<b>Tier 1:</b> Basic Beginner & DIY Maintenance	7	11
<b>Tier 2:</b> Professional Bike Mechanic Essentials	11	28
<b>Tier 3:</b> Advanced Topics for Established Professional Bike Mechanics	13	20

Table 2: Number of Curriculums and Programs Scanned based on Tier

## 6.1 Curriculum Topics

### 6.1.1 Tier 1 Basic Beginner & DIY Maintenance

Tier 1 programs cover topics that give participants with no prior experience the skills to do bike adjustments, basic repairs, preventative maintenance, and parts replacement. They provide essential knowledge required to become a professional bike mechanic but are not designed with the express purpose of preparing participants to enter the workforce. Participants are often individuals looking to develop skills for the joy of learning or better maintain their own bikes. The focus of many of the Tier 1 programs is on standard bikes. There is little or no mention of cargo bikes, e-bikes, or any other type of specialized bike in any of the Tier 1 programs scanned. Key focus areas for Tier 1 curriculums include tires and tubes, rear sprockets, hubs, wheels, pedals, cranksets, chains, brakes, handlebars, and suspension. A detailed curriculum that combines topics from all Tier 1 training program can be found in Appendix F.

### 6.1.2 Tier 2 Professional Bike Mechanic Essentials

Tier 2 programs are typically designed to prepare participants for careers in bike assembly,



maintenance, and repair. The programs often teach students to assemble bikes, and to assess and troubleshoot problems in all bike systems. The topics cover similar ground to Tier 1 programs but are far more technical and detailed. Additionally, Tier 2 programs explore common practices for working professionally as a mechanic in a bike shop. Similar to Tier 1, the focus of many of the programs scanned is standard bikes. There are no mentions of cargo bikes, e-bikes, or any other type of specialized bike. A detailed curriculum that combines topics from all Tier 2 training program can be found in Appendix G.

### **6.1.3 Tier 3 Advanced Topics for Established Professional Bike Mechanics**

Tier 3 programs are often positioned to provide experiences bike mechanics with additional, upgraded skills on specific topics, parts and/or brands. In the programs covered in the scan, e-bike mechanic training only comes up in Tier 3 programs, suggesting that many bike mechanic training programs view e-bike repair as a highly specialized skill. In addition to e-bikes, common topics for Tier 3 programs include wheel building and electronic gear systems. A detailed list of topics covered by Tier 3 training programs can be found in Appendix H.

## **6.2 Curriculum Development & Delivery**

### **6.2.1 Curriculum Development**

Bike mechanic curriculums are developed in a combination of ways. For Tier 1 level programs, it's often that curriculums are developed by the same individual or organization that is delivering the training. This could be a bike shop, a non-profit community bike hub or an individual with industry experience. Curriculum topics might be decided based on that organization or individual's own experience or pulled from another industry-recognized curriculum such as Park Tool or Cytech. For many of the higher level (Tier 2-3) programs, including Park Tool and Cytech, curriculums are often developed collaboratively by and in partnership with industry associations, bike manufacturers and other stakeholders who provide input on topics and learning outcomes, and give access to tools and resource to facilitate training. Cytech's suite of bike mechanic training curriculums, for example, is developed by the Association of Cycle Traders (ACT) which is an industry association that represents the interests over 4,000 bike retailers, bike manufacturers and other bike industry organizations in the UK.

## 6.2.2 Curriculum Delivery

Curriculums are delivered by a wide range of organizations including small community-based non-profit organizations, private training colleges, individual bike mechanics, and public universities and colleges.

Some develop their curriculum internally, while others receive permission to use established curriculums. Some of the curriculums developed by government-industry-college partnerships like Quebec's Attestation d'études professionnelles (AEP) in bike mechanics, or large industry associations like ACT's Cytech programs are developed with expressed goal of distributing their curriculums widely and engaging a variety of delivery organizations to teach the curriculum.

In April 2022, Quebec launched a new professional certificate in bike mechanics (Tier 2). This AEP program created one consistent curriculum to be taught in eleven trade schools and vocational training centres across the province. In all cases, these schools and centres offer other trade and vocational programs as well. This standardized curriculum, which calls for 645 hours of training, is far lengthier than any other training program covered in the scan. The nine program delivery organizations have flexibility to charge different prices, train different number of students, and schedule the courses at different times of the year, provided the required 645 hours of training are provided. To make up the 645 hours, two of the organizations offer work placement opportunities which span 375 and 322.5 hours, respectively. Two of them also promote this program as being eligible to students who qualify for financial assistance through the Government of Quebec loans and bursaries program as well as the Workforce Training program offered by Emploi-Québec.

The Cytech Technical 1 and 2 curriculums (Tier 2) are examples of this approach and is one of the most commonly used training curriculums in the world. The Cytech training curriculums are developed by ACT, and is delivered through a variety of organizations around the world. In the United Kingdom, the Cytech curriculums are delivered by 5 colleges operated by Activate Cycle Academy, by Spokes People, a 2-person-run bike workshop in England, and Bike For Good, a cycling charity and social enterprise in Scotland. Globally, Cytech is also utilized by Torq Zone Academy, a bicycle technician training centre in Pretoria, South Africa, Whistler Adventure School, a licenced private career training institution in British Columbia, and The Bicycle Academy in Australia, which has 4 training locations across the country. The Bicycle Academy (a partnership of industry graduates, training organizations, bicycle retail stores, and bike wholesale distributors) is the exclusive licensee in Australia and New Zealand for Cytech training.

The chart below illustrates how Cytech bike mechanic programs are developed and delivered. The Association of Cycle Traders (ACT) serves as an oversight and governance body, which develops the curriculum and allows training providers to teach the curriculum.

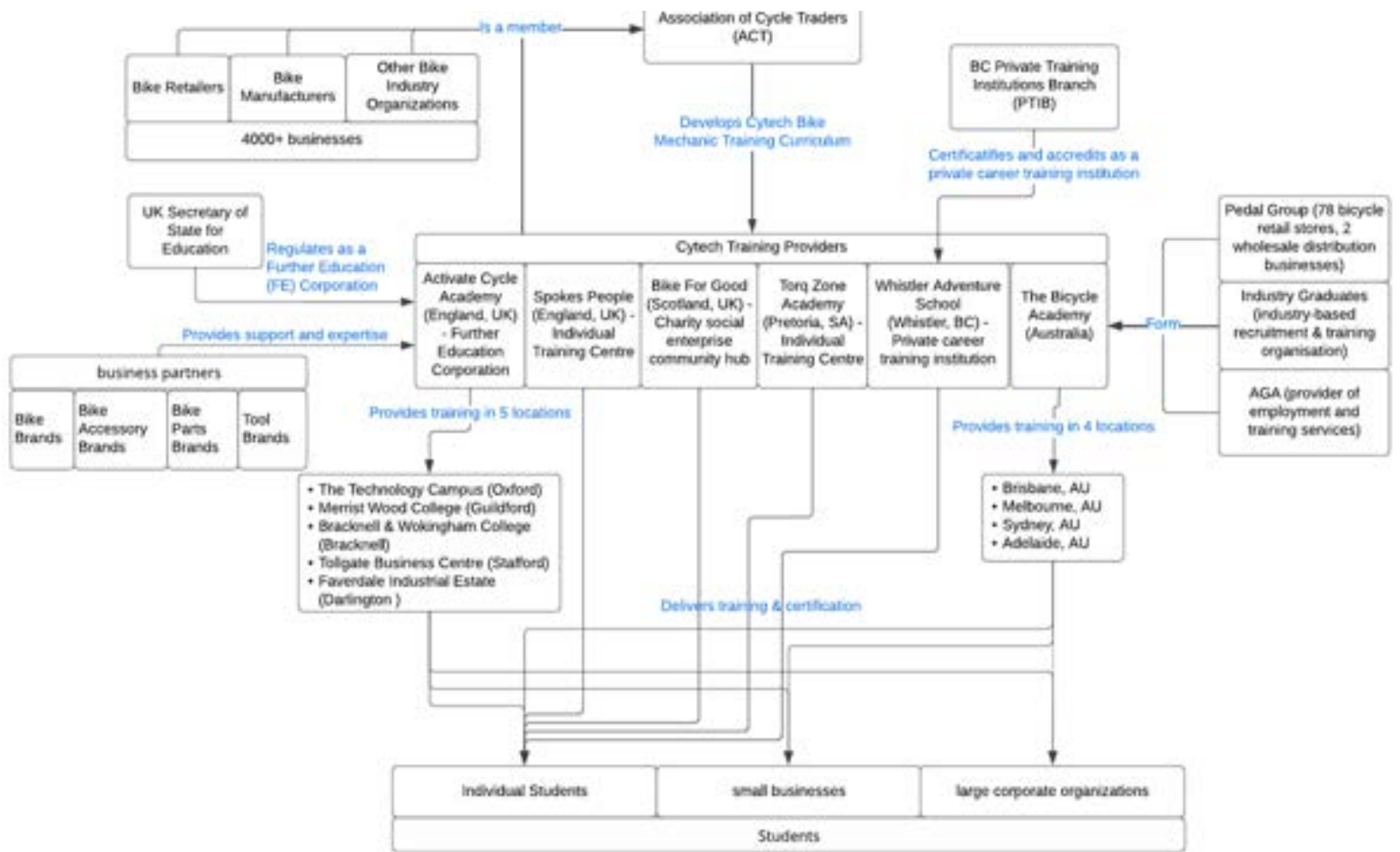


Figure 1: Cytech Bike Mechanic Training Development, Delivery and Governance Model

According to the Bicycle Academy, the organization with an exclusive licence to offer Cytech training in Australia, a national Vocational Education and Training in Schools (VETis) program for bike mechanics will be launched in 2023, which will allow partner Registered Training Organizations (RTOs) to provide bike mechanic training to secondary school level students. This “will enable bicycle industry employers to access a new talent pool of future bicycle mechanics and other employees for their business” ([The Bicycle Academy, 2022](#)).

### 6.2.2 Curriculum Delivery

Bike mechanic programs are primarily taught using in-person instruction and hands-on skill development in a workshop setting, or sometimes within a job placement setting. However, there are instances where other forms of learning are provided. At the Tier 2 level of training, Cytech's Technical 1 program requires students to first complete an online theory course prior to registering for the practical course. Beginning in July 2023, the U of Q Institute, a trade school for bicycle mechanics managed by Quality Bicycle Products, will offer hybrid-format courses using an online learning tool which claims to modernize how students interact with the written

curriculum, allowing for “more focused hands-on learning in the classroom as well as better overall retention of the material as students engage with the curriculum in new ways” ([Quality Bicycle Products, 2023](#)). In other programs scanned, some curriculum components are administered using videos, textbooks, and written tests for knowledge-assessment. This approach combines learning by doing (experiential/kinesthetic learning) with learning through reading and writing. This may be useful for students who are visual learners and can provide a more flexible curriculum delivery approach.

## 6.3 Program Lengths and Costs

Based on the scan and analysis of the 30 curriculums and 59 programs, the following trends were observed.

	Tier 1	Tier 2	Tier 3
Mean	14	106	19
Minimum	1	4	8
Maximum	45	645	48

Table 3: Curriculum Length (in hours)

	Tier 1	Tier 2	Tier 3
Mean	CAD 479.92	CAD 1,410.70	CAD 1,335.86
Minimum	CAD 0.00	CAD 0.00	CAD 332.50
Maximum	CAD 1,729.00	CAD 3,657.50	CAD 3,553.00

Table 4: Program Cost to Participants

## 6.4 Certifications, Accreditations and Licencing

For the purposes of this report, TCAT has defined the terms ‘certification’, ‘accreditation’ and ‘licencing’ in the following ways:

- **Certification:** Recognition that a student has met the necessary learning outcomes or demonstrated the necessary requirements of a program to earn a certificate of completion or certificate of skills training.
- **Accreditation:** Recognition by an authoritative, industry-recognized third-party that a program and/or program delivery organization can achieve industry-recognized learning outcomes. Accredited program delivery organizations are authorized to certify students.

- **Licensing:** Recognition by government authorities that program deliver organizations can legally operate and offer programs to students.

Most Tier 1 programs and all Tier 2 and Tier 3 programs reviewed provide certificates of completion which are accredited by the curriculum developer(s) and delivery organization(s).

For the Cytech mechanic programs offered in the UK, South Africa, Canada and Australia, graduates are provided with certificates of completion which are accredited by the governing body of Cytech, and the Association of Cycle Traders (ACT). The programs delivered by the Activate Learning education group in the UK and the Whistler Adventure School in BC are also licenced by their respective government ministry responsible for training and education. This licencing allows these organizations to legally operate as private training schools.

In Quebec, the bike mechanic AEP program is accredited by the partners responsible for developing and delivering it, including CycloChrome, who developed the curriculum, the trade schools who deliver the curriculum, and the Quebec Ministry of Education which authorizes the program and licences the trade schools. The bike mechanic AEP provides graduates with a certificate of skills training. This certification means that graduates have passed the necessary requirements of the program. It should be mentioned that an AEP is not equivalent to a Certificate of Qualification in the regulated skilled trades across Canada.

## 6.5 Approaches to Equity in Bike Mechanic Training

Similar to the organizations providing local training programs, several of the bike mechanic programs scanned sought to embed opportunities for equity and reduce barriers for equity-deserving communities to participate in their training.

Life Cycle UK, a United Kingdom-based training provider, works with Bristol CFO Activity Hub to offer 15-hour placements to people who are on probation. They provide bike mechanic training to help participants learn new skills in a supportive and non-judgmental environment. The goal is to facilitate a successful reintegration into the community by providing meaningful activities and insight into potential new career opportunities. This opportunity is partly-funded by the European Social Fund.

Bike Teacher, an independent bike mechanic school in San Jose, California, works with the California State Department of Rehabilitation (DOR) to provide financial assistance to program participants with disabilities and who are veterans.

Two of the training institutions that offer the AEP of Bike Mechanics in Quebec offer financial assistance to program participants and two offer the program for free. This makes the program more accessible for those who want to get into the industry but have financial constraints.

A close-up photograph of a person's hands working on a bicycle wheel. The person is using a yellow-handled tool, possibly a screwdriver, to adjust the rear hub. The wheel is mounted on a light-colored wooden floor. Several tools are scattered around the wheel, including a silver adjustable wrench, a silver open-end wrench, and a silver hex key. The background is slightly blurred, showing the person's legs and a dark jacket.

7

# Technical Skills Training Pathways in Ontario

## 7.1 Technical Skills Training Pathways in Ontario

A skilled trade is a professional occupation that involves hands-on work, and specialty knowledge and training. There are currently 144 skilled trades in Ontario that are recognized by the Ministry of Labour, Immigration, Training and Skills Development (MLITSD). 23 of these trades are compulsory, which means individuals can legally work in that trade only if they are registered apprentices, have completed an apprenticeship program at a trade school in Ontario and passed a certification exam (if there is a certifying exam for the trade), or have passed a trades equivalency assessment. The other 121 trades are non-compulsory, which means individuals do not need to be a registered apprentice or certified to work in that trade. However, for those interested in certification, 60 of these non-compulsory trades do offer certifying exams which, if passed, awards a Certificate of Qualification (CofQ). A CofQ confirms that the tradesperson has met the learning and training standards recognized by that trade or industry.

While skilled trades in Ontario have traditionally been overseen solely by the MLITSD, in 2021 the Province enacted the [Building Opportunities in the Skilled Trades Act, 2021](#) (BOSTA), which created a new Crown agency, Skilled Trades Ontario (STO). Operating at arms-length from the MLITSD, Skilled Trades Ontario's mandate includes promoting careers in the skilled trades and developing the latest apprenticeship training and curriculum standards, certification, and trade equivalency assessments. At maturity, STO will allow tradespeople and apprentices to get all services in one place, including registration, issuance and renewal of certificates, and trade equivalency assessments with more services offered digitally.

### 7.1.1 Prescribing a new skilled trade

Prescribing a new trade does not take place often. The last trade to be prescribed in Ontario, Residential (Low-Rise) Sheet Metal Installer (308R), was in 2010. Under the new legislation, there are several steps in prescribing a trade and developing the associated apprenticeship program, which will involve both the MLITSD and STO:

1. The Minister of Labour, Immigration, Training and Skills Development would use their authority to prescribe a trade and classify it as compulsory or non-compulsory.
2. STO would then be responsible for the development of the apprenticeship program, with support and input from industry partners.

Historically, for the Minister to consider prescribing a new skilled trade, the following rationale would need to be provided:

1. A detailed description of the proposed trade, including a description of the proposed Scope of Practice, and which sector (Construction, Industrial, Motive Power or Service) the trade should belong to.

2. Identification of any potential skills overlaps with existing trades in Ontario.
3. A rationale for why the trade should be designated; why the apprenticeship model is suitable for the trade; and how certification for the trade would protect the public interest.
4. Evidence of the viability of the trade, and the trade's contribution to Ontario's economic prosperity.
5. Support from industry, including letters of support and evidence of province-wide application.
6. Identification of any groups or associations that may oppose the proposed trade.

In September 2020, the Minister of Labour, Training and Skills Development [appointed a five-member skilled trades panel](#), which was tasked with seeking public input and providing advice on modernizing the apprenticeship and skilled trades system. [Phase 2](#) of the panel's mandate was to provide advice and recommendations on matters related to the classification and training for trades, including the criteria and process for trade prescription.

At the time of writing this report, recommendations from the panel are with the Ministry for review. As such, no updated criteria or process for the prescription of new trades has been introduced.

### 7.1.2 Prescribing a new skilled trade

Once a trade is prescribed by the Minister, the next step is to establish an apprenticeship training program. An apprenticeship program is developed with industry and typically includes:

- 85%-90% on-the-job training under the supervision of a qualified tradesperson
- 10%-15% in-school technical training at an approved Training Delivery Agent\*

For some trades where registration numbers for in-school technical training is low, apprenticeship programs may shift to 100% on-the-job training with the approval from the Ministry. According to STO, there has not been any skilled trade programs which have been taught 100% in school. Skilled trades are meant to provide paid apprenticeship opportunities. The total hours of an apprenticeship program are typically established with the input from subject-matter experts and usually equals the amount of time necessary to become competent in the trade.

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\*To be an approved Training Deliver Agent (TDA) for apprenticeship training, organizations must apply to the MLITSD. Decisions are based on the ability of the organization to deliver the learning outcomes of the curriculum. This includes an adequate learning space (shop and classroom), qualified instructors, and demonstrated commitment and experience to deliver the program.

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### 7.1.3 Considerations for pursuing a skilled trade prescription

Whether or not to pursue a skilled trade prescription for a profession should depend on the model that the industry wants to adopt. The apprenticeship model is not necessarily the right fit for every profession.

An apprenticeship program needs to be attractive to industry employers to invest in the training. A common problem is that an employer will train an apprentice for the duration of the prescribed time and then once certified, the apprentice will leave and go elsewhere. There is also considerable administrative, research and coordination work that needs to be done to advance a prescription proposal to the MLITSD in the first place, as well as ongoing work to ensure compliance with Ministry and STO requirements. According to Skilled Trades Ontario, this process can take 2-5 years to prescribe a new trade and create an apprentice program for it.

However, prescription as a skilled trade can boost recognition of the profession and unlock promotion opportunities from the MLITSD and STO. Prescription as a skilled trade also signals that the industry is committed to working together to design and deliver a common curriculum and learning outcomes for the profession. This can lead to greater workforce attraction and retention.

## 7.2 College Training Programs

Technical skills training has long been developed and delivered by post secondary college institutions. In Ontario, technical skills training is either delivered by public or private colleges. There are 24 publicly assisted colleges, and over 500 registered private career colleges and institutions.

### 7.2.1 Delivering training through a private career college

Under the [Private Career Colleges Act \(PCCA\)](#), a private career college is defined as “an educational institution or other institution, agency or entity that provides one or more vocational programs to students for a fee and pursuant to individual contracts with the students”. Institutions are not considered private career colleges if they provide vocational training free of charge or exclusively receive payment from a third-party organization (such as an employer or charitable organization). Other exemption information is provided [here](#).

Vocational programs offer instruction in the skills and knowledge required to obtain employment in a prescribed vocation. Prescribed vocations are those included in the [National Occupational Classification \(NOC\)](#) system stipulated in [Ontario Regulation 415/06](#). Under the PCCA, non-exempted organizations that offer a vocational program that is 40 hours or more of instruction or cost more than \$2,000 in tuition fees must be approved and registered by the Superintendent of Private Career Colleges, who is part of the Ministry of Colleges and Universities.

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For a vocational program to be delivered through a private career college, the organization that intends to deliver the program needs to register itself and the program with the Superintendent of Private Career Colleges.

The Superintendent will register an applicant to operate a private career college if the Superintendent is satisfied that, in addition to the applicant being in legal and financial good standing:

- it is in the public interest to grant the registration or to renew the registration.
- the applicant will operate the private career college in compliance with the PCCA and the regulations.
- the vocational programs that are provided, or are proposed to be provided, by the private career college meet, or are likely to meet, the requirements of the PCCA and the regulations.

A registered private career college must [renew their registration](#) with the Superintendent of Private Career Colleges on an annual basis and provide, audited statements regarding annual finances, monthly prepaid unearned vocational revenue, revenue by funding source, international and domestic student enrolment and more.

If a private career college is registered, the program(s) it intends to deliver must go through the approval process. Private career colleges submit applications for program approval to the Superintendent of Private Career Colleges through the Program Approval and Registration Information System (PARIS). As part of this approval process, private career college must ensure that its programs and its methods of program delivery are consistent with the [program standards](#) which may already be established by the MCU.

## 7.2.2 Considerations for delivering training through a private career college

Private career colleges are historically well suited to deliver skills training. According to [StudyinCanada](#), an education information resource, PCC programs are generally shorter, more flexible, more current, have smaller class sizes and are taught by industry-experienced teachers. Students that attend private career colleges in Ontario are eligible for Ontario Student Assistance Program (OSAP) funding. Private career colleges are also published on the [Ontario Private Career College Search Service](#) and can join associations like Career Colleges Ontario (CCO) and the National Association of Career Colleges (NACC). There could also be a legitimizing effect of offering programs through a private career college, which could boost recognition and interest from prospective students. Depending on the length, tuition fee and vocation of the program being delivered, licencing as a private career college may be required by law. For organizations captured under the PCCA, this means annual data collection, auditing, and reporting.

### 7.2.3 Delivering training through a public college

Skills training has also historically been developed and delivered by public colleges. Colleges focus on more practical training and grant diplomas, certificates, apprenticeships, and post-graduate degrees. Most college programs are two years, some colleges also offer four-year bachelor's degree, either on their own or in partnership with universities.

To develop and offer a new training program in an Ontario public college, there are several common steps that need to be taken. Generally, a program concept paper, proposal and/or business plan needs to be developed and approved by the college's administration and Board of Governors (BOG). These items will generally include a description of the program, credential type and length of program, alignment with strategic plan, program competitors, employment demand, student demand, program feasibility and more. These may be developed in close collaboration with relevant industry stakeholders. Once a college administration and/or BOG have approved the program, the college can then apply for funding through the MCU.

## 7.3 Modular training programs

Modular programs are shorter training programs designed to address skill development needs in specific industries such as mining, forestry, or commercial vehicles. These programs are created in collaboration with industry employers and the Strategic Workforce Policy and Programs Branch of the MLITSD.

There is no publicly available information regarding eligibility criteria, process, or standards to create and deliver a modular program, however, the experience of the Ontario mining sector in the development and maintenance of its [modular training programs](#) might provide some insight.

The [Ministry of Colleges and Universities \(MCU\)](#), in consultation with the mining sector develop and maintain the modular mining training programs: the Common Core Modules and the Specialty Modules. Common Core training provides mandatory entry-level training for new workers entering specific mining work environments. The Specialty Modules are mandatory hands-on competency-based workplace training.

Mine and mining plant employers are required to establish and maintain the appropriate modular training program(s) to train their workers. Each employer must apply to the Ministry of Colleges and Universities to grant a designated person signing authority, which means that person is accountable for ensuring the quality of training, maintaining training records and determining the competency of workers for accreditation after completing the modular training program.

Each program has specific guidelines outlining program prerequisites, ministry accreditation requirements, signing authority responsibilities, trainer qualifications and audit guidelines. While there are requirements for the initial training of mine workers in Ontario, there is

currently no formal requirement for refresher training or any mechanism to ensure workers keep up-to-date with new skills or changing technology.

According to the MCU, within the mining sector, there is support for the current modular training program concept and approach to training. While there is some support for making mining a registered trade and developing appropriate apprentice programs to transfer knowledge from the more experienced miner to the apprentice, most feel the current Common Core modular training model serves the sector well. There are concerns that if mining were to become a prescribed trade, higher training requirements would create a barrier to workers entering the field or currently working in the sector, which could be problematic for an industry facing potential labour recruitment challenges.

This modular program training pathway used by the mining sector incorporates mandatory training that is delivered by employers, sets standards for quality of training, maintaining training records, determining the competency of workers, program prerequisites, ministry accreditation requirements, signing authority responsibilities, trainer qualifications and audit guidelines.

According to Skilled Trades Ontario, this is how modular training was designed for the mining sector. Other sectors could approach modular training differently, as long as the program responds to the needs and challenges of that particular industry and receives support of the Strategic Workforce Policy and Programs Branch of the MLITSD.

## 7.4 Association training programs

Training programs are commonly developed and delivered by industry associations which are made up of employers and stakeholders of that particular industry or sector. The standards, learning outcomes, requirements, fees, and all other details of association training programs are determined by that association which theoretically, serves the interest of the industry as a whole. Association training programs, while often not endorsed or accredited by government regulatory bodies, can provide training that helps workers attain necessary skills to meet the needs of the industry.



A woman with dark hair in a ponytail, wearing a light blue button-down shirt and a purple apron, is smiling as she works on a bicycle wheel. She is holding the wheel with both hands, adjusting the spokes. The background is a workshop filled with various tools, equipment, and bicycle parts, including shelves with tools and racks of bicycle frames.

8

# Recommendations For Improving Workforce Attraction

While this report was researched and developed as part of the City of Toronto's work to advance the local bike industry, many of the following recommendations have broader provincial and even national implications. These recommendations should be implemented collaboratively between the MMIWDC, industry partners and stakeholders, and all levels of government including the City of Toronto, the Government of Ontario and the Government of Canada.

## 8.1 Increase expectations and perceptions of bike mechanics as a career path

### 8.1.1 Address industry wage standards:

Bike mechanics in Toronto are not very well compensated and are often paid a wage under most living and thriving wage standards for the City. To improve workforce growth and retention, the City of Toronto, through the MMIWDC, should work closely with the bike industry to align wage standards with the [City of Toronto's Fair Wage Policy](#) or consider providing wage subsidies for entry level mechanics. Increasing wages should also be considered while keeping bike repair services as accessible and affordable as possible. Bikes are the sole means of transportation for many people.

### 8.1.2 Develop a campaign promoting bike mechanic as a worthy and viable career path:

Bike mechanics in Toronto are not very well compensated and are often paid a wage under Promoting bike mechanics as a profession that is viable and has smaller costs to entry would help build greater interest in the industry. Compared to many other trades, there are far fewer tools and space needed to start working. Promotion campaigns could illustrate the many career opportunities that exist in the industry including bike shop mechanics, entrepreneurs delivering by-appointment repair services, bike assemblers, and workers at bike and bike parts manufacturing brands.

### 8.1.3 Embed bike riding skills and bike mechanics training into elementary and high school curriculums:

Getting students interested in bikes and learning to ride and do basic bike maintenance at an early age can inspire interest in joining the bike mechanic workforce. Educating children from a young age about bikes and bike mechanics is a key aspect of building a sustainable cycling culture in Toronto that will support the bike industry but is essential in meeting the City's climate and mobility goals. Several non-profit organizations in Toronto provide this service to schools but there is no sustainable funding for this work, or a systematic approach for teaching youth about cycling and bike maintenance.

## 8.1.4 Include community service organizations in program development and delivery:

organizations are already doing much of the work in training new bike mechanics through Tier 1 and Tier 2 programs. These organizations, who in addition to bike mechanic training often provide settlement services, employment services and skills training, and work with equity-deserving communities, are ideally situation to connect people to the industry and potential new career paths.

## 8.1.5 Continue researching workforce expectations and perceptions:

Conduct a regular survey to better understand the perceived barriers and benefits of people entering the bike mechanic workforce. Use the results of this survey to inform strategies that attract people to the workforce.

## 8.2 Keep bike mechanic training accessible and barrier-free

When developing bike mechanic training curriculums and authorizing program delivery organizations, consider the many ways bike mechanic training needs to be as accessible and barrier-free as possible. Considerations should be made regarding:

- **Cost:** Ensure that programs are low-cost, free, and/or have funding partnerships that allow equity-deserving students to access the programs.
- **Time:** Ensure that program lengths are long enough to teach all essential skills while remaining competitive compared to other programs.
- **Flexibility:** Ensure that programs are offered in flexible formats including part-time, fulltime and night school to ensure all prospective students can accommodate the program within their schedule.
- **Location:** Ensure that programs are offered widely throughout the city and can be easily accessed by participants by active transportation or transit.
- **Paid education opportunities:** Ensure that paid apprenticeships are made available to students, assignments, and online video instruction.
- **Teaching methods:** Ensure programs offer teaching methods that support different learning styles, such as incorporating practical hands-on lessons, written theory through tests and assignments, and online video instruction. Accommodating for different learning styles can help all students learn and succeed.

## 8.3 Centre equity within bike mechanic programs

Interviews with industry experts and locally available training organizations identified key barriers to workforce participation based on race, gender, and income. Other equity-deserving groups likely encounter barriers as well. These inequities within the bike industry are symptomatic of larger systemic issues common in most workforces. While dismantling systemic inequities in the workplace is outside the scope of this report, it is critical that the bike industry acknowledge these issues and work to ensure that steps are taken to meaningfully address these serious issues. The following recommendations are part of these first steps but are no means comprehensive. More study is needed to fully understand the systemic barriers preventing equity-deserving groups from participating in the bike industry.

### 8.3.1 Provide opportunities for equity deserving communities to access free bike mechanic programs:

Ensure that funding is made available through government grants and/or community service organizations to offer free bike mechanic programs to equity deserving communities including newcomers, racialized communities, people with disabilities, and members of the LGBTQ community.

### 8.3.2 Integrate Equity, Diversity, and Inclusion (EDI) topics into program curriculums and program delivery:

Ensure that all program curriculums incorporate lessons on anti-discrimination and anti-oppression, LGBTQ content, unconscious bias, diversity, equity, and inclusion to support the development of a more inclusive industry culture. Also integrate EDI into the delivery of the curriculums consistent with the [City of Toronto Policy on Equity](#). Program instructors should be trained in EDI so that people from equity-deserving communities feel comfortable participating.

## 8.4 Support local industry to grow job opportunities

### 8.4.1 Give supports to help bike shops and other industry employers expand communities to access free bike mechanic programs industry employers expand:

The City of Toronto should provide grants, low-cost loans or other incentives to help bike businesses launch and expand. The City of Toronto and MMIWDC should also engage the provincial and federal government to provide this support to the industry.



## **8.4.2 Encourage strategies to reduce seasonality of employment:**

Bike mechanic employment opportunities often taper off during the winter season. This needs to be addressed. One way might be to teach another skill alongside bike mechanics such as winter sport technician skills. Similar to how ski resorts transform into bike parks in summer, bike mechanics and ski/ice-skate mechanics could go hand-in-hand, to ensure employment throughout the year. This could potentially attract more people to bike mechanics if they are able find a year-round job with an employer that offers bike and winter sport technician services.

## **8.4.3 Ensure that public bike programs are tapping into local training programs and certified mechanics:**

City-owned bike fleets, police service bikes, and public bikeshare programs should all prioritize hiring local bike mechanics for permanent or apprenticeship positions, keeping jobs and economic investment local.

## **8.4.4 Encourage large bike retailers to consider tapping into local training programs and certified mechanics:**

Large retailers such as Walmart and Canadian Tire sell a lot of bikes. The City of Toronto, through the MMIWDC, should engage with these retailers to utilize local bike mechanic training programs and workforce to assemble bikes.

## **8.4.5 Deliver bike mechanic training programs ahead of the bike industry hiring season:**

If programs are offered from September to February, this allows students to get trained and ready for employment just as the springtime bike mechanic hiring season commences. As Toronto moves closer to its bike ridership goals and more people cycle year-round, programs can be offered all year.

## **8.4.6 Develop a centralized jobs board for local bike industry employers and job seekers:**

The MMIWDC should lead the development of a centralized jobs board that can help connect local employers with local job seekers.

A person in a dark blue shirt is working on a bicycle in a workshop. The person is seen from the side, focused on the task. The background is a blurred workshop environment with various tools and equipment. The text is overlaid on a white rectangular area in the center of the image.

9

# Recommendations For Improving Workforce Skills

## 9.1 Continue developing the MMIWDC

The City of Toronto has convened key industry stakeholders to form the MMIWDC. This is a solid foundation that should continue to be developed and supported to carry out the following recommendations:

### 9.1.1 Develop a governance strategy for the MMIWDC

MMIWDC which will include how members can join the committee, requirements and expectations for membership, terms of reference, and decision-making protocols.

### 9.1.2 Co-create a strategic plan for the MMIWDC

Develop a multi-year strategic plan that defines the committee's vision and objectives in partnership with MMIWDC members and other industry stakeholders. Part of the strategic plan will likely include steps for how the MMIWDC will improve workforce skills and attraction which should include implementing the recommendations in this report. Establishing a strategic plan will help guide the scope and types of work the committee does.

Part of this strategic plan should include an objective to lead the development, standardization, recognition, and delivery of bike mechanic curriculums. Figure 2 and Table 5 below offer a recommended model which outlines MMIWDC stakeholders and their roles in this effort. Recommendation 9.1.3 provides recommended topics and elements to be included in standardized curriculums for Tiers 1-3 bike mechanic programs. Recommendation 9.1.4 provides recommended training pathways to deliver these curriculums.

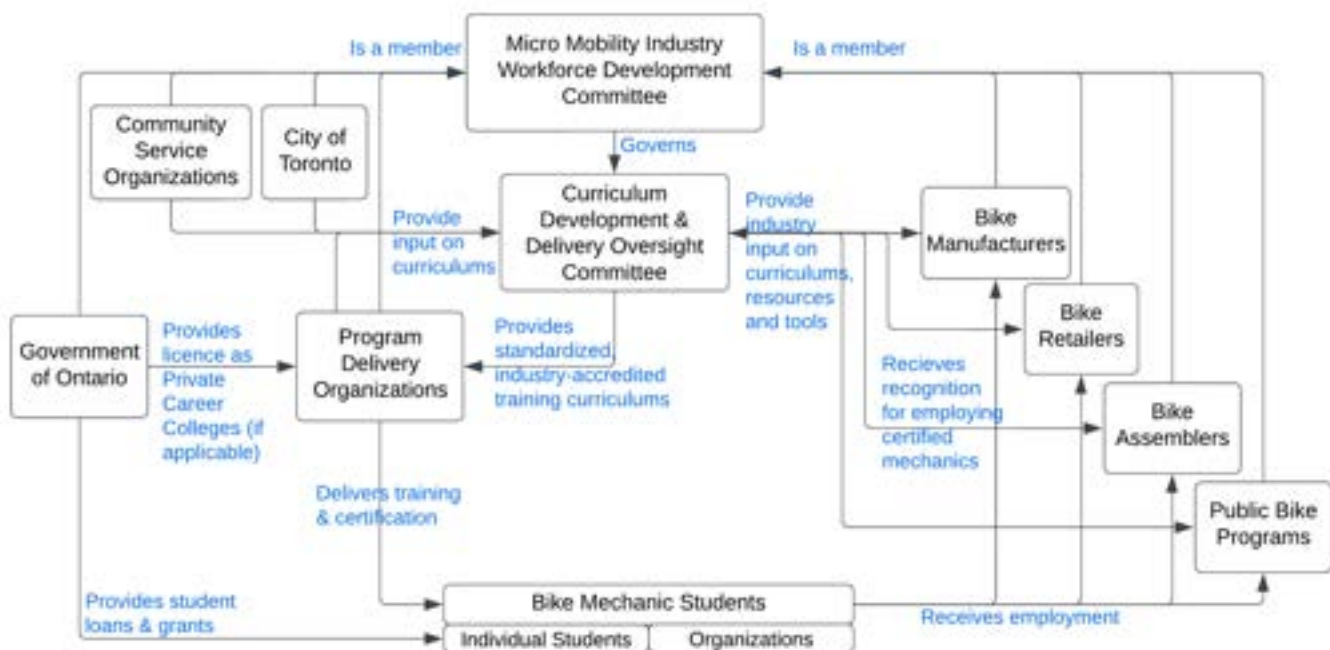


Figure 2: Recommended Bike Mechanic Training Development and Delivery Model

<b>MMIWDC</b>	The MMIWDC is the central governing body that convenes industry stakeholders to support the growth and development of the bike mechanic workforce. The MMIWDC governs the Curriculum Development & Delivery Oversight Committee (CDDOC) which collaboratively develops and oversees the delivery of standardized bike mechanic programs. The MMIWDC can also act as a representative of bike mechanic program delivery organizations on matters of government regulation, funding, etc.
<b>Ministry of Colleges and Universities</b>	Ministry of Colleges and Universities register training delivery organizations that offer programs above 40 hours or charge above \$2,000 as Private Career College under the Private Career Colleges Act. The Ministry also administers student loan services and program promotion to attract and support students interested in bike mechanics.
<b>Community Service Organizations</b>	Community service organizations that provide settlement services, employment services and skills training, especially those that work with equity-deserving communities are part of the MMIWD and CDDO Committees to ensure access and equity is centred in bike mechanic program curriculum and delivery.
<b>City of Toronto</b>	The City of Toronto is a member of the MMIWD and CDDO Committees and acts as the secretariat for the committee. The city provides support by aligning municipal services with bike mechanic programs. For example, Solid Waste and Public Works departments leverage bike donation programs to save bikes from landfills and donate them to bike mechanic programs. The city also supports programs through financial support.
<b>Government of Ontario</b>	The Government of Ontario is a member of the MMIWDC and provides funding to support the work of the MMIWDC, program delivery organizations and to support the development of the bike industry workforce generally.
<b>Program Delivery Organizations</b>	Program Delivery Organizations include non-profit community bike hubs such as LEF, Charlie's FreeWheels, and CultureLink, as well as local academic institutions interested in offering the programs. These may be overlap with community service organizations.
<b>Bike Manufacturers, Retailers, Assemblers and Public Bike Programs</b>	Bike businesses are members of the MMIWDC and provide the necessary technical industry input to develop standardized curriculums. They also provide industry tools and resources which can be accessed by program delivery organizations. They are also the employers of bike mechanic program graduates.

Table 5: Stakeholders and Roles

### 9.1.3 Create standardized curriculums for Tiers 1-3

The City of Toronto should support the MMIWDC to develop standardized curriculums for Tier 1, 2, and 3 training levels, considering the recommended objectives, topics, lengths, and teaching methods outlined in table 6.

	<b>Tier 1: Basic beginner do-it-yourself maintenance</b>	<b>Tier 2: Professional bike mechanic essentials</b>	<b>Tier 3: Advanced topics for established professional bike mechanics</b>
<b>Objectives</b>	<p>Provide basic bike maintenance skills to bike-owners and hobbyists so they can maintain their bikes throughout the year.</p> <p>Provide an entry-point into Tier 2 professional bike mechanic training programs.</p>	<p>Ready professionals for jobs in bike assembly, maintenance and repair in bike shops, private workshops, manufacturers, etc.</p> <p>Provide connections to Tier 3 training in specialized topics.</p>	<p>Provide additional educational opportunities for professional bike mechanics who have taken the Tier 2 program or have equivalent work experience.</p>
<b>Topics</b>	<p>Basic tune ups, flat tire repair, brake adjustment, brake pad replacement, derailleur adjustment, chain repair, basic suspension setup, rider positioning guidelines and setup.</p> <p>For a full list of potential topics for Tier 1, refer to Appendix F.</p>	<p>Basic mechanical skills, tires &amp; tubes, rear sprockets, hubs, wheels, pedals, cranksets, chains, derailleur systems, internal gear systems, brake systems, handlebars, stems, saddles, seatposts, headsets, frame &amp; fork, suspension, on-ride repair, employment skills training, bike shop operations &amp; practices, environmental health &amp; safety, first aid and WHMIS training*</p> <p>For a list of Tier 2 topics, refer to Appendix G.</p>	<p>Wheel building, suspension, e-bikes, electronic gear systems, hydraulic brakes and topics aligned with individual manufacturers and bike part brands.</p> <p>For a full list of potential topics for Tier 3, refer to Appendix H.</p>

		*Electric bike mechanics should be considered as a potential additional topic. The MMIWDC should continue engaging with electric bike specialists and manufacturers to discuss if and how e-bike topics could be a part of Tier 2 programs or if it should be separate as its own specialized Tier 3 program	
<b>Length</b>	1 – 39 hours	40-645 hours*	8 – 39 hours
<b>Teaching Methods</b>	Hands-on practical mechanic work Theory reading and writing Video instruction	Hands-on practical mechanic work Theory reading and writing Video instruction Potential on-job training placement	Hands-on practical mechanic work Theory reading and writing Video instruction

Table 6: Recommended Topics and Elements for Tier 1-3 Curriculums

\*The range of 40-645 hours recommended for Tier 2 gives the MMIWDC and industry stakeholders flexibility to decide for themselves the exact appropriate number of hours required to train professional bike mechanics. This number should be based on the breadth and depth of topics included in the curriculum as well as the potential for an on-job training component. The Tier 2 curriculum should be comprehensive, while not being so long that it discourages participation in the training program or in the bike mechanic workforce entirely. As part of curriculum development, the MMIWDC should closely monitor other training programs such as Quebec’s AEP program to learn from their approaches, successes, and challenges

### 9.1.4 Support the development of standards and training pathways in which these curriculums will be delivered

The City of Toronto and MMIWDC should help develop standards for program delivery organizations and support efforts to formalize and recognize bike mechanic training through the many training pathways available as outlined in section 7. In what ever way the industry decides to advance training delivery, the City of Toronto and MMIWDC should support any regulatory steps or requirements needed to do so.

## Tier 1

Tier 1 programs can be delivered through any type of organization, but the MMIWDC should ensure that this type of basic maintenance program is free or offered on a sliding price scale and is available widely throughout the city. As this curriculum is a basic beginner tier (non-vocational) and is recommended to be less than 40 hours long and cost less than \$2,000 to participate, there are no mandatory regulatory requirements for organizations offering it.

## Tier 2

Tier 2 programs can be delivered through any type of organization as well but may need to be licenced under the [Private Career Colleges Act \(PCCA\)](#) of Ontario if they are a [non-exempt organization](#) (organization such as Charlie's FreeWheels and CultureLink would be exempt as they do not charge for their classes) and the program is over 40 hours of instruction as recommended in table 6. This licencing could potentially boost recognition for bike mechanics as a career path, making it a more attractive career option. Additionally, students that attend private career colleges in Ontario are eligible for Ontario Student Assistance Program (OSAP) funding.

To support the licencing process, the City of Toronto and MMIWDC should offer to facilitate reporting between program delivery organizations and the Ministry of Colleges and Universities. The City of Toronto should also call on the Ministry to reduce the administrative barriers associated with PCC licensing in an effort to support community bike training organizations delivering these programs.

Additionally, the MMIWDC should carefully consider the potential training pathways available and support the industry in any regulatory process required by these pathways. This includes pursuing the prescription of a skilled trade to develop an apprenticeship program, developing college programs, pursuing the development of a modular training program, or developing an industry association training program (as described in section 7).

Pursuing a skilled trade prescription could help give the bike mechanic profession a substantial publicity and recognition boost by becoming the latest skilled trade to be prescribed by the MLITSD in Ontario. It would also ensure the standardization and safety of training. This would likely assist in addressing many of the barriers identified by the locally available training organizations, as well as bolster efforts to improve workforce attraction and workforce skills.

There are potential drawbacks to pursuing a skilled trade prescription, including increased administrative costs and new requirements that could pose a barrier to program delivery organizations and potential program students. The apprenticeship model might not be favourable or sustainable for industry employers that currently work on a seasonal hiring cycle. The process of prescribing a new skilled trade and creating a new apprenticeship program also takes two to five years.

If skilled trade prescription is an opportunity the MMIWDC would like to pursue for bike mechanic training, it would also need to expand the scope of its mandate from regional to provincial and transform into a provincial organization that represents a much larger and diverse group of industry stakeholders than it currently does.

Modular training programs provide many of the benefits of skilled trade prescription, without requiring a case be made for province-wide applicability and with fewer administrative burdens. Modular programs can be developed to meet the needs of the industry and have more flexibility in determining who develops and delivers the training. However, there are potential drawbacks with modular training depending on the practices for delivering programs that are developed with the Ministry. For example, existing modular training in the mining industry is delivered directly by employers and is mandatory, requirements that may not be suitable for the bike industry. Pursuing modular training as either an alternative to or a steppingstone towards skilled trade prescription should be seriously considered, as long as the modular program can be designed in such a way that aligns with the needs of the bike industry.

If the MMIWDC decides to pursue a skilled trade, modular, college, or association training program, or some combination of these pathways, the City of Toronto and the MMIWDC will need to work with the MLITSD and the MCU to outline and complete the administrative steps and requirements.

### **Tier 3**

Tier 3 programs could be offered through any type of organization as well without need for licencing under the PCCA as long as they are under 40 hours of instruction and are priced at no more than \$2,000. They would however, likely be developed and delivered in close collaboration with specific bike and bike part brands. Tier 3 programs might be able to charge a higher price as they are intended to upgrade skills in specific niche areas.

### **9.1.5 Support ongoing research efforts on key topics identified by MMIWDC**

- Conduct an analysis on the economic potential of the industry, including jobs, wages, number of employees, and number of bikes sold and repaired annually, assuming the scenario under the City of Toronto's 2040 climate change targets.
- Conduct a study on the correlation between increased bike shops and increased bike riding in the community as well as understanding the ideal bike mechanic to population ratio given the City's stated mobility share goals.



A close-up photograph of a person's hands using a multi-tool to adjust the rear gear mechanism of a bicycle. The person is wearing a white t-shirt and dark shorts. The bicycle has a black frame and a brown tire. The background is slightly blurred, showing a paved area and a white car. The text '10' is displayed in a dark blue circle at the top center of the image.

10

# Conclusion

As part of its work towards meeting long term climate change, transportation and economic development goals, the City of Toronto is planning to grow bike ridership significantly across the city. To achieve this, the City is improving protected and connected active transportation networks, implementing education and safety programs, as well as ensuring that growing bike ridership is met with a growing and skilled bike mechanic workforce.

The bike mechanic workforce is already facing challenges of attraction and skill development. To help address these challenges, the City of Toronto should continue developing the Micro Mobility Industry Workforce Development Committee (MMIWDC) into a larger industry association which can work to promote the benefits and remove the barriers to entering the bike mechanic workforce, collaborate with industry stakeholders and other levels of government, and develop a standardized, industry-accredited suite of bike mechanic training programs.

The findings and recommendations provided in this report are keys to unlocking growth and skill development of a vitally important workforce and economic sector for the City of Toronto, the province, and the country as a whole. With a supported and professionally trained bike mechanic workforce, the City of Toronto and its partners can achieve their climate, transportation, and economic development objectives.



A man in a dark blue t-shirt is working on a bicycle in a workshop. He is wearing black gloves and is focused on the rear wheel and drivetrain. The background is a blurred workshop with various tools and equipment. The text "Appendix A" is overlaid on a white rectangular box in the upper left quadrant of the image.

# Appendix A

# CultureLink Bike to the Future Program Overview

North York, Toronto, Ontario | [www.culturelink.ca](http://www.culturelink.ca) | [reception@culturelink.ca](mailto:reception@culturelink.ca)

## Program Curriculum



### Curriculum level

Tier 2: Bike  
Mechanic  
Essentials



### Type of bike

Standard bikes &  
electric bikes.



### Program Length

240 hours over 8  
weeks (30 hours/  
week)

### What topics does the curriculum cover?

The curriculum provides detailed bike mechanics training complemented with soft-skills and employment skills training. Each week participants are expected to spend 21 hours (3 days) on developing their technical skills and expertise in bike mechanics, and 9 hours developing their soft skills needed to succeed in the job market.

Week 1: Bike shop introduction, safety, expectations, tool use

Week 2: Bicycle anatomy, recycling of bicycle parts, ABC check

Week 3: Fixing flat tires, brake adjustment & maintenance

Week 4: Drivetrain and Gear Adjustment & Maintenance

Week 5: Diagnosis/Assessment of Repair Needs, Self-Employment vs. Shop Protocol

Week 6: Introduction to Electric Bicycles: Motors, Batteries & Maintenance

Week 7: Assembling Bicycles

Week 8: Safe Cycling: Road Laws and Riding Skills

### What are the learning outcomes of the curriculum?

After completing the program, participants will be able to build a bike, maintain and repair a bike and have the foundational skills to work as a professional bike mechanic.

### What teaching methods are used?

Bike mechanics training is completely hands-on (donated bikes are provided to participants, and they learn to rebuild, repair, and maintain the bike). Knowledge on theory is also taught and tested through reading and writing.

### How often is the curriculum reviewed and updated?

CultureLink tests participant learning and engagement through quizzes. This gives them the data needed to make micro adjustments to the lessons and repeat information as needed. A larger more comprehensive update to the curriculum takes place every few years. The last update was in 2022 and CultureLink is planning to do an update in 2023.

## Program Delivery



### Frequency

2-3 times per year  
(depending on  
funding)



### Number of participants

max 6 per program  
up to 18



### Cost to Participants

No cost. Participants  
are paid to participate  
in the program

## Who is involved in developing & delivering the training?

<b>CultureLink</b>	CultureLink develops the curriculum and facilitates program marketing, administration, and curriculum delivery.
<b>Toronto Community Housing</b>	Toronto Community Housing hosts a CultureLink satellite office and workshop at 15 Tobermory Drive where the program is located. TCH also offered financial support for the project delivery in 2021/2022, mainly to cover the personnel cost and the stipends.
<b>City of Brampton</b>	The City of Brampton's Solid Waste Department collects and donates used bikes to CultureLink for participants to rebuild and repair.
<b>Government of Canada</b>	The federal government's Canada Summer Jobs program provides funding to pay participants who take the program
<b>Metcalfe Foundation</b>	The Metcalfe Foundation is a stakeholder and funder of CultureLink.

## Who certifies the trainers?

There is no formal certification process. CultureLink's Bike Hub Program Worker, an experienced bike mechanic, is responsible for designing the training program, and onboarding program trainers.

## Where is the program delivered?

The program is delivered at a CultureLink satellite location at 15 Tobermory Drive inside a Toronto Community Housing building.

## Program Promotion

### How is the program promoted to prospective participants?

In 2022, CultureLink worked with Toronto Community Housing to promote the Bike to the Future program to their residents. Although this was an effective way to attract many participants, CultureLink found that not all participants were necessarily interested in bike mechanics and that some joined only because the program paid them to participate. In the future, CultureLink plans to do a more targeted promotion campaign to newcomers and youth who are already

interested in engineering, mechanics, or biking.

### How are graduates of the program promoted to prospective employers?

CultureLink has several close relationships with local bike shops where some participants go on to become employed as mechanics. These bike shops are excited to hire participants who have a foundation of bike mechanic experience through the Bike to the Future program

## Recommended Policy Actions to Support the Bike Mechanic Workforce

CultureLink discussed some of the potential enabling government policies that could support bike mechanic programs, attract more people to the industry, and grow the capacity of the bike mechanic workforce. These policy actions are presented below.

### Support bike mechanic training programs

- **Formalize relationship between municipalities and local bike mechanic training programs:** For example, Solid Waste and Public Works departments could formalize bike donation programs, saving bikes from landfills and paying bike mechanic trainers to pick them up for use in training programs.
- **Provide funding to bike mechanic training programs:** Municipal governments and the province should provide more funding opportunities to community bike hubs. CultureLink suggested that even a modest increase in funding could significantly improve administrative support, increase the number of program participants and program frequency.
- **Develop an industry-recognized and standardized curriculum:** Develop a working group of bike industry stakeholders including bike brands, shops and training organizations to create a standardized and regularly updated curriculum for bike mechanic training. This would help training organizations strengthen their programs.

### Attract more prospective participants

- **Create more linkages between community housing and community bike mechanic programs:** Municipal housing agencies could work with CultureLink and other community bike hubs to deliver cycling training activities for community housing residents. This could provide more entry-points into the bike industry.
- **Make bike mechanics a standardized, prescribed skilled trade:** The Ministry of Labour, Immigration, Training and Skills Development should legitimize bike mechanics as a skilled career path by prescribing it as a skilled trade.
- **Ensure a shorter length of program:** If people know that they can go through a quick training program and start right away they would be more interested.

- **Ensure fewer educational requirements for bike mechanics:** Even if bike mechanics were to become a skilled trade, expected earnings are still relatively low compared to other skilled trades. Therefore, the level of training needed to become a bike mechanic would have to commensurate with pay expectations. There should be fewer educational requirements at a cheaper cost of tuition.
- **Increase the minimum wage:** The government should consider increasing the minimum wage to a living wage so that even entry level mechanics can earn a living. Low wages are likely one of the biggest factors contributing to bike mechanic shortages and turnover rates. Consider how this can be done while also keeping bike repair services as accessible and affordable as possible. Bikes are the sole means of transportation for many people.
- **Promote minimal needed tools/space:** Need to promote the fact that there is a low barrier to entry as a mechanic is less than other trades (regarding tools and space needed).
- **Ensure paid apprenticeships:** CultureLink mentioned that attracting new participants would be easier if trade had paid apprenticeships just like other skilled trades but didn't cost as much or take as long.
- **Ensure there are low-cost/free community hub programs:** If bike shops joined together to suggest a common curriculum that could be deployed through community hubs, this could increase the amount and diversity of participants. Programs like Barnetts, UBI, and Winterborne are all too expensive.

## Support employers of bike mechanics

- **Ensure participants are consistently educated and trained:** If bike mechanic training was a skilled trade, shops would be excited to hire them to reduce the amount of training the shop has to do. Additionally, if there was an organized oversight body that could research, develop and standardize bike mechanic curriculums, this would help establish confidence.
- **Promote productivity and retention gains of hiring certified mechanics:** certified mechanics would be more productive and would be able to do more repairs more quickly. Shops could then consider paying them more without affecting profit margins, giving employees more security and increasing retention rates.
- **Give supports to bike shops and other prospective employers of bike mechanics:** Provide grants or low-cost loans to help bike mechanic businesses expand. CultureLink mentioned that some bike shops have enough work for up to 20 mechanics, but lack sufficient workspace to hire more.

## CultureLink Bike to the Future Training Program Curriculum

Week 1: Bike shop introduction, safety, expectations, tool use

Week 2: Bicycle anatomy, recycling of bicycle parts, ABC check

Week 3: Fixing flat tires, brake adjustment & maintenance

Week 4: Drivetrain and Gear Adjustment & Maintenance

Week 5: Diagnosis/Assessment of Repair Needs, Self-Employment vs. Shop Protocol

Week 6: Introduction to Electric Bicycles: Motors, Batteries & Maintenance

Week 7: Assembling Bicycles










# Appendix B

# Charlie's FreeWheels Pre-Employment Bike Mechanic Training Program Overview

Moss Park, Toronto, Ontario | [www.charliesfreewheels.ca](http://www.charliesfreewheels.ca) | [info@charliesfreewheels.ca](mailto:info@charliesfreewheels.ca)

## Program Curriculum

	<p><b>Curriculum level</b></p> <p>Tier 2: Bike Mechanic Essentials</p>		<p><b>Type of bike</b></p> <p>Standard bikes (e.g., road, mountain, hybrid).</p>		<p><b>Program Length</b></p> <p>36 hours over 6 days</p>
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### What topics does the curriculum cover?

<p><b>Day 1</b></p>	<p>Intros and welcomes          Shop layout, tour and safety information          Tool and workspace familiarity          Consistency of approach          Making notes on repairs          Threads          Introduction to Torque Specs and torque wrenches</p>
<p><b>Day 2</b></p>	<p>Sharing a workspace          Mechanical resources          Flat Fix Lesson</p>
<p><b>Day 3</b></p>	<p>Quality check of each other's flat fix from last week          Communication discussion and exercise - customer phone calls.          Brakes: Compatibility, Arm installation, Spring Adjustments, Cables Pads          Chains</p>
<p><b>Day 4</b></p>	<p>Accessories          Rack          Fenders          Drivetrain          Deraileurs          Shift Cables</p>

	Box Bike Assembly (New this year)
	Review and group discussion of materials we have covered: Checklist Exercise Test rides Interviews Final discussion

**What are the learning outcomes of the curriculum?**

Throughout the program, participants will have had 8 hours of instruction and demonstration, 18 hours of hands-on repair time, 4 hours of discussion and investigation of workplace expectations, scenarios, and resources, and 2 hours of job interview training. After completing the program, participants will be able to build, maintain and repair a bike and have the technical and professional skills to work in a bike shop setting.

**What teaching methods are used?**

Charlie's FreeWheels pre-employment training is all experiential, where hands-on, practical lessons are provided. As well, there are 2 full-time mechanics for every 10 participants, providing a supportive learning environment.

**How often is the curriculum reviewed and updated?**

The training is updated annually based on participant feedback, observations from instructors, teaching method best practices, and ongoing input from bikes shops on the changing landscape of bikes and staff skill needs.

**Program Delivery**

	<p><b>Frequency</b></p> <p>Twice per year</p>		<p><b>Number of participants</b></p> <p>10 - 20 per year</p>		<p><b>Cost to Participants</b></p> <p>No cost. Participants are paid \$20/hour to participate.</p>
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## Who is involved in developing & delivering the training?

<b>Charlie's FreeWheels</b>	Charlie's FreeWheels' head mechanic developed the curriculum with support from Urbane Cycles. It also facilitates program marketing, administration, and curriculum delivery. Program updates will be led by Charlie's FreeWheels' executive director, head mechanic, and Ya Bikes!
<b>Ya Bikes!</b>	Ya Bikes! is the host location and supports the programming of Charlie's FreeWheels.

## Who certifies the trainers?

Charlie's FreeWheels' head mechanic will certify trainers, who will have worked at a bike shop in the past or have been trained in Charlie's FreeWheels' programs.

## Where is the program delivered?

The program is delivered at Ya Bikes! at 242.5 Queen St E, Toronto, ON.

## Program Promotion

### How is the program promoted to prospective participants?

Participants learn about the Pre-Employment Bike Mechanic Training Program through social media or through past program participants.

### How are graduates of the program promoted to prospective employers?

Charlie's FreeWheels has relationships with bicycle shops in Toronto which have hired program graduates.

## Recommended Policy Actions to Support Bike Mechanic Training Programs

Charlie's FreeWheels discussed some of the potential enabling government policies that could support bike mechanic programs, attract more people to the industry, and grow the capacity of the bike mechanic workforce. These policy actions are presented below.

### Support bike mechanic training programs

- **Ensure community organizations are supported:** Develop a consistent and standardized curriculum for community bike hubs to teach from and provide financial support to cover program costs.

## Attract more prospective participants

- **Ensure accessibility to all prospective participants:** Bike mechanic training should always remain accessible through community organizations like Charlie's FreeWheels.
- **Ensure that equity, diversity, and inclusion is embedded within bike mechanic programs:** The demographics and culture of the bike industry is heavily white male dominated. Black, Indigenous and People of Colour, women, older people, and people in the LGBTQ community often report being discriminated against by bike shops or as employees in the bike industry.

## Charlie's FreeWheels Pre-Employment Bike Mechanic Training Curriculum

<b>Day 1</b>	<p><b>Intros and welcomes</b></p> <p><b>Shop layout, tour and safety information</b></p> <p><b>Tool and workspace familiarity</b></p> <ul style="list-style-type: none"> <li>• naming tools</li> <li>• where do things go</li> <li>• what resources are at each station</li> </ul> <p><b>Creating opening and closing duties list</b></p> <p><b>Consistency of approach</b></p> <ul style="list-style-type: none"> <li>• Proper use of repair stands/lifting and clamping bikes</li> <li>• systematic habits to form</li> <li>• Safety checks and red flags</li> </ul> <p><b>Making notes on repairs</b></p> <p><b>Threads</b></p> <ul style="list-style-type: none"> <li>• thread prep</li> <li>• standards and best practices</li> <li>• Types of fasteners and appropriate tools</li> </ul> <p><b>Introduction to Torque Specs and torque wrenches</b></p> <ul style="list-style-type: none"> <li>• Standards and guidelines</li> <li>• Proper use</li> <li>• Hands-on practice</li> </ul>
<b>Day 2</b>	<p><b>Sharing a workspace</b></p> <ul style="list-style-type: none"> <li>• Collaboration and respect</li> <li>• sharing/borrowing tools</li> <li>• Communication</li> <li>• Asking questions/needing assistance/taking breaks</li> </ul>

	<p><b>Mechanical resources</b></p> <ul style="list-style-type: none"> <li>• Overview of various resources</li> <li>• Hierarchy of information</li> <li>• Who/where to trust with accurate information</li> <li>• Problem-Solving exercise using and exploring various possible resources</li> </ul> <p><b>Flat Fix Lesson</b></p> <ul style="list-style-type: none"> <li>• Tire/Tube/Rim compatibility</li> <li>• Assessment and safety</li> <li>• Step-by-step checklists</li> <li>• Demonstration and procedure</li> <li>• Hands-on practice</li> <li>• *Developing a process/time management</li> </ul>
<p><b>Day 3</b></p>	<p><b>QC of each other's flat fix from last week</b></p> <ul style="list-style-type: none"> <li>• check for any items on the checklist, including wheel installation, brake alignment, tire seating, pressure, etc.</li> </ul> <p><b>Communication discussion and exercise - customer phone calls.</b></p> <p><b>Brakes: Compatibility, Arm installation, Spring Adjustments</b></p> <p><b>Cables</b></p> <ul style="list-style-type: none"> <li>• Demonstration of cable install</li> <li>• Checklists and safety guidelines</li> <li>• Hands-on practice for cable installs and adjustments</li> </ul> <p><b>Pads</b></p> <ul style="list-style-type: none"> <li>• Demonstration and discussion of proper installation, adjustment, and testing</li> <li>• Various pads/correct pads for different types of brakes</li> <li>• Checklist for pad installs</li> <li>• Hands-on practice for pad installs</li> </ul> <p><b>Chains</b></p> <ul style="list-style-type: none"> <li>• Compatibility and sizing</li> <li>• Proper cleaning/lubing</li> <li>• Safety check for damage/wear</li> <li>• Chain installation demonstration</li> <li>• Hands-On practice of the above</li> </ul>
<p><b>Day 4</b></p>	<p><b>Check-In with group</b></p> <p><b>Accessories</b></p> <ul style="list-style-type: none"> <li>• Overview of common accessories</li> <li>• Installation expectations and compatibility</li> <li>• price v quality</li> <li>• Safety considerations</li> </ul>

	<p><b>Rack</b></p> <ul style="list-style-type: none"> <li>• Demonstration and discussion of proper installation</li> <li>• Hands-on rack install</li> </ul> <p><b>Fenders</b></p> <ul style="list-style-type: none"> <li>• Demonstration and discussion of proper installation</li> <li>• Hands on fender install</li> </ul> <p><b>Drivetrain</b></p> <p><b>Derailleurs</b></p> <ul style="list-style-type: none"> <li>• Common shifting issues</li> <li>• Demonstration of common adjustments <ul style="list-style-type: none"> <li>» Assess derailleur damage or wear</li> <li>» Proper installation</li> <li>» Limit screws</li> <li>» Cable tension + dialing in</li> </ul> </li> </ul> <p><b>Shift Cables</b></p> <ul style="list-style-type: none"> <li>• Discussion and demonstration - Installation in various shifters</li> <li>• Cable routing and housing length</li> <li>• Hands-on shift cable installs</li> </ul> <p>*Review of what we have looked at so far Discussion: Balance of safety, performance, comfort, and aesthetics.</p>
<b>Day 5</b>	<p><b>Box Bike Assembly (New this year)</b></p> <ul style="list-style-type: none"> <li>• Discussion - Process, expectations, best practices</li> <li>• Common issues to look out for</li> <li>• Time-Management</li> </ul> <p><b>Demonstration (Overview) *handout with guidelines</b></p> <p><b>Assembly bike #1 in pairs</b></p> <p><b>Assembly bike #2 individually (if Urbane can offer more box bikes)</b></p>
<b>Day 6</b>	<p><b>Review and group discussion of materials we have covered:</b></p> <ul style="list-style-type: none"> <li>• safety checks</li> <li>• assessment/note-taking</li> <li>• Workplace expectations/communication</li> <li>• flat fix</li> </ul> <p><b>Checklist Exercise</b></p> <p><b>TEST RIDES</b></p> <ul style="list-style-type: none"> <li>• <b>Best practices</b></li> <li>• Safety (for yourself and the bike)</li> <li>• Practice test riding (with assembly bikes)</li> <li>• Interviews (approx 2 hours)</li> </ul> <p><b>Feedback Forms</b></p> <p><b>Final discussion, questions, clean up and good-byes.</b></p>

# Appendix C

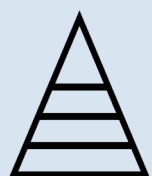




# Learning Enrichment Foundation (LEF) Bike Assembly & Maintenance (BAM) Program Overview

Mount Dennis, Toronto, Ontario | [www.lefca.org](http://www.lefca.org) | [info@lefca.org](mailto:info@lefca.org)

## Program Curriculum



### Curriculum level

Tier 2: Bike  
Mechanic  
Essentials



### Type of bike

Standard bikes  
(e.g., road,  
mountain, hybrid).



### Program Length

218 hours over 8  
weeks

## What topics does the curriculum cover?

Title of subject	Hours
Organization orientation and program overview	5
Basic mechanical skills/proper shop tool use	5
First Aid	7
Workplace Hazardous Material Information System (WHMIS)	7
Health and safety	14
Seat posts and bearings	5
Headsets	5
Bottom brackets, cranks, and pedals	5
Wheel truing	5
Making the wheels stronger	10
The rubber hits the road	5
Chains	5
Rear derailleurs	5
Smooth shifting	5
Brakes	15
Handlebars	5
Refurbish used bikes	75
Placement in a commercial bicycle shop	35
Total number of contact hours for 8 weeks	
155 hours (5 hours per day x 31 days) for subject content + 28 hours (7 hours x 4 days) for First Aid; WHMIS; Health and Safety + 35 hours of job placement	218

In 2023, LEF reached out to retailers to offer Upskilling Workshops to train their current employees and new hires. These included these topics:

- Road Bike Ergonomics
- Disc Brakes Servicing for Road and Mountain Bikes
- Tubeless Tire Set-up for Mountain Bikes
- Bicycle Assembly Certificate

### What are the learning outcomes of the curriculum?

After completing the program, participants will have knowledge and mechanical aptitude in each subject area.

### What experiential teaching methods are used?

The BAM Program is about 60/40 split between practical hands-on experience and theory knowledge and understanding. To teach theory, LEF uses written lessons as well as video content sourced from Park Tool School.

### How often is the curriculum reviewed and updated?

The BAM program curriculum was developed in 2009, but LEF is continuously refining and revising it based on new technology and practices. LEF also adapts the program slightly depending on the clients they work with. They find it helpful to keep the curriculum flexible to cater to participants' skillsets and learning needs. However, these revisions and adaptations are usually minor. As a registered Private Career College in Ontario, LEF would have to reregister the program curriculum to the Ministry of Colleges and Universities for changes that alter more than 10% of the content or learning outcomes.

## Program Delivery



### Frequency

Three times per year from Sept. to Feb



### Number of participants

5 per program  
15 per year



### Cost to Participants

Zero cost to participants. Funding is provided to cover program costs.

## Who is involved in developing & delivering the training?

<b>LEF</b>	LEF develops, updates, and delivers the curriculum to students.
<b>Ministry of Colleges and Universities</b>	Ministry of Colleges and Universities licences LEF as a Private Career College under the Private Career Colleges Act, 2005 which requires any vocational program that is 40 hours or more of instruction or cost more than \$2,000 to secure approval of the Superintendent of Private Career Colleges.
<b>Employment Ontario</b>	Employment Ontario funds the 2023 BAM program with the City of Toronto. It also funds the Accessible Sector Skills Employment and Training Support (ASSETS) program which offers the BAM training to people with intellectual disabilities.
<b>City of Toronto</b>	The City of Toronto funds the 2023 BAM program with Employment Ontario.
<b>Ontario Works</b>	In past years, Ontario Works has funded LEF to offer the BAM training to participants in the Ontario Works program.
<b>Sonderbloom</b>	Sonderbloom provides consulting services for programs that work to support the lives of people with disabilities. As a partner of the ASSETS program, they assist with program outreach.
<b>Community Living Toronto</b>	Community Living Toronto fosters inclusive communities by supporting the rights and choices of people with an intellectual disability. As a partner of the ASSETS program, they have assisted with adapting the program materials for individuals with an intellectual disability.

## Who certifies the trainers?

LEF's Lead Instructor for BAM has 35 years of industry experience and is responsible for designing, adapting and delivering the training program, and hiring and onboarding program trainers.

## Where is the program delivered?

The program is delivered at the Learning Enrichment Foundation's main location at 116 Industry St in the Mount Dennis Neighbourhood of Toronto. This location also offers many other programs to support individuals and families including settlement services, employment services, skills training, language training, and childcare.

## Program Promotion

### How is the program promoted to prospective participants?

LEF works directly with funding partners such as Employment Ontario and Ontario Works (OW) to offer the BAM program to their clients. However, finding passionate and dedicated program participants this way can be challenging; when the pool of OW participants is small, for example not everyone taking the program is necessarily interested in pursuing a career as a bike mechanic. LEF is currently developing some promotional materials for the general

public as they have had some participants come through the program interested in a career change.

### **How are graduates of the program promoted to prospective employers?**

LEF's Lead Instructor has many close connections with bike shop owners who will reach out when they are looking to hire. Similarly, LEF will reach out if they have a recent program graduate looking for work. This process has also been formalized through LEF's bike assembly and maintenance job board.

## **Recommended Policy Actions to Support the Bike Mechanic Workforce**

LEF discussed some of the potential enabling government policies that could support bike mechanic programs, attract more people to the industry, and grow the capacity of the bike mechanic workforce. These policy actions are presented below.

### **Support bike mechanic training programs**

- **Create more linkages between public bike programs and bike mechanic programs:** LEF used to be contracted to do maintenance for the Toronto BIXI bike share system in its first three years and this complemented the training program and provided employment opportunities for graduates. The City of Toronto then decided to contract maintenance work to another company that hasn't been open to hiring graduates from the program. For any future public bike program (e.g., bike share, police service bikes, city fleet), the City of Toronto should utilize local mechanics and training programs to create local job opportunities.
- **Be cautious about Skilled Trade prescription:** LEF advised that they would not want to see a whole new massive amount of administrative work and barriers be created through prescription as a Skilled Trade. There should not be any additional burden for trainers or for people who want to be trained.
- **Support bike mechanic training organizations financially:** LEF gets funding to deliver the program one session or one year at a time, often through a changing combination of government agencies and funders. Finding the funding is a part-time job in and of itself. The City of Toronto and higher levels of government should fund or help secure longer-term, more reliable funding to develop consistent training.

### **Support bike mechanic training programs**

- **Design programs that combine bike mechanics with another related skillset:** LEF mentioned the idea of teaching another skill alongside bike mechanics such as winter sport technician skills. This could attract more people to bike mechanics if they are able find a year-round job with an employer that offers bike and winter sport technician services

- **Attract university students to the profession:** If jobs remain largely seasonal, then LEF suggested that employers could greatly benefit from attracting and hiring university students with the suggestion that the industry focus their training and hiring efforts on this demographic.

### Support employers of bike mechanics

- **Support employers to create permanent positions:** LEF mentioned that provincial funding could help employers transition seasonal temporary jobs to permanent ones.





# Appendix D

# Canadian Electric Bike Association Bike Technician Certification Training Overview

Canada | [www.cebassociation.com](http://www.cebassociation.com) | [info@cebassociation.ca](mailto:info@cebassociation.ca)

## Program Curriculum



### Curriculum level

Tier 3: Specialized Topic – E-Bikes



### Type of bike

Electric Bikes



### Program Length

12 hours over 2 days

### What topics does the curriculum cover?

The curriculum covers all electrical components of the electric vehicle. The primary focus is electric bicycles, but the curriculum will carry over to most electric micro mobility devices.

### What are the learning outcomes of the curriculum?

The curriculum will give students the ability to diagnose the electrical system for electric bicycles as well as electric micro mobility devices quickly, accurately and most importantly safely.

### What experiential teaching methods are used?

All learning is hands-on, using tools and electric components. All instruction is provided in an online format.

### How often is the curriculum reviewed and updated?

The curriculum has been vetted extensively and we are constantly making improvements based on feedback we ask for at the end of each training session. The course is constantly evolving and changes are made from course to course as the industry is evolving.

## Program Delivery



### Frequency

Three times per year from Sept. to Feb



### Number of participants

5 per program  
15 per year



### Cost to Participants

Zero cost to participants. Funding is provided to cover program costs.

## Who is involved in developing & delivering the training?

Canadian Electric Bicycle Association - CEBA is the developer and deliverer of the training.

## Who certifies the trainers?

The Canadian Electric Bicycle Association

## Where is the program delivered?

Prior to COVID-19 the program was in person however it has shifted to an online format that is extremely effective and able to be taught worldwide.

## Program Promotion

### How is the program promoted to prospective participants?

Currently the program is promoted online through the CEBA website and only available to CEBA members.

### How are graduates of the program promoted to prospective employers?

Our organization would reach out to distributors and bike shops to raise awareness of the program. We are in the process of building a database of certified technicians.

## Recommended Policy Actions to Support the E-Bike Mechanic Workforce

CEBA discussed some of the potential enabling government policies that could support bike mechanic programs, attract more people to the industry, and grow the capacity of the bike mechanic workforce. These policy actions are presented below.

### Support bike mechanic training programs

- **Recognize and promote the programs:** Have E-bike mechanic programs recognized as a skilled trade and promote mechanic programs through a media campaign.

### Attract more prospective bike mechanics

- **Recognize and promote the profession:** Recognition as a trade and a media campaign would attract more mechanics to the profession as most people do not know any E-bike technician training program exists and is available for them.

### Support employers of e-bike mechanics

- **Promote the training offered by CEBA:** Prior to the Canadian Electric Bicycle Association offering e-bike technician training most distributors did not provide any formal training and currently still do not offer any formal training program on how to quickly, accurately and



safely diagnose e-bikes. If they do offer a program it's only for their models of e-bikes and limits the store's ability to take on new business with other brands that need service. Currently employers do not have any way to train E-bike technicians so hiring someone to be an E-bike technician is very limited and not readily available for hire.

## CEBA E-Bike Technician Certification Training Program Curriculum

1. Introduction
2. Safety
3. E-Bike Overview
4. Tools & Equipment
5. Electrical Theory
6. Connectors
7. E-Bike Set Up
8. Diagnostics
9. Connector & Wiring Repairs
10. Batteries
11. Chargers
12. Diagnosing Motors
13. Diagnosing Controllers
14. Diagnosing Throttles & Controls
15. Displays & Auxiliary items



# Appendix E



# Cycle Toronto Cargo Bike Courier Program Training Overview

Toronto, Ontario | [www.cycleto.ca](http://www.cycleto.ca) | [info@cycleto.ca](mailto:info@cycleto.ca)

## Program Curriculum



### Curriculum level

Intermediate to advanced



### Type of bike

Cargo and e-cargo bikes



### Program Length

2 sessions completed in 1-2 days.

## What topics does the curriculum cover?

In-class learning	Practical learning
- Getting ready to ride	- A-B-C Quick check on the bike
- Rights & responsibilities	- Helmet fit
- Riding in your city	- Seat height check
- Sharing road space	- Kick stand
- Using cycling infrastructure	- Closed course riding exercises
- In case of a collision	
- Biking in all weather	

## What are the learning outcomes of the curriculum?

After completing the program, students will be able to ride a cargo bike confidently and safely in live on-street environments.

## What experiential teaching methods are used?

The practical portion of this cargo bike training is a series of closed-course exercises that test the riders' ability to turn, stop and navigate course obstacles. The riders are also taken through the process of an A-B-C Quick check, helmet fit, seat height check, and kick stand use.

## How often is the curriculum reviewed and updated?

Cycle Toronto first conducted the program in 2020 with the e-cargo bike couriers at FedEx Ground and Express. They are hoping to further refine the in-class and practical learning components in 2023 with another local bike courier company that is interested in the program.

## Program Delivery



### Frequency

Once every few years



### Number of participants

?



### Cost to Participants

?

### Who is involved in developing & delivering the training?

**Cycle Toronto** - Cycle Toronto develops and delivers the curriculum to students. It also promotes the program to organizational partners who want to train their bike couriers.

### Who certifies the trainers?

There is no formal certification process. Currently, Cycle Toronto staff are the only ones delivering the training.

### Where is the program delivered?

The program is delivered at Cycle Toronto and/or the participating organization's location. Program promotion.

### How is the program promoted to prospective students?

Cycle Toronto reaches out and engages with individual organizations.

### How are graduates of the program promoted to prospective employers?

Cycle Toronto works directly with employers to train bike courier staff.

## Recommended Policy Actions to Support Bike Training Programs

### How can government support bike training programs like yours?

While the goal is to avoid unnecessary licensing and registration, offering organizations and employers a standardized rider training program could help further professionalize the industry especially for last mile deliveries. Having the government help fund and endorse programs like ours (and offer subsidies where possible) would be of importance.

### How can government support student interest and uptake in programs like yours?

Helping promote the program to organizations and industry.

## How can government support would-be employers of the graduates of programs like yours?

Continuing to promote active transportation and build a network of connected bikeways so it's safer for all road users and bike couriers. Look at offering further subsidies for e-bikes and e-cargo bikes to encourage a transition to smaller vehicles that contribute less to traffic congestion and GHG emissions.



# Appendix F



# Tier 1 Curriculum Topics

The following table lists the Tier 1 bike mechanic curriculums that were researched as part of the national and international bike mechanic program scan. Below the table is one curriculum which combines the topics and lessons taught in all the curriculums researched.

## Tier 1 Curriculums Scanned

Curriculum	Program(s) that use this curriculum
Bike Teacher - Beginner class	<a href="#">Bike Teacher - Beginner class</a>
CyTech: Home mechanic	<a href="#">CyTech: Home mechanic</a>
City & Guilds - Bike Maintenance Beginners	<a href="#">City &amp; Guilds - Bike Maintenance Beginners</a>
UBI: Introduction to Bicycle Maintenance	<a href="#">UBI: Introduction to Bicycle Maintenance</a>
OCAD: Introduction to Bicycle Repair & Maintenance	<a href="#">OCAD: Introduction to Bicycle Repair &amp; Maintenance</a>

## Tier 1 Curriculum Topics

Curriculum Topics and Sub-topics	
<b>General Bike Overview</b> <ul style="list-style-type: none"> <li>• Orientation</li> <li>• A simple overview of bike design</li> <li>• Naming the parts of the bike</li> <li>• Different types of bikes</li> <li>• Basic safety check</li> <li>• Bounce test</li> <li>• Crucial bolt checks</li> <li>• Rider Positioning guidelines and setup</li> </ul>	<b>Pedals</b> <ul style="list-style-type: none"> <li>• Pedal Replacement</li> </ul>
<b>Basic Mechanical Skills</b> <ul style="list-style-type: none"> <li>• Introduction to tools</li> </ul>	<b>Cranksets</b> <ul style="list-style-type: none"> <li>• Drive train overview</li> <li>• Bottom Bracket and Crankset Overhaul / Replacement</li> </ul>

<b>Tires &amp; Tubes</b> <ul style="list-style-type: none"> <li>• Tire removal and installation</li> <li>• Different types of flats and their causes</li> <li>• Flat Tire Repair</li> <li>• Assessing rim and rim-tape for damage</li> <li>• Reading wheel and tire sizes (3 different ways)</li> <li>• Determining air pressure requirements</li> <li>• Rim/tire compatibility</li> </ul>	<b>Derailleur Systems</b> <ul style="list-style-type: none"> <li>• Derailleur System Adjustment and Maintenance</li> <li>• Cable and Housing Replacement and Maintenance</li> </ul>
<b>Rear Sprockets</b> <ul style="list-style-type: none"> <li>• An introduction to gear set-up</li> </ul>	<b>Chains</b> <ul style="list-style-type: none"> <li>• Chain Repair</li> </ul>
<b>Hubs</b> <ul style="list-style-type: none"> <li>• Hubs Overview and Adjustment</li> </ul>	<b>Handlebars, Stems, Saddles, &amp; Seatposts</b> <ul style="list-style-type: none"> <li>• Stem and Handlebars overview and adjustment</li> </ul>
<b>Wheels</b> <ul style="list-style-type: none"> <li>• Removing and installing front and rear wheels</li> <li>• Wheel Truing</li> </ul>	<b>Brakes</b> <ul style="list-style-type: none"> <li>• An introduction to brake set-up</li> <li>• Testing braking system</li> <li>• Brake Adjustment and maintenance</li> <li>• Brake Pad Replacement</li> </ul>
<b>Headsets</b> <ul style="list-style-type: none"> <li>• Headset Overview &amp; Replacement</li> </ul>	<b>On-Ride Repair</b> <ul style="list-style-type: none"> <li>• Emergency Roadside Repair</li> </ul>
<b>Suspension</b> <ul style="list-style-type: none"> <li>• Basic Suspension Setup</li> </ul>	<b>Bike Wash</b> <ul style="list-style-type: none"> <li>• Essential care, cleaning, and lubrication</li> </ul>





# Appendix G

## Tier 2 Curriculum Topics

The following table lists the Tier 2 bike mechanic curriculums that were researched as part of the national and international bike mechanic program scan. Below the table is one curriculum which combines the topics and lessons taught in all of the curriculums researched.

### Tier 2 Curriculums Scanned

Curriculum	Program(s) that use this curriculum
Park Tool Big Blue Book of Bicycle Repair	<a href="#">Bike Teacher - 70 hour class</a> <a href="#">Bike Teacher - 40 Hour Class</a>
Cytech Technical One & Two	<a href="#">CyTech: Technical One &amp; Two</a> <a href="#">CyTech: Technical One</a> <a href="#">CyTech: Technical Two</a>
City & Guilds Level 2 Cycle Mechanic	<a href="#">City &amp; Guilds - Level 2 Cycle Mechanic</a>
Bicycle Mechanic Certification Part-1	<a href="#">PBMA Certification Test</a> <a href="#">WBI: Pro Mechanics Course: MECH 1230</a>
Bicycle Mechanic Certification Part-2	
UBI: Professional Repair & Shop Operation	<a href="#">UBI: Professional Repair &amp; Shop Operation</a>
Quebec Bicycle Mechanic AEP	<a href="#">Quebec Bicycle Mechanic AEP</a>
Quality Bicycle Products U of Q Training: Professional Bicycle Service	<a href="#">Quality Bicycle Products U of Q Training: Professional Bicycle Service</a>

## Tier 2 Curriculum Topics

### Curriculum Topics and Sub-topics

<p><b>General Bike Overview</b></p> <ul style="list-style-type: none"> <li>• Bicycle Component Standards and Specifications</li> <li>• Finding technical information on bicycles</li> <li>• Proper bicycle setup and safety checks</li> <li>• Physiology Alignment via Bike Geometry and Frame Fit</li> <li>• Adjustment, set-up &amp; frame alignment</li> <li>• Systematic bike check</li> <li>• Assemble a bike</li> <li>• Carry out the overall tune-up of a bicycle</li> <li>• Full bike re-build &amp; final assessments</li> </ul>	<p><b>Rear Sprockets</b></p> <ul style="list-style-type: none"> <li>• Remove, replace &amp; configure cassette/freewheel</li> <li>• Cassette Sprocket Removal &amp; Installation</li> <li>• Freewheel Sprocket Removal &amp; Installation</li> <li>• Single-Speed Removal</li> <li>• Sprocket Inspection &amp; Cleaning</li> <li>• Fixed Gear Sprockets</li> </ul>
<p><b>Bike Shop Operations &amp; Practices</b></p> <p>Workshop induction &amp; orientation</p> <ul style="list-style-type: none"> <li>• Employment skills <ul style="list-style-type: none"> <li>• Communication, time-management, conflict management and working under pressure</li> </ul> </li> <li>• Health &amp; Safety in the workshop <ul style="list-style-type: none"> <li>• Pre-delivery inspections</li> <li>• Workshop practices</li> <li>• WHMIS Training</li> </ul> </li> <li>• Customer Service <ul style="list-style-type: none"> <li>• Sales and Pricing of Merchandise</li> <li>• Customer Service and Sales procedures</li> <li>• Service Writing</li> <li>• Consumer Protection Act</li> </ul> </li> <li>• Suppliers <ul style="list-style-type: none"> <li>• Generating accounts with Local Partners</li> <li>• Sources of Supply</li> </ul> </li> <li>• Employment opportunities in the industry <ul style="list-style-type: none"> <li>• Repair shops, retailers, wholesalers, assemblers, manufacturers</li> <li>• Starting a small repair shop/service (e.g., Start-Up Costs, Tool Selection)</li> </ul> </li> <li>• Bike mechanics and the environment <ul style="list-style-type: none"> <li>• Waste reduction</li> <li>• Hazardous waste management</li> </ul> </li> </ul>	<p><b>Basic Mechanical Skills</b></p> <ul style="list-style-type: none"> <li>• Instructor's Introduction to Class</li> <li>• Tools &amp; Tool Selection <ul style="list-style-type: none"> <li>• Measuring Tools</li> <li>• Repair Stands</li> <li>• Torque wrenches (review of torque, proper use of torque wrenches, and torque wrench settings)</li> <li>• Chemicals (Lubrication, solvents, ThreadLockers, &amp; Cleaners)</li> <li>• Cutting Tools</li> <li>• Shop Tools</li> </ul> </li> <li>• Bearing Theory, bearing systems, and conventional Bearing Techniques</li> <li>• Thread Specifications</li> <li>• Principles of mechanics, diagnosing &amp; Solving Mechanical Problems</li> <li>• Maintenance schedule</li> <li>• Safety &amp; Liability</li> </ul>
<p><b>Tires &amp; Tubes</b></p> <ul style="list-style-type: none"> <li>• Tire/Rim Compatibility</li> <li>• Removal of Tire &amp; Tube from Rim</li> <li>• Inner Tube Inspection <ul style="list-style-type: none"> <li>• Cut at Valve Vase</li> <li>• Leaky Valve Core</li> <li>• Large Shredded Hole</li> <li>• Hole on the Rim Strip Side of Tube</li> <li>• Long Cut or Rip</li> <li>• Single Puncture or Small Hole</li> <li>• Double Slits</li> </ul> </li> <li>• Tire Inspection and repair <ul style="list-style-type: none"> <li>• Tire wear (casing, bead)</li> </ul> </li> <li>• Rim Strip</li> </ul>	<p><b>Hubs</b></p> <ul style="list-style-type: none"> <li>• Hub Adjustment <ul style="list-style-type: none"> <li>• Loose ball systems</li> <li>• Rear Sprockets</li> <li>• Cassette / Freewheel</li> <li>• Install / Remove</li> <li>• Fixed Gear</li> <li>• Derailleurs - fundamentals of</li> <li>• Limit screws</li> <li>• Cable tension</li> <li>• Index adjust</li> <li>• Housing length / routing / type &amp; construction</li> <li>• Wear and service</li> </ul> </li> </ul>

<ul style="list-style-type: none"> <li>• Inner Tube Repair <ul style="list-style-type: none"> <li>• Pre-Glued Patch Repair</li> <li>• Inner Tube Repair with Self-Vulcanizing Patches</li> </ul> </li> <li>• Inner Tube Sealants</li> <li>• Tire Liners</li> <li>• Temporary Tire Repair with Tire Boot</li> <li>• Inner Tube Valves</li> <li>• Tire &amp; Tube Sizing</li> <li>• Tubeless Systems <ul style="list-style-type: none"> <li>• Tubeless tire installation (sealants, rim compatibilities)</li> </ul> </li> <li>• Tubeless Conversion Systems</li> <li>• Tubular Tires</li> </ul>	<ul style="list-style-type: none"> <li>• Cartridge bearing (remove/ install)</li> <li>• Freehub / driver compatibility</li> <li>• Service symptoms</li> <li>• Remove, replace &amp; service loose and cartridge bearings</li> <li>• Sturmey Archer and Nexus</li> <li>• Hub Bearing Service: Adjustable Cup-and-Cone Type <ul style="list-style-type: none"> <li>• Disassembly</li> <li>• Parts Inspection</li> <li>• Assembly</li> <li>• Hub Adjustment</li> </ul> </li> <li>• Oversized Axle Service: Campagnolo® and Shimano® <ul style="list-style-type: none"> <li>• Hub Adjustment: Solid Axle Cup-and-Cone</li> </ul> </li> <li>• Freehub Removal &amp; Installation</li> <li>• Cartridge Bearing Hubs <ul style="list-style-type: none"> <li>• Mavic® Hub (Level 1 Type)</li> </ul> </li> <li>• Bearing Inspection &amp; Assessment</li> <li>• Conventional Bearings</li> <li>• Cartridge Bearings</li> <li>• Hub &amp; Axle Sets</li> <li>• Freewheels &amp; Freehubs</li> </ul>
<p><b>Wheels</b></p> <ul style="list-style-type: none"> <li>• Wheel Building (Part 1: theory and practice)</li> <li>• Wheel Building (Part 2: build and assessment)</li> <li>• Wheel Truing Overview <ul style="list-style-type: none"> <li>• Lateral True</li> <li>• Radial True</li> <li>• Rim Centering (Dish)</li> <li>• Tension</li> </ul> </li> <li>• Truing Procedures <ul style="list-style-type: none"> <li>• Lateral Truing</li> <li>• Radial Truing</li> <li>• Wheel Centering (Dishing)</li> <li>• Spoke Tensioning</li> </ul> </li> <li>• Assessing wear and damage</li> <li>• Broken &amp; Damaged Spoke Replacement</li> <li>• Wheel removal and Installation <ul style="list-style-type: none"> <li>• Front Wheels with Disc Brakes</li> <li>• Solid Axle Types</li> <li>• Thru-Axle Systems</li> </ul> </li> <li>• Wheel Wear, Damage, &amp; Repair</li> <li>• Wheel Lacing</li> </ul>	<p><b>Chains</b></p> <ul style="list-style-type: none"> <li>• Remove, replace &amp; configure chain</li> <li>• Chain Sizing for Derailleur Bikes <ul style="list-style-type: none"> <li>• Chain Sizing with Chain Retention System</li> <li>• Chain Removal</li> </ul> </li> <li>• New Chain Installation on Derailleur Bikes <ul style="list-style-type: none"> <li>• Shimano® and FSA® Chains with Connecting Rivet</li> <li>• Campagnolo® 10-speed Chain</li> <li>• Campagnolo® 11-speed Chain (Setting or Peening of 11-Speed Coupling Rivet)</li> <li>• Chains with Master Link</li> <li>• Chain with Reusable Rivets</li> <li>• Tight Link Repair</li> </ul> </li> <li>• Chain Sizing and Tension Adjustment: Two-Sprocket Bicycles <ul style="list-style-type: none"> <li>• Chain Tension: Two-Sprocket Bikes</li> <li>• Chain Tension: Two-Sprocket Bikes with Chain Tension Idler Device</li> <li>• Chain Tension: Eccentric Bottom Brackets on Tandem and Single-Speeds (Tandem Crank Synchronizing)</li> </ul> </li> <li>• Chain Wear and Damage</li> <li>• Chain Cleaning</li> <li>• Chain Lubrication</li> <li>• Understanding Chain parts <ul style="list-style-type: none"> <li>• Rivet</li> <li>• Quick Link</li> <li>• Length / size</li> </ul> </li> <li>• Chain / Cassette</li> </ul>

	<ul style="list-style-type: none"> <li>• Wear</li> <li>• Replacement</li> <li>• Compatibility</li> </ul>
<p><b>Cranksets</b></p> <ul style="list-style-type: none"> <li>• Crank Types</li> <li>• Removal and Installation <ul style="list-style-type: none"> <li>• 3 piece</li> <li>• Two piece compression slotted</li> <li>• Two piece wave washer</li> <li>• Two piece self-extracting</li> <li>• Two piece pre-load adjust</li> <li>• Threaded BB</li> <li>• Threaded cartridge bb</li> </ul> </li> <li>• Crank Removal &amp; Installation <ul style="list-style-type: none"> <li>• Self-Extracting Crank Systems</li> <li>• Three-Piece Cranks: Octalink®, ISIS Drive, Square Spindle, Power Spline™, and Power Drive™</li> <li>• Two-Piece Compression Slotted Cranks: Shimano® and FSA®</li> <li>• Two-Piece Cranks Using Wave Washer: FSA® MegaExo® and SRAM® GXP® PF</li> <li>• Two-Piece Self-Extracting Cranks: Truvativ®, SRAM® GXP®</li> <li>• Two-Piece Pre-Load Adjuster Nut Cranks: Truvativ®, SRAM® BB30 I-A, and FSA® Afterburner™</li> <li>• Campagnolo® and Fulcrum® Ultra-Torque® Cranks</li> <li>• Campagnolo® Power Torque™ Cranks</li> <li>• Specialized® S-Works® Cranks</li> </ul> </li> <li>• Fitting cartridge and press-fit bottom brackets</li> <li>• Bottom brackets (adjustable, cartridge &amp; external); cranks; facing bottom brackets</li> <li>• Installing bicycle bearings and doing maintenance for bottom brackets <ul style="list-style-type: none"> <li>• Understanding bottom Bracket System Types</li> <li>• Threaded Standards</li> <li>• Non-Threaded Standards (BB86 and BB92, BB90 and BB95, BB30, PF30, 386EVO, BBright)</li> </ul> </li> <li>• Bottom Bracket Bearing Service for Non-Threaded Shells <ul style="list-style-type: none"> <li>• PF30 and BBright® Bearings</li> <li>• BB30 and PF30 Adaptors for Non-BB30 Cranks</li> <li>• BB86, BB90, BB92, BB95 Bearings (Shimano® PF and GXP® PF)</li> <li>• Campagnolo® Ultra-Torque® and Fulcrum® Bearings</li> <li>• Campagnolo® Power Torque™ Bearings</li> <li>• Campagnolo® BB30 Bearing Adaptors</li> </ul> </li> <li>• Bottom Bracket Bearing Service for Threaded Shells</li> </ul>	<p><b>Chains</b></p> <ul style="list-style-type: none"> <li>• Remove, replace &amp; configure chain</li> <li>• Chain Sizing for Derailleur Bikes <ul style="list-style-type: none"> <li>• Chain Sizing with Chain Retention System</li> </ul> </li> <li>• Chain Removal</li> <li>• New Chain Installation on Derailleur Bikes <ul style="list-style-type: none"> <li>• Shimano® and FSA® Chains with Connecting Rivet</li> <li>• Campagnolo® 10-speed Chain</li> <li>• Campagnolo® 11-speed Chain (Setting or Peening of 11-Speed Coupling Rivet)</li> <li>• Chains with Master Link</li> <li>• Chain with Reusable Rivets</li> <li>• Tight Link Repair</li> </ul> </li> <li>• Chain Sizing and Tension Adjustment: Two-Sprocket Bicycles <ul style="list-style-type: none"> <li>• Chain Tension: Two-Sprocket Bikes</li> <li>• Chain Tension: Two-Sprocket Bikes with Chain Tension Idler Device</li> <li>• Chain Tension: Eccentric Bottom Brackets on Tandem and Single-Speeds (Tandem Crank Synchronizing)</li> </ul> </li> <li>• Chain Wear and Damage</li> <li>• Chain Cleaning</li> <li>• Chain Lubrication</li> <li>• understanding Chain parts <ul style="list-style-type: none"> <li>• Rivet</li> <li>• Quick Link</li> <li>• Length / size</li> </ul> </li> <li>• Chain / Cassette</li> </ul>

<ul style="list-style-type: none"> <li>• Threaded Bottom Bracket with Two-Piece Cranks</li> <li>• Threaded Cartridge Bottom Brackets: ISIS Drive, Octalink®, and Square Spindle</li> <li>• Threaded Adjustable Bottom Bracket Bearings (Bottom Bracket Removal, Bottom Bracket Installation, Bottom Bracket Adjustment)</li> </ul>	
<p><b>Derailleur Systems</b></p> <ul style="list-style-type: none"> <li>• Remove, replace &amp; configure cables, shifters and derailleurs</li> <li>• Cable System <ul style="list-style-type: none"> <li>• Cable Housing Length and Routing</li> <li>• Cable Lubrication</li> </ul> </li> <li>• Shift Levers <ul style="list-style-type: none"> <li>• Flat Bar Trigger Shifters</li> <li>• Twist Grip Shifters</li> <li>• Above-the-Bar Shifters</li> <li>• Drop Bar Integral Brake / Shift Levers (Campagnolo)</li> <li>• Down Tube Shifters</li> <li>• Bar End Shifters</li> </ul> </li> <li>• Front Derailleur <ul style="list-style-type: none"> <li>• Derailleur System Set-up</li> <li>• Derailleur System Troubleshooting</li> <li>• Derailleur Cable &amp; Housing</li> <li>• Height Adjustment</li> <li>• Rotational Adjustment</li> <li>• Limit Screw Adjustment (L-Limit Screw &amp; H-Limit Screw)</li> <li>• Front Index Adjustment: Three-Chainring Bikes</li> <li>• Front Index Adjustment: Two-Chainring Bikes</li> <li>• Front Derailleur Performance</li> <li>• Shimano® Front Derailleur FD-9000 (Shimano® FD-9000 Front Derailleur Adjustment)</li> </ul> </li> <li>• Rear Derailleur <ul style="list-style-type: none"> <li>• R Derailleur - replace / align</li> <li>• Derailleur Capacity and Maximum Sprocket Size</li> <li>• Derailleur Installation</li> <li>• Derailleur Cable Attachment</li> <li>• Limit Screw Adjustment (H-Limit Screw, L-Limit Screw, B-Screw Adjustment)</li> <li>• Index Adjustment (Shimano® Rapid Rise™ Derailleurs)</li> <li>• Clutch System Rear Derailleurs</li> </ul> </li> </ul>	<p><b>Caliper Disc Brake Systems</b></p> <ul style="list-style-type: none"> <li>• Disc Brake systems <ul style="list-style-type: none"> <li>• Levers</li> <li>• Cable System</li> <li>• Lube</li> <li>• Housing length / type</li> <li>• Pads (wear, install, remove)</li> <li>• Mechanical disc brake caliper alignment</li> <li>• Setup and installation (bedding process - disc)</li> <li>• Mineral vs DOT (fluids and safety)</li> <li>• Bleeding systems</li> <li>• Setup and installation</li> <li>• Disc pad / rotor wear</li> </ul> </li> <li>• Perform installation, maintenance and repair of a braking system</li> <li>• Brake Pads</li> <li>• Disc Brake Rotors</li> <li>• Hydraulic Brake Systems <ul style="list-style-type: none"> <li>• Hydraulic Brake Levers</li> <li>• Hydraulic Disc Calipers (Hydraulic Brake Caliper Alignment)</li> </ul> </li> <li>• Hydraulic Brake Fluid Service <ul style="list-style-type: none"> <li>• Shimano® Hydraulic Brakes (Brake Pad Removal and Replacement, Brake Bleeding)</li> <li>• Magura® Hydraulic Caliper Brakes</li> <li>• Hayes® Hydraulic Caliper Brakes</li> <li>• Avid® Hydraulic Caliper Brakes</li> <li>• Tektro® Hydraulic Caliper Brakes</li> <li>• Hydraulic bleeding</li> </ul> </li> <li>• Mechanical Disc Brake Systems <ul style="list-style-type: none"> <li>• Brake Lever</li> <li>• Caliper Pad Alignment and Clearance</li> <li>• Shimano® Mechanical Disc Brakes</li> <li>• Tektro® Mechanical Disc Brakes</li> <li>• Hayes® Mechanical Disc Brakes</li> <li>• Avid® Mechanical Disc Brakes</li> </ul> </li> </ul>

<ul style="list-style-type: none"> <li>• Derailleur Hanger Alignment &amp; Repair/ Hanger Alignment</li> <li>• Derailleur Wear &amp; Service <ul style="list-style-type: none"> <li>• Troubleshooting Derailleur Systems</li> </ul> </li> <li>• Derailleur systems advanced <ul style="list-style-type: none"> <li>• Clutch</li> <li>• Rear capacity / max sprocket</li> <li>• Front derailleur compatibility</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• Electronic Shift Derailleurs</li> <li>• Shimano Di2 Intelligent System (Shifters, Di2 Battery, Front Derailleur, Rear Derailleur, Crash Feature)</li> <li>• Campagnolo EPS Derailleurs: Super Record, Record, and Athena (EPS Rear Derailleur Adjustment, EPS Front Derailleur Adjustment, EPS Derailleur Ride-Setting, Crash Mode and Ride Home Mode, EPS Battery and Charging Unit, Troubleshooting)</li> </ul>	<p><b>Internal Gear Systems</b></p> <ul style="list-style-type: none"> <li>• Internal hub gears <ul style="list-style-type: none"> <li>• Sturmey Archer</li> <li>• SRAM® DualDrive™</li> <li>• SRAM® I-Motion® 9</li> <li>• Shimano® Nexus Inter-7®, Nexus Inter-8®, &amp; Alfine® Hubs / Nexus</li> </ul> </li> </ul>
<p><b>Caliper Rim Brake Systems</b></p> <ul style="list-style-type: none"> <li>• Rim Brake systems setup and repairs <ul style="list-style-type: none"> <li>• Levers</li> <li>• Cable System</li> <li>• Lube</li> <li>• Housing length / type</li> <li>• Pads (wear, install, remove)</li> <li>• Variances (single pivot, dual, linear, side)</li> </ul> </li> <li>• Brake Levers <ul style="list-style-type: none"> <li>• Upright Handlebar Brake Levers</li> <li>• Drop Bar Brake Levers</li> </ul> </li> <li>• Cable System <ul style="list-style-type: none"> <li>• Cable Lubrication</li> <li>• Cable Housing Length</li> </ul> </li> <li>• Caliper Rim Brakes <ul style="list-style-type: none"> <li>• Brake Pads (Brake Pad Alignment, Vertical Height Alignment, Tangential Alignment Vertical Face Alignment, Pad Toe)</li> <li>• Linear-Pull Caliper Adjustment</li> <li>• Cantilever Caliper Adjustment</li> <li>• Dual-Pivot Caliper Adjustment</li> <li>• Side-Pull Caliper Adjustment</li> </ul> </li> </ul>	<p><b>Headsets</b></p> <ul style="list-style-type: none"> <li>• Headset <ul style="list-style-type: none"> <li>• Overview</li> <li>• Headset Types</li> </ul> </li> <li>• Headset Service <ul style="list-style-type: none"> <li>• Threadless Headset Service</li> <li>• Threadless Headset Adjustment</li> <li>• Threaded Headset Service</li> <li>• Threaded Headset Adjustment</li> <li>• Installation press in cup</li> <li>• Installation drop in bearings</li> <li>• Adjustment (each system)</li> <li>• Stem</li> </ul> </li> <li>• Headset Replacement &amp; Installation <ul style="list-style-type: none"> <li>• Headset Stack Height</li> <li>• Pressed Headset Removal</li> <li>• Pressed Headset Installation</li> <li>• Fork Crown Race Installation</li> </ul> </li> <li>• Fork Steering Column Sizing <ul style="list-style-type: none"> <li>• Threadless Steering Columns (Star Nut and Compression Plug Installation)</li> <li>• Threaded Steering Columns</li> </ul> </li> </ul>

<p><b>Handlebars, Stems, Saddles, &amp; Seatposts</b></p> <ul style="list-style-type: none"> <li>• Upright Handlebars <ul style="list-style-type: none"> <li>• Bar Grips</li> </ul> </li> <li>• Drop Style Handlebars (Road Bars) <ul style="list-style-type: none"> <li>• Clip-On and Aero Handlebars</li> </ul> </li> <li>• Stems</li> <li>• Quill Stems</li> <li>• Threadless Stems</li> <li>• Saddles</li> <li>• Seatposts <ul style="list-style-type: none"> <li>• Damage</li> <li>• Removal of stuck unit</li> </ul> </li> </ul>	<p><b>Suspension</b></p> <ul style="list-style-type: none"> <li>• Spring Systems <ul style="list-style-type: none"> <li>• Helical Compression Springs</li> <li>• Elastomer and Rubber Springs</li> <li>• Air (Gas) Springs</li> </ul> </li> <li>• Shocks (Dampers)</li> <li>• Suspension Linkages</li> <li>• Suspension servicing and maintenance <ul style="list-style-type: none"> <li>• Service &amp; Tuning</li> <li>• Spring Preload</li> <li>• Fluid Viscosity</li> <li>• Valving</li> <li>• Linkage</li> <li>• Cyclist Posture</li> <li>• Tire Contact</li> </ul> </li> </ul>
<p><b>Frame &amp; Fork</b></p> <ul style="list-style-type: none"> <li>• Frame Preparation and Manufacturing Methods</li> <li>• Frame Alignment</li> <li>• Frame Materials</li> <li>• Frame Components <ul style="list-style-type: none"> <li>• Fork</li> <li>• Head Tube</li> <li>• Top Tube</li> <li>• Down Tube</li> <li>• Seat Tube</li> <li>• Chain Stay</li> <li>• Seat Stay</li> <li>• Dropouts</li> <li>• Bottom Bracket Shell</li> <li>• Swing Arm</li> </ul> </li> <li>• Frame Construction &amp; Service <ul style="list-style-type: none"> <li>• Steel</li> <li>• Aluminum</li> <li>• Titanium</li> <li>• Carbon Fiber</li> </ul> </li> <li>• Frame &amp; Assembly <ul style="list-style-type: none"> <li>• Frame prep</li> <li>• Cutting tools / guides</li> </ul> </li> <li>• Maintain and repair a frame and steering system <a href="http://www.parktool.com/trade-resources/become-a-park-tool-school/the-bbb-3tg-instructors-guide-table-of-contents">http://www.parktool.com/trade-resources/become-a-park-tool-school/the-bbb-3tg-instructors-guide-table-of-contents</a></li> </ul>	<p><b>On-Ride Repair</b></p> <ul style="list-style-type: none"> <li>• Tool Choices</li> <li>• Repair Procedures <ul style="list-style-type: none"> <li>• Flat Tire</li> <li>• Cut or Ripped Tire</li> <li>• Broken Spoke</li> <li>• Dented Rim</li> <li>• Broken Chains</li> <li>• Chain Suck</li> <li>• Twisted Chain</li> <li>• Squeaky and Noisy Chain</li> <li>• Rear Derailleur Shifting Into the Spokes or Frame</li> <li>• Derailleur Not Indexing Properly</li> <li>• Broken Derailleur Body, Cage, or Hanger</li> <li>• Missing Derailleur Pulleys</li> <li>• Front Derailleur Cage Bent or Twisted</li> <li>• Crank Falling Off</li> <li>• Pedals Falling Off</li> <li>• Bent Crank</li> <li>• Bottom Bracket Loose or Falling Apart</li> <li>• Broken Derailleur Cable</li> <li>• Broken Brake Cable</li> <li>• Twisted or Bent Handlebars or Stem</li> <li>• Bent Frame or Fork</li> <li>• Bent Saddle or Seat Post</li> </ul> </li> </ul>
<p><b>Bike Wash</b></p> <ul style="list-style-type: none"> <li>• Cleaning methods (in and outside)</li> <li>• Materials needed</li> <li>• Lubrication of bicycle</li> </ul>	<p><b>Pedals</b></p> <ul style="list-style-type: none"> <li>• Pedal installation, removal, and replacement</li> <li>• Drivetrain systems setup and repairs</li> <li>• Assessing damage to Crank Pedal Threads</li> <li>• Pedal Bearing Service</li> </ul>



# Appendix H



## Tier 3 Curriculum Topics

The following table lists the Tier 3 bike mechanic curriculums that were researched as part of the national and international bike mechanic program scan, organized by topic.

### Tier 3 Curriculums Scanned

Topic	# of programs on this topic	Program(s) that cover this topic
Brakes	3	<a href="#">UBI Continuing Education Seminar: Disc Brake Seminar</a> <a href="#">Quality Bicycle Products U of Q Training: Advanced Topics: Hydraulic Brakes</a> <a href="#">CyTech: Technical Three</a>
E-Bike	3	<a href="#">Quality Bicycle Products U of Q Training: E-Bike Fundamentals</a> <a href="#">Quality Bicycle Products U of Q Training: Comprehensive Ebike Service</a> <a href="#">CyTech: Technical E-Bike</a>
Electronic gear systems	2	<a href="#">UBI Continuing Education Seminar: Shimano Di2 course</a> <a href="#">CyTech: Technical Three</a>
Seatpost	1	<a href="#">UBI Continuing Education Seminar: Dropper post seminar</a>
Suspension	4	<a href="#">UBI: Certified Suspension Technician</a> <a href="#">UBI Continuing Education Seminar: FOX Master Tech Clinic</a> <a href="#">Quality Bicycle Products U of Q Training: Advanced Topics: Suspension</a> <a href="#">CyTech: Technical Three</a>
Tubular & tubeless tire installation	1	<a href="#">CyTech: Technical Three</a>
Wheel building	3	<a href="#">UBI: UBI/DT Swiss certified Wheel Builder</a> <a href="#">CyTech: Technical Three</a> <a href="#">WBI: Pro Wheel Building Course: MECH 1400</a>

