



## Physics for Modern Technology First Annual Follow-Up Report

**Date Self-Study Report approved by SSCPR:** June 22<sup>nd</sup>, 2022

**Date of External Review Site Visit:** November 31<sup>st</sup> & December 1<sup>st</sup>, 2022

**Date Quality Assurance Plan approved by SSCPR:** September 27, 2023

**Date First Annual Follow-up Report submitted to SSCPR:** September 23, 2024

### FIRST PROGRESS REPORT

**MONTH/YEAR WHEN THE FIVE-YEAR ACTION PLAN BEGINS:** May 2023

**GOAL 1: Grow enrollment in the PMT program and increase retention.**

Actions(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Progress to date/Reasons for Lack of Progress
Identify specific internal and external promotional events that are important for PMT to be represented at, and ensure they are included in the FSH calendar of events.	Chair	September 2023	December 2023	Completed and being maintained -- Several internal and external events were identified and inclusion in the Faculty's calendar of events has been discussed with the Dean's office. We plan to regularly follow up to ensure the events get listed there.  [Note: Faculty of Science and Horticulture (FSH) is now the Faculty of Science.]
Propose a two-year physics/engineering credential which will ladder into the PMT program. The first step is to develop a proposal.	Engineering program co-ordinator	August 2023	September 2024	Completed -- KPU Concept Paper for Diploma in Engineering Physics submitted to Provost office, May 2024
Seek approval for the above proposal at the relevant FSH and Senate committees	Engineering program co-ordinator	June 2024	June 2025	In progress -- Concept paper still under review with KPU Finance (since June 2024)
In conjunction with the Dean's office, FSO, and Marketing, develop promotional materials for the program strongly featuring stories of graduates. These will be used internally and externally and will showcase both the	Chair and L Flinn	May 2023	October 2023	In progress -- Images and videos have been made and are currently being used on our Physics for Modern Technology (PMT) webpage. New posters have also been produced. A more up to date brochure for the program is currently being worked on. Promotional print materials

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diversity of our student body and of the opportunities opened by the program.				are in development and should be complete by October 2024. [Note: FSO = Future Students Office]
Have a designated faculty member on each campus to visit all our first-year physics classes to introduce KPU students to the program. Also invite students to PMT welcome events and student project presentations.	Chair	September 2023	September 2024	Completed -- This is constantly done in our first-year physics courses. Instructors teaching these courses always take time to promote the PMT program with their students. We also do an annual PMT social where all physics students are invited to participate, and we invite all PMT students to work experience presentations and project presentations.
Have a repository of demonstrations and activities for outreach.	M Coombes, L Flinn, D Mathewson	August 2023	December 2023	In progress and will be continually maintained -- The Richmond campus demo room (where demonstration materials are kept) has been re-organized. Lab technician Alex Godhe will be making an online catalogue of demos. L Flinn has enlisted Teaching & learning Commons (T&L) Educational Media Strategist Olivia Jeon to film demo videos (one filmed and to be edited so far). Surrey demo materials will be added to catalogue once Richmond is complete.
Work with Marketing to develop materials to use the CloudLab to promote the program.  Host a summit between key faculty and staff in Physics, as well as representatives from Advising, Marketing and FSO to co-develop these materials and a marketing strategy	T Sato	January 2024	May 2024	In progress -- New space for the CloudLab has already been approved. Construction is nearly complete. In communication with Matt Hoekstra in anticipation of grand opening.
Meet annually with FSO, FSH advisors, international advisors, and Marketing to maintain a dialogue on how best to promote the program to different groups. Offer tours and produce explainers for these groups to ensure they are fully up to speed on the program.	Chair and L Flinn	August 2023	August 2024	In progress -- Regular meetings with advisors were taken throughout 23 and early 24. There have been regular meetings with Marketing as we have worked through our new promotional materials. We have yet to hold tours for the staff of these groups but intend to invite them to our

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				student research seminar at the end of Fall term where they will be able to see some of our student's outputs.
Maintain communication with students interested and admitted to the PMT program by sending a welcome letter and invitation to welcome events.	Chair	September 2023	October 2024	In progress -- We are currently trying to establish a mechanism for contacting interested/admitted students. There is still some discussion as to whether this should come from the department or Dean's office. Complete and will continue annually -- PMT welcome events were held in 23 and 24 and were well attended by existing PMT students. A PMT social event is also held once a year and students taking physics courses are invited to it. They are also invited to attend student presentations.
Establish and renew MOU's with other post-secondary institutions not offering full Physics degree programs to ease transfer of students to PMT at KPU.	Physics articulation rep	September 2023	May 2024	Proceeding with alternate plan. Because Memoranda of Understanding (MOU's) involve many people and administration on both ends and can take a long time to establish, we are working with physics faculty at other institutions to enhance awareness and ask them to identify PMT to their students as a potential path. Course-by-course transfer articulation is being updated.
Establish internal MOU with KPU Mechatronics program for laddering their students into PMT	Chair	May 2023	December 2024	No longer being pursued. A pathway was discussed and proposed for this and agreement reached between chairs. However in higher level discussions it was decided not to formalize the pathway.
Work with FSH Dean's office and other departments on the creation of an FSH recruitment and retention committee led by chairs and coordinators.	M Coombes	June 2023	September 2023	A recruitment and retention (R&R) committee was not formed. This may be because of unexpected changes in Dean and Associate Deans. Though Chairs and Coordinators do work regularly with the Dean's office and the Future Students Office (FSO) on R&R.

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Work with FSO to develop a recurring outreach event aimed specifically at grade 9-10 women.	Chair	January 2024	December 2026	In progress -- This event has not yet been established, however there has been discussion of setting this up as a summer camp event in summer 25.

### GOAL 2: Enhance and expand connections with organizations external to KPU

Action(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Progress to date/Reasons for Lack of Progress
Invite the BC Tech Association to come to speak to other FSH departments to encourage faculty-wide involvement	F Callaghan	August 2023	December 2023	Complete -- Sent an email to BC Tech in March 2024, and followed up in June, asking if they would like to present to our Faculty on the benefits of BC Tech Association membership. Had a meeting with their VP Marketing in July 2024. They won't come to speak to other departments in our Faculty, but they have shared info on membership benefits that we can share with other departments in our Faculty.
Set up and maintain LinkedIn profile for PMT	K Tahani	June 2023	September 2023	Complete -- Our Department of Physics now has an active presence on LinkedIn, where we regularly share updates about our research, events, and achievements. <a href="https://www.linkedin.com/company/kpu-physics-for-modern-technology/">https://www.linkedin.com/company/kpu-physics-for-modern-technology/</a>
Establish connections with SCWIST (Society for Canadian Women in Science and Technology) and CAP's (Canadian Association of Physicists) Division for Gender Equity in Physics and encourage dept members to join these organisations.	Chair	September 2023	September 2023	Complete --There was contact with SCWIST in summer 23 and they provided us with suggested events for our students to attend. Related to this, the physics and math departments, with help from the Dean's office, organised a successful Women in STEM speakers panel, which took place on the Surrey campus in September 2024. See <a href="https://www.kpu.ca/stempanel">https://www.kpu.ca/stempanel</a>

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				Department members are regularly encouraged to maintain their membership of CAP and engage with their Division for Gender Equity in Physics.
Initiate a seminar series with guest speakers from industry or applied research labs, with a goal of having at least one speaker per semester (Fall and Spring)	F Callaghan	January 2024	May 2025	In progress -- Two of our industry contacts have agreed to give seminars at KPU in the 24/25 academic year. Next step is to arrange the dates.
Invite representatives of suitable graduate programs to present to our students to increase their awareness of their options for further study.	Chair	September 2023	May 2024	Not started -- We may combine this with our annual student research seminar.
Establish a regular industry network event, possibly in conjunction with other departments.	F Callaghan	January 2024	January 2026	Not started -- This was brought to the attention of our Program Advisory Committee (PAC) at its June 2024 meeting as an item that will be discussed at future meetings (the next meeting is planned for December 2024).
Commit to filling at least 3 seats on the PAC with women and/or Indigenous representatives from relevant industry sectors.	F Callaghan	May 2024	May 2025	In progress -- This was brought to the attention of our PAC at its June 2024 meeting as an item that will be discussed at future meetings (the next meeting is planned for December 2024). One of the Women in STEM event (see above) attendees from a local company expressed interest in our PAC, and we will follow up on that.
Identify gaps in PAC membership to ensure all relevant industry sectors are represented.	F Callaghan	May 2024	May 2025	Not started -- This was brought to the attention of our PAC at its June 2024 meeting as an item that will be discussed at future meetings (the next meeting is planned for December 2024).
Showcase industrial partner contributions to the program and how they have benefited our students in order to encourage further support.	Chair	May 2023	May 2025	Complete and will be continually addressed -- Industrial partner contributions have been included on some of our posters and website. More needs to be done on this though.

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Increase the number of visits / field trips to local companies to give students more exposure to the local tech sector, with a goal of having one trip per semester (Fall and Spring)	D Mathewson	September 2023	September 2025	In progress -- Honeywell have offered to host a field trip to their labs in North Vancouver. A list of other possible destinations has been compiled. First outing planned for Spring 2025 will be publicized to PMT program students in Fall 2024.

### GOAL 3: Enhance student experience

Action(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Progress to date/Reasons for Lack of Progress
Maintain physics membership of the FSH Research Committee to ensure we continue to be involved in FSH efforts to expand student involvement in research.	J Hoyland	May 2023	May 2023	Complete -- The Physics department is a consistent member of the Faculty of Science Research Committee.
Widen participation in the annual student research seminar to include presentations by students from more of our courses	J Hoyland	September 2023	December 2024	Complete -- Students from PHYS 1600 and PHYS 2100 are now included in the seminar presenting posters and live demonstrations.
Investigate possibility of expanding the above seminar to an FSH-wide event (and other STEM-based programs in other Faculties) and inviting more widely in the University and beyond.	Chair	January 2024	December 2025	Not started, though we plan to expand invitations this year.
Strike an ad-hoc committee including a female student representative and an alumna to investigate the issue of gender diversity within the department.	J deBenedictis	September 2023	September 2025	In progress. Initial discussions on setting this up have taken place at department meetings.
Invite students to regular industry/student network event.	F Callaghan	January 2024	January 2026	Not started -- This will be done when the next event is organized. See note above (under Goal 2) regarding progress on this event.
Seek guidance from the Indigenous Advisory Committee and Indigenous Students' Association on how indigenization can be addressed in our program.	Chair	January 2024	February 2024	Not started, though new dept chair plans to begin work on this soon.

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Invite someone from the International office to a dept meeting to talk to us about the services provided by KPU for international students.	Chair	August 2023	August 2023	Not started, though new dept chair plans to invite someone from the International Office to attend our December department meeting.
Investigate the use of e-portfolios and present results of investigation to dept.	D Mathewson	September 2023	August 2024	In progress -- We met with KPU T&L to investigate options. We tried their current platform, PebblePad, and it's inappropriate for our needs. We are collaborating to find a better option.
Investigate possible external student competition opportunities.	L Flinn	September 2023	September 2024	Completed -- A list of student competitions was completed and submitted to Chair.
Develop a proposal for dedicated student research project space in conjunction with other FSH departments and bring forward to Faculty Council for support.	Chair	September 2023	September 2025	Started, though may not proceed within the stated timeframe. This has been discussed with other chairs, however the current budgetary constraints make this seem unlikely to succeed in the near future.

### GOAL 4: Implement curricular changes as described in the External Review Report, to better align the program with the needs of stakeholders

Action(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Progress to date/Reasons for Lack of Progress
Re-open discussions with co-op office with regards to support which could be offered to expand work experience opportunities for students.	Chair and F Callaghan	January 2024	September 2024	Started but delayed -- Physics faculty discussed this in June 2024, but the co-op office has not yet been approached. We plan to do that in Fall 2024.
Update the PHYS 2420 course outline to reflect current practice	F Callaghan and K Tahani	May 2024	June 2024	In progress -- Changes to the PHYS 2420 course outline were discussed and agreed upon in June and July 2024. The changes will be submitted for approval along with the other curricular and program changes that arise out of this program review.
Survey faculty to determine how computing and software are currently used, taught, and incorporated in the program and assess the results for gaps.	K Tahani	September 2023	September 2024	Complete. The survey on how computing and software are integrated into our physics program is now complete. During a

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				recent meeting, we assessed the identified gaps and discussed several potential approaches to addressing them. The key points and conclusions from these discussions are summarized in the section below.
Use the survey results to develop a framework for including computing throughout the program to ensure students gain experience with key programming topics and techniques. Update course outlines accordingly.	K Tahani	September 2024	September 2026	<p>In progress. Based on discussions that have been taking place among faculty, we are considering the following as a possible course of action:</p> <ul style="list-style-type: none"> <li>• Introduce a programming course in the first year of the PMT program.</li> <li>• Prioritize Python as the main programming language, while students will learn C, C++, and MATLAB in other courses.</li> <li>• Include a Machine Learning course, which could be offered in the 3rd or 4th year.</li> </ul> <p>Such changes could affect a small number of other courses in the program (e.g. replacement or moving to a different semester), which we are carefully considering and which will be part of the program changes we submit for approval. Currently we aim to make these changes by Sep 2025.</p>
Pilot suggested additional topics within our Special Topics course.	Chair	March 2024	March 2025	Completed and will continue -- This was done with our data science course which was piloted in special topics. We will continue this in future iterations of the special topics course.
Survey faculty to find out which journals we would like easy access to, and follow up with the library.	T Sato	October 2023	January 2024	Completed -- A wish-list for journals was compiled and reviewed with Angela Ryan, physics' liaison librarian. New acquisitions are being considered, as well as deletion of unneeded journals.

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Formalize the incorporation of literature research skills in the program. Update course outlines accordingly.	F Ruiz Oliveras	September 2023	September 2025	In progress -- Discussions have begun and course outlines will be updated when they are sent to Curriculum Committee for review.
Reassess math topics that are required for the program	T Sato	September 2023	April 2024	Complete -- Dept faculty has met to discuss, has emerged with proposal.
Consult with math dept on the content of MATH 2721 and 2821 to ensure required topics are covered.	T Sato	May 2024	September 2024	In progress -- A new sequence of math & physics courses are proposed by dept faculty consensus.
Investigate including more examples of technology developed in the region into the curriculum.	F Callaghan	September 2023	September 2026	Complete and will be continually addressed -- This was discussed at our June 2024 PAC meeting. We received great input, resulting in a list of technologies being developed locally that would be suitable for inclusion in our program. Next steps will be determining how and where to fit them into the curriculum.
Form a committee that includes lab staff to review literature on best practices for first-year laboratory education.	J Hoyland	September 2023	August 2024	In progress -- A committee has been formed to review this, but has not yet produced recommendations
Incorporate the findings of the above review into our courses.	J Hoyland	September 2024	September 2026	See above.
Consult with PAC to determine which Business topics to include in the program. Then consult School of Business to determine which of their courses would be appropriate.	Chair	September 2023	December 2024	Not started -- This was brought to the attention of our PAC at its June 2024 meeting as an item that will be discussed at future meetings (the next meeting is planned for December 2024).

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### GOAL 5: Build the resilience of the program to future changes

Action(s) Required to Achieve this Goal	Led by	Start on (M/YY)	Complete By (M/YY)	Progress to date/Reasons for Lack of Progress
Develop a proposal for dedicated student research project space in conjunction with other FSH departments and bring forward to Faculty Council for support.	Chair	September 2023	September 2025	Started, though may not proceed within the stated timeframe. This has been discussed with other chairs, however the current budgetary constraints make this seem unlikely to succeed in the near future.
Work with Facilities to realize the CloudLab's new permanent home on the Richmond campus and continue development work to expand online lab offerings.	T Sato	May 2023	September 2025	Complete and will continually be maintained – New permanent home for CloudLab home has been built. Development of CloudLab will be an ongoing process.
Develop documentation and standard operating procedures for all laboratory equipment (for example CloudLab, scanning electron microscope and other specialized equipment) to ensure resilience in case of personnel changes.	Chair	September 2023	September 2026	In progress (partially complete) -- Standard operating procedures for the scanning electron microscope and some other pieces of equipment have been developed.
Maintain a list of who in dept can teach which courses and perform a SWOT (strengths, weaknesses, opportunities and threats) analysis to ensure high program quality.	Chair & Dept search committee	May 2023	May 2024	Complete -- A table of who has and hasn't taught courses has been produced and faculty have rotated across upper level courses.
Maintain discussions with PAC to ensure program currency and relevance to industry needs.	F Callaghan	January 2024	January 2025	Complete -- We received input on latest industry trends and desirable graduate attributes/skills/knowledge at our June 2024 PAC meeting. This is, and will continue to be, a standing item on PAC meeting agendas.
Maintain a repository of teaching materials that instructors can use when teaching a course for the first time or when they have to take over at short notice.	J deBenedictis & M Coombes	May 2023	May 2025	Complete -- The Physics department has a sharepoint site where all current lab manuals can be found and instructors put course materials.