FINAL ASSESSMENT REPORT

Institutional Quality Assurance Program (IQAP) Review

Automotive & Vehicle Engineering Technology (AVT)

Date of Review: May 18 - 19, 2021

In accordance with the University Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external evaluation and the internal response and assessments of the Bachelor of Technology (B.Tech) Automotive and Vehicle Engineering Technology (AVT) Program. This report identifies the significant strengths of the program, together with opportunities for program improvement and enhancement, and it sets out and prioritizes the recommendations that have been selected for implementation.

The report includes an Implementation Plan that identifies who will be responsible for approving the recommendations set out in the Final Assessment Report; who will be responsible for providing any resources entailed by those recommendations; any changes in organization, policy or governance that will be necessary to meet the recommendations and who will be responsible for acting on those recommendations; and timelines for acting on and monitoring the implementation of those recommendations.

Executive Summary of the Review

In accordance with the Institutional Quality Assurance Process (IQAP), the W Booth School of Engineering Practice and Technology submitted a self-study in April 2021 to the Vice-Provost Faculty to initiate the cyclical program review of the B.Tech. Automotive and Vehicle Engineering Technology program. The approved self-study presented program descriptions, learning outcomes, and analyses of data provided by the Office of Institutional Research and Analysis. Appendices to the self-study contained the CVs for each full-time member in the department.

Two arm's length external reviewers and one internal reviewer were endorsed by the Faculty Dean, W Booth School of Engineering Practice and Technology, and selected by the Vice-Provost Faculty. The review team reviewed the self-study documentation and then conducted a review on May 18-19, 2021. The review included interviews with the Provost and Vice-President (Academic), Faculty Dean, Vice-Provost Faculty, Associate Dean Academic, Program Chair of the B.Tech. Automotive and Vehicle Engineering Technology Program within the W Booth School of Engineering Practice and Technology and meetings with groups of current students, full-time faculty and support staff.

The Program Chair of the B.Tech. Automotive and Vehicle Engineering Technology program and the Dean of the Engineering submitted responses to the Reviewers' Report (January 2022). Specific recommendations were discussed, and clarifications and corrections were presented. Follow-up actions and timelines were included.

The reviewers were very positive about the Automotive and Vehicle Engineering Technology (AVT) program. The AVT program provides a rich student experience in the business and engineering technology domains. The engagement and interactions between McMaster University and Mohawk College are strong (and unique), with additional programs under development. The B.Tech. program family may serve to be a roadmap for other institutions, and McMaster should be proud of this.

Based on the program review, more joint activities between the professional / business aspects with the technical courses needs to be incorporated, and the number of sessional instructors should continue to be reduced where possible. No major issues with respect to admissions, governance, and other auxiliary program support are noted; however, suggestions to improve the program are provided, especially as there is potential to expand the AVT program, and the resources are heavily utilized at the present.

The following program strengths were identified:

- Graduates are exposed to experiential learning activities with hands-on labs, co-op placements, and challenging capstone projects.
- Multi-disciplinary knowledge is gained in the technical and business domains.
- The Automotive and Vehicle Engineering Technology (AVT) instructors have many years of industrial experience and are passionate about this program.
- The students are employed in related fields within a few months of graduation and are remunerated well. Graduates may continue to graduate studies programs.

The following areas of improvement were suggested:

- Introduce an optional program extension of one term that incorporates the courses that the PEO would consider acceptable for program accreditation.
- Additional technical elective courses could be drawn from Faculty of Engineering portfolio.
- Create a 'super course' for each year that combines the content from several complementary courses including business and professional course elements.
- Upgrade materials, manufacturing, and controls-based labs to allow more diverse experimental activities, and program expansion.
- Encourage local industrial supported projects for the capstone projects.
- Develop an internal enterprise-based coop program.
- Use "Kira Talent" for admissions evaluation.
- Better integration of the GENTECH courses and the technical courses.
- Continue to reduce sessional instructors where possible (primarily in the business program).
- Increase the number of tutorial hours for our courses.
- The website info, and support response times are flagged as issues in the Student Satisfaction surveys and should be addressed.

- An orientation session for the sessional instructors should be provided to streamline start of term activities and to ensure general program information is provided.

More specific areas program enhancement described in the report are directly reflected in the recommendations, discussed below.

Implementation Plan

Recommendation	Proposed Follow-Up	Responsibility for Leading Follow-Up	Timeline for Addressing Recommendation
Introduce an optional program extension of one term that incorporates the courses that the PEO would consider acceptable for program accreditation.	We suspect that the reviewers did not have the full picture of PEO and CEAB's responsibilities. Program accreditation is the responsibility of CEAB not PEO. Currently, PEO has assigned "5 confirmatory exams" to our graduates. There are previous PEO exam questions posted online available. Also, there are PEO preparation courses available from organizations such as OSPE (Ontario Society of Professional Engineer). Since the number of students interested in getting their P.Eng. varies every year, it is much more cost effective for our students to enroll into the OSPE courses than us creating an additional 1-year program for PEO exams preparation.	AVT Program Chair to inform Level 4 students about the resources available to help students prepare for their PEO confirmatory exams.	Start sharing resources to Level 4 students via AUTOTECH 4CI3 course in Fall 2022.
Additional technical elective courses could be drawn from Faculty of Engineering portfolio.	We agree with the reviewers' comments and we can add more technical electives. Currently the following 3 technical elective courses from other B.Tech. programs are available to our students to take. We will continue to investigate increasing the	AVT Program Chair to discuss with faculty members to identify new technical electives and propose to	Submit new technical electives in Fall 2022.

	number of these technical electives in the future. 1. MANTECH 4MM3 - Design and Manufacturing of Machine Elements 2. PROCTECH 4MH3 - Machine Health and Remote Monitoring 3. SFWRTECH 4AI3 - Artificial Intelligence.	curriculum committee.	
Create a 'super course' for each year that combines the content from several complementary courses including business and professional course elements.	Currently, the Capstone Design courses are being used as a platform for our students to integrate their theoretical knowledge, technical skills and their management skills. In this course, 2 to 3 students would form a project group, and some would take on the role of the project manager and some would be the mechanical designer or software programmer. The idea is that students would apply knowledge and skills they have gained in their technical or management courses to design and build an integrated system.	AVT Program Chair and the Business and Management Chair to meet and discuss possibilities of eliminating existing course(s) and adding super course(s) to our curriculum.	Propose changes (if any) to faculty curriculum committee in Fall 2022.
Upgrade materials, manufacturing, and controls-based labs to allow more diverse experimental activities, and program expansion.	We agree with the reviewers' comments. We will carefully consider upgrading the equipment in our labs.	AVT Program Chair to discuss with faculty members to identify new lab equipment to purchase and propose to school via annual budget in Dec 2022.	Submit new equipment budget in Dec 2022.
Encourage local industrial supported projects for the capstone projects.	We do encourage locally supported projects. Every year, a list potential projects from local industries and hospitals are given to our	We are already doing what was recommended. No new actions required.	Ongoing effort. No action dates required.

	capstone projects students to choose from.		
Develop an internal enterprise-based coop program.	We already have a very close relationship with Mohawk College. On top of this, we are well connected with our alumni. Many of our alumni hired our students for co-op. Co-op numbers are very encouraging in recent years.	We are already doing what was recommended. No new actions required.	Ongoing effort. No action dates required.
Use "Kira Talent" for admissions evaluation.	We agree that Kira Talent is a useful tool for evaluating applicants for admissions into Level 1.	The Faculty of Engineering has already decided to use Kira Talent as part of a Supplementary Application for B.Tech. No new actions required.	We will use Kira Talent for Fall 2022 admissions.
Better integration of the GENTECH courses and the technical courses.	We agree with the reviewers' comments. This recommendation #8 is related to #3 above.	AVT Program Chair and Management Chair to meet and discuss possibilities of a better integration of our GENTECH courses and technical courses.	Propose new course(s) or changes to faculty curriculum committee in Fall 2022.
Continue to reduce sessional instructors where possible (primarily in the business program)	The high number of sessional instructors teaching our management courses could represent a challenge for integrating the business and technical elements of the program. We will continue to reduce the number of sessional instructors.	Ongoing effort.	Ongoing effort.

Increase the number of tutorial hours for our courses	Currently most of our tutorials are scheduled for our Level 2 courses with enrollment numbers close to 100 students. When class size starts to get bigger in our Levels 3 and 4 courses, it would a good idea to start introducing tutorials in our higher-level courses.	AVT Program Chair to monitor class size and identify needs for adding new tutorials.	Ongoing effort.
The website info, and support response times are flagged as issues in the Student Satisfaction surveys and should be addressed.	We update our website information frequently and we work very hard to improve our support response time. For example, as the program chair, I typically response to my students' emails within 12 hours.	Ongoing effort. No new actions required.	Ongoing effort.
An orientation session for the sessional instructors should be provided to streamline start of term activities and to ensure general program information is provided.	An instructors' orientation meeting is held at the beginning of each term. We always encourage our faculty members and sessional instructors to attend these meetings.	Ongoing effort. No new actions required.	Ongoing effort.

Dean's Response

It looks terrific - the responses are well thought out. I particularly liked your response around accreditation of the program. However, perhaps we can explore the PEO comment more. I agree with your take that the OSPE courses are likely the best option but if there are opportunities for us, perhaps we can consider them. If I am naive in this, of course please let me know.

Quality Assurance Committee Recommendation

McMaster's Quality Assurance Committee (QAC) reviewed the above documentation, and the Committee recommends that the B.Tech. Automotive and Vehicle Engineering Technology program should follow the regular course of action with an 18-month progress report and a subsequent full external cyclical review to be conducted 7 years after the start of the last review.