SFU OFFICE OF THE PROVOST AND VICE-PRESIDENT ACADEMIC

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MEMORANDUM

ATTENTION	Senate	**DATE**	February 12, 2025
FROM	Dilson Rassier, Provost and Vice-President Academic, and Chair, SCUP	**PAGES**	1/18
RE:	Full Program Proposal for a Graduate Diploma in Big Data (SCUP 25-15)		

At its meeting on February 5, 2025, SCUP reviewed and approved the Full Program Proposal for a Graduate Diploma in Big Data.

> **Motion:** That Senate approve and recommend to the Board of Governors the Full Program Proposal for a Graduate Diploma in Big Data in the School of Computing Science within the Faculty of Applied Sciences, effective Fall 2025.

For Information

Included in the Full Program Proposal and approved by SGSC, subject to approval by Senate:

1. New Calendar Entry: Graduate Diploma in Big Data
2. New Course: CMPT 790 Big Data Portfolio

C: Ali Mahdavi Amiri, Assistant Professor, Program Chair and Director, Master's in Professional Computer Science, Faculty of Applied Sciences

SFU GRADUATE STUDIES

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MEMORANDUM

ATTENTION Senate Committee on University Priorities (SCUP)

DATE January 17, 2025

FROM Mary O'Brien,
Chair of Senate Graduate Studies Committee (SGSC)

RE: Full Program Proposal: Graduate Diploma in Big Data

For Approval: At its meeting on January 7, 2025, the SGSC approved the following full program proposal, a Graduate Diploma in Big Data from the School of Computing Science and is recommending it to SCUP for approval, effective **Fall 2025**.

Motion:
That SCUP approve and recommend to Senate the full program proposal for a Graduate Diploma in Big Data from the School of Computing Science within the Faculty of Applied Sciences, effective Fall 2025.

For Information:
Included with the full program proposal and approved by SGSC subject to approval by Senate:

1) New Calendar Entry: Graduate Diploma in Big Data
2) New Course: CMPT 790 Big Data Portfolio

Senators wishing to consult a more detailed report of curriculum revisions may do so on the Senate Docushare repository at https://docushare.sfu.ca/dsweb/View/Collection-12682

OFFICE OF THE DEAN
Faculty of Applied Sciences
Simon Fraser University

MEMORANDUM

Attention: Dr. Mary O'Brien
Dean, Graduate Studies

Date: Nov. 1, 24

From: Dr. Parvaneh Saeedi,
Associate Dean of Research and Graduate Studies, Faculty of Applied Science

Re: FAS-CS Graduate Diploma Program Proposals

The Faculty of Applied Sciences Graduate Studies Committee would like to submit three proposals for Graduate Diplomas in Big Data, Cyber Security, and Visual Computing, proposed by our School of Computing Science.

We kindly request that these proposals be submitted to the Senate Graduate Studies Committee for review. Thank you for considering our proposals, and we look forward to your support.

Regards,
Parvaneh Saeedi

Associate Dean of Research and Graduate Studies,
Faculty of Applied Sciences

SFU COMPUTING SCIENCE

MEMO

Attention: **Parvaneh Saeedi, Associate Director**

From: Manolis Savva, Graduate Program Chair

Re: **New Graduate Diploma Degree Proposals**

Date: October 25th, 2024

NEW GRADUATE DIPLOMA DEGREE PROPOSALS

The School of Computing Science is proposing three new graduate diploma degree programs, effective Fall 2025: Graduate Diploma in Visual Computing, Graduate Diploma in Big Data, and Graduate Diploma in Cybersecurity.

These three diploma degrees mirror the Master's in Professional Computer Science (MPCS) degrees in the corresponding tracks currently offered by the School of Computing Science.

Please see the attached proposal documents for more details. If you have any questions regarding these proposals, please let me know.

Manolis Savva
Graduate Program Chair
School of Computing Science

SFU SIMON FRASER UNIVERSITY
ENGAGING THE WORLD

Graduate Diploma in Big Data

Full Program Proposal

09/12/2024

School of Computing Science

Executive Summary

The Graduate Diploma in Big Data is initially offered as an exit option for students who are enrolled in the MSc in Big Data and unable to complete the program requirements. By having the Diploma as an alternative credential, we will be able to extend admissions offers to a larger number of applicants.

Our eventual goal is to make it possible for working professionals in computing science to pursue the Diploma through part-time study as these students will not need the co-op that is integral to the Master's credential. Providing the Diploma for working professionals will enable them to boost their careers by learning in hands-on lab courses, as well as allow us to establish lasting partnerships with local industries that wish to train their staff but are not ready to send them for a long and demanding Master's program.

PART A

Proposed credential to be awarded

Graduate Diploma in Big Data

Location of program

Main courses will be offered in SFU Burnaby campus, School of Computing Science, with the possibility of having some of the courses in Surrey campus.

Academic unit(s) offering proposed program

School of Computing Science at Faculty of Applied Science will offer the Graduate Diploma in Big Data.

Students must maintain a minimum 2.5 CGPA throughout their graduate career.

Students complete all of

CMPT 756 - Distributed and Cloud Systems (3)
CMPT 732 - Big Data Lab I (6)
CMPT 733 - Big Data Lab II (6)
CMPT 726 - Machine Learning (3)
and three units of graduate courses in Computing Science

and

CMPT 790 - Big Data Portfolio (1)

or

an additional three units of graduate courses in Computing Science

In the initial offerings, the Diploma in Big Data will be an exit option for students who are not able to complete the MSc. Over time, we expect to allow to enrol directly into the Diploma in Big Data either as a stand-alone credential or with option to transfer or ladder into the MSc in Big Data.

Anticipated program start date

Fall 2025

Anticipated completion time

Fall	CMPT 732 - Big Data Lab I (6) CMPT 726 - Machine Learning (3)
Spring	CMPT 733 - Big Data Lab II (6) CMPT 756 - Distributed and Cloud Systems (3)
Summer/Fall	three units of graduate courses in Computing Science and CMPT 790 - Big Data Portfolio (1) or an additional three units of graduate courses in Computing Science

Summary of proposed program

a) Aims, goals and/or objectives of the proposed program

The graduate Diploma program will complement the existing Master of Science in Big Data program of the School of Computing Science by providing a dignified exit option for students who are unable to complete the MSc. We expect to be able to transition the Diploma in Big Data to be an on ramp for the MSc. In this latter instance, the Diploma program will also provide an accessible pathway to the Master of Science in Big Data for some students who do not meet the 3.0 CGPA or other academic qualifications for direct admission to the Master's program, but are subsequently able to meet the requirements for transfer from the Diploma program to the Master's program based on a 3.0 CGPA in Diploma program courses (Graduate General Regulations 1.3.6b). In the future, it may also provide a less intensive (part-time) option for some students who wish to pursue graduate training in Big Data, but are unable to commit to the full-time nature of the Master of Science in Big Data program. Diploma students who demonstrate strong performance will have the option to apply to transfer or ladder (GGR 1.7.7c) into a Master's degree program, with the opportunity to transfer their credits, including lab courses. Those requests will be assessed

individually by the school to assess student qualifications and determine resource availability, particularly in terms of supporting mandatory co-op placements.

b) Anticipated contribution of the proposed program to the mandate and strategic plan of the institution

The proposed Graduate Diploma in Big Data aligns seamlessly with the Faculty of Applied Sciences' academic plan. It is listed as New Scholarly Priorities of the faculty (Data driven applied science).

The program is also aligned with the University's academic plan, explicitly by offering a program that helps in "maintaining and improving revenue streams" under "Improving Institutional Effectiveness". It provides an opportunity to enhance the inclusivity of the program by admitting students from a diverse set of groups including age, ethnicity, ability, etc. under "Developing a Culture of Inclusive Excellence".

Academic Enrichment: The diploma program expands the institution's academic offerings, providing students with specialized training in a field crucial to the modern data-driven landscape. This aligns with the strategic goal of enhancing academic programs to cater to evolving industry demands.

Achieving international attention: This program enhances the institution's global competitiveness by attracting students interested in cutting-edge technologies and analytics. Graduates with expertise in Big Data contribute to the institution's reputation as a hub for preparing professionals with skills relevant on the global stage.

Interdisciplinary programs: Big Data often involves interdisciplinary collaboration with fields such as finance, statistics, and business. The program promotes collaboration across disciplines, supporting the institution's strategic emphasis on interdisciplinary research and education.

Diversity: The Graduate Diploma in Big Data program provides an inclusive learning environment, attracting students with diverse backgrounds and interests. This aligns with the institution's commitment to diversity, ensuring that education is accessible and appealing to a broad spectrum of learners.

c) Potential areas/sectors of employment for graduates and/or opportunities for further study

The major occupation group that graduates from this program would be looking for employment in is "Science, Technology, Engineering and Mathematics (STEM) occupations" (NOC 21211, Data Scientists) as per the BC Labour Market Outlook 2023. We also anticipate the following job employments

Technology and IT Companies: Big Data professionals are in high demand in technology firms that develop data analytics tools, databases, and software solutions.
Graduates can work on designing, implementing, and optimizing data systems.

Finance and Banking: The finance industry leverages Big Data analytics for risk management, fraud detection, and customer insights. Graduates may find opportunities in financial institutions to analyze large datasets and derive valuable insights.

Healthcare: Big Data plays a crucial role in healthcare for predictive analytics, personalized medicine, and patient outcomes analysis. Graduates can contribute to improving healthcare systems by analyzing vast amounts of medical data.

E-commerce and Retail: Online retailers utilize Big Data for customer behavior analysis, demand forecasting, and personalized marketing. Graduates can work in ecommerce companies to optimize business strategies.

Marketing and Advertising: Big Data is instrumental in marketing for customer segmentation, campaign effectiveness analysis, and targeted advertising. Graduates can pursue roles in marketing analytics and data-driven decision support.

Government and Public Sector: Governments use Big Data for policy analysis, urban planning, and public service optimization. Graduates may find opportunities in government agencies or municipal organizations.

Consulting Firms: Management and data consulting firms often seek professionals with Big Data expertise to assist clients in leveraging data for strategic decision-making.

Manufacturing and Supply Chain: Big Data analytics is valuable in optimizing manufacturing processes, predicting equipment maintenance needs, and improving supply chain efficiency. Graduates may find roles in manufacturing industries.

d) Delivery methods

The Graduate Diploma in Big Data will be delivered face-to-face.

e) Related programs in the institution or other British Columbia postsecondary institutions.

SFU currently offers a Master of Science in Big Data program. The proposed Graduate Diploma in Big Data will complement this existing program by catering to students who may face constraints that prevent them from completing a full Master's degree.

Contact information

Dr. Ali Mahdavi Amiri,
Assistant Professor in Professional Practice,
Director of Master's in Professional Computing Science

amahdavi@sfu.ca

PART B

PROGRAM DETAILS

a) Graduation requirements, target audience

The Graduate Diploma in Big Data offers an alternative entry pathway for MSc students with CGPA below 3.0 or for the ones that are not fully prepared for the MSc program. This will allow us to extend offers of admission to a broader range of domestic and international applicants who might have been assessed as less likely to be able to complete the degree.

b) Admission requirements

The Graduate Diploma in Big Data functions as an alternative exit option integrated into the current Master of Science in Big Data program. The sole distinct requirement for Diploma students is a minimum GPA of 2.5; otherwise, all other admission criteria align with those of the Master of Science in Big Data program. With the Diploma, students who run into difficulties completing the MSc we can be more flexible in considering Canadian universities and colleges with lower rankings, unlike our Master's program, which typically admits students from top institutions.

c) Evidence of student interest and labour market demand

Every year, we receive over 1,000 applications for our MSc programs, yet we can only admit approximately 80 students in total. Among them, a considerable number are domestic applicants who may not have graduated from top-tier universities or meet our CGPA requirements. Introducing the Diploma program enables us to extend conditional admission offers to individuals who we would not have admitted unconditionally. Furthermore, the Big Data sector is witnessing increased demand in the job market due to growing business needs. Our firsthand experience managing the Master of Science in Big Data over the past few years has provided us with insights into its strong presence and capacity in the job market.

d) Eligibility for scholarships, awards, and financial aid

We expect that scholarships, awards, and financial aid will not be provided.

RESOURCES

a) Enrolment Plan

In its initial configuration, the Diploma in Big Data is an alternative exit option for students who cannot compete the MSc in Big Data. These students can transfer from the MSc and receive the Diploma after completing 22 units of core and elective courses. Eventually, we expect to develop a part-time Diploma option that will act as an accessible pathway for working professionals in the computing field and others who are unable to commit to a program of full-time study. Diploma students achieving strong performance (CGPA above 3) can apply for our MSc program, with their applications reviewed by the school. They also have the opportunity to transfer completed units to the MSc program for graduation.

b) Resources required and/or available to implement the program (financial and personnel) including any new faculty appointments

The resources required for this diploma program are existing resources that meet the needs of the Master of Science in Big Data. Existing resources at the School of Computing Science will be utilized including classrooms, study areas and student facilities. Administrative support will include an Academic Director and Program Coordinator that already manage the Master of Science in Big Data program; therefore, no additional personnel resources will be required.

c) Faculty member's teaching/supervision

Graduate Diploma in Big Data courses will be taught by faculty members teaching in the Master of Science in Big Data program. The Academic Director for the Master of Science in Big Data also serves as the Academic Director for the Graduate Diploma in Big Data. Since this is a course-based program, students do not need a supervisor.

d) Tuition

The tuition model for Graduate Diploma in Big Data, as an exit option from the MSc in Big Data, remains the same as for the MSc in Big Data. Completed co-op course CMPT 626 shall be considered as a replacement for CMPT 790 Big Data Portfolio towards graduation requirements.

Graduate Diploma in Big Data

Description of Program

The Graduate Diploma in Big Data is a professional graduate program that provides a hands-on introduction to computing technology relevant to the acquisition, preprocessing, storage, manipulation, and analysis of very large data sets, including both structured and unstructured data.

Admission Requirements

Applicants must satisfy the university admission requirements as stated in Graduate General Regulation 1.3 in the SFU Calendar. In addition to the University CGPA requirement, students must hold a bachelor's degree or its equivalent in computing science or a related field. Students admitted to the Master of Science in Big Data may transfer to the Graduate Diploma in Big Data at any time with permission of the Graduate Program Committee and Graduate Studies.

Program Requirements

This program consists of course work for a minimum of 22 units. The program requires students to maintain a minimum 2.5 CGPA throughout their graduate career.

Students complete all of

CMPT 756 - Distributed and Cloud Systems (3)
CMPT 732 - Big Data Lab I (6)
CMPT 733 - Big Data Lab II (6)
CMPT 726 - Machine Learning (3)
and three units of graduate courses in Computing Science

and

CMPT 790* - Big Data Portfolio (1)

or

three additional units of graduate courses in Computing Science

*In CMPT 790, students prepare a portfolio of their works in the area of Big Data including completed projects and assignments from the Big Data Lab courses and other relevant courses, as well as contributions to other projects. The portfolio is examined by at least two readers from the professional graduate programs committee.

Program Length

We expect that full-time students can complete the Graduate Diploma in Big Data in three terms.

Academic Requirements within the Graduate General Regulations

All graduate students must satisfy the academic requirements that are specified in the graduate general regulations, as well as the specific requirements for the program in which they are enrolled.

SFU GRADUATE STUDIES

NEW GRADUATE COURSE PROPOSAL

Course Subject (eg. PSYC)	Number (eg. 810)	Units (eg. 4)
CMPT	790	1

Course title (max. 100 characters): Big Data Portfolio

Short title (for enrollment/transcript, max. 30 characters): Big Data Portfolio

Course description for SFU Calendar (course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description. Max. 50 words)

Students prepare a portfolio of their works in the area of Big Data including work from Big Data Lab courses and other relevant courses, as well as contributions to other projects. Graded on a satisfactory/unsatisfactory basis.

Rationale for introduction of this course (if more space is required, add a separate page)

This is a capstone course for students in the Graduate Diploma in Big Data. Students showcase their work throughout the program with a view to being able to present the assembled portfolio in applications for employment in the area and/or further study.

Term of initial offering (eg. Fall 2019): Fall 2025	**Course delivery** (eg. 3 hrs/week for 13 weeks): 0
Frequency of offerings/year: every semester	**Estimated enrollment per offering**: 5

EQUIVALENT COURSES

Courses that replicates the content of this course to such an extent that students should not receive credit for both courses. Please select the one that is most relevant.

☐ **SEQUENTIAL COURSE**	☐ **ONE-WAY EQUIVALENCY**	☐ **TWO-WAY EQUIVALENCY**
[is not hard coded in the student information management system (SIMS).] Students who have taken (place relevant course(s) in the blank below (ex: STAT 603)) first may not then take this course for further credit.	[is not hard coded in SIMS.] (Place relevant course(s) in the blank below (ex: STAT 603)) will be accepted in lieu of this course.	[is hard coded and enforced by SIMS.] Students with credit for (place relevant course(s) in the blank below (ex: STAT 603)) may not take this course for further credit.

Does the partner academic unit agree that this is a two-way equivalency? ☐ YES ☐ NO

Please also have the partner academic unit submit a course change form to update the course equivalency for their course(s).

Prerequisite and/or Corequisite

CMPT 733

Criminal record check required? ☐ Yes (if yes is selected, add this as prerequisite) | **Additional course fees?** ☐ Yes ☑ No

Campus where course will be taught ☑ Burnaby ☐ Surrey ☐ Vancouver ☐ Great Northern Way ☐ Off campus

Course Components * ☐ Lecture ☐ Seminar ☐ Lab ☑ Capstone ☐ Practicum ☐ Online ☐ Other: _____

Grading Basis ☐ Letter grades ☑ Satisfactory/ Unsatisfactory ☐ In Progress / Complete

* See important definitions on the curriculum website.

Repeat for credit? ☐ Yes ☑ No	**Total completions allowed?** 1	**Repeat within a term?** ☐ Yes ☑ No
Required course? ☑ Yes ☐ No	**Final exam required?** ☐ Yes ☑ No	

Combined with an undergraduate course? ☐ Yes ☑ No If yes, identify which undergraduate course and the additional course requirements for graduate students. Please include a copy of the undergraduate course outline and fill out the Equivalent Courses section above.

RESOURCES

If additional resources are required to offer this course, provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course

Ke Wang, Greg Baker, Steven Bergner

Additional faculty members, space, and/or specialized equipment required in order to offer this course

None.

CONTACT PERSON

Academic Unit / Program	Name (typically, Graduate Program Chair)	Email
CMPT/Professional Grad Programs	Ali Mahdavi-Amiri	ali_mahdavi-amiri@sfu.ca

ACADEMIC UNIT APPROVAL

☐ A course outline / syllabus is included

Non-departmentalized faculties need not sign

Graduate Program Committee Manolis Savva	**Signature**	**Date** Nov 22nd 2024
Department Chair Oliver Schulte	**Signature** Oliver Schulte Digitally signed by Oliver Schulte Date: 2024.11.22 10:30:05 -08'00'	**Date** Nov 22, 2024

FACULTY APPROVAL

The course form and outline must be sent by FGSC to the chairs of each FGSC (fgsc-list@sfu.ca) to check for an overlap in content

Overlap check done? ☑ YES

This approval indicates that all the necessary course content and overlap concerns have been resolved. The Faculty/Academic Unit commits to providing the necessary resources.

Faculty Graduate Studies Committee Parvaneh Saeedi	**Signature** Parvaneh Saeedi Digitally signed by Parvaneh Saeedi Date: 2024.11.22 13:55:39 -08'00'	**Date** Nov 22, 2024

A library review will be conducted. If additional funds are necessary, Graduate Studies will contact the academic unit prior to SGSC.

SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee Mary O'Brien	**Signature**	**Date** January 20, 2025

ADMINISTRATIVE SECTION (for Graduate Studies office only)

Library Check: _____
Course Attribute: GCAP
Course Attribute Value: PORTFOLIO
Instruction Mode: _____
Attendance Type: _____

If different from regular units:
Academic Progress Units: _____
Financial Aid Progress Units: _____

CMPT 790 Big Data Portfolio

Description

CALENDAR DESCRIPTION:

In this course, students will compile a comprehensive portfolio showcasing their projects and works in Big Data. Students have already engaged in various lab courses, allowing them to explore techniques and applications in areas such as big data engineering, data science, machine learning, etc.

Students will practice how to effectively present their projects, emphasizing both technical skills and creative problem-solving. The portfolio will not only demonstrate their individual expertise but also reflect their growth and development in the field. By the end of the course, students will have a polished collection of work that can be used for academic purposes, internships, or career opportunities in Big Data.

COURSE DETAILS:

Instructor's Objectives

The objective of this course is to guide students in the creation of a professional portfolio that effectively showcases their skills and projects in Big Data. The instructor aims to foster a collaborative and creative environment so that students can receive constructive feedback, and develop a strong personal narrative that highlights their unique contributions to the field. By the end of the course, it is intended for each student to have a polished and cohesive portfolio that not only demonstrates their expertise but also enhances their readiness for future professional endeavors.

GRADING:

The course will be graded on a pass/fail basis, with criteria established by the instructor at the start of the semester.
The following is a proposed grading mechanism and students who achieve a score above 70% will pass. Instructors are encouraged to meet with students multiple times throughout the semester to provide feedback. While this is the recommended approach, instructors have the discretion to modify it as needed.

GRADING MECHANISM:

Portfolio Content (40%)

- **Quality of Projects (20%**): Depth and complexity of the projects included. Clear demonstration of Big Data concepts (e.g., engineering, data science, machine learning techniques).
- **Variety and Relevance (10%)**: Inclusion of diverse projects reflecting different Big Data domains. **Documentation and Clarity (10%)**: Proper documentation of each project (e.g., objectives, methodology, results, and conclusions). Use of clean, concise, and professional language. Having clean and runnable Github page.

Presentation Skills (30%)

- **Design and Organization (20%):** Webpages, resumes, and other necessary documents should have sufficient visual appeal, usability, and coherence in addition to logical flow and ease of navigation.
- **Presentation of Work (10%)**: Ability to effectively and concisely explain and present projects in written documents and orally to the instructor if needed. Use of storytelling to emphasize contributions and problem-solving.

Engagement and Process (20%)

- Demonstration of growth by addressing feedback from the instructors.

Online Presence and Professional Documents (10%):

- Students should provide updated resume, Linked In page, Github page, and personal webpage where all these portfolio content is available.

MATERIALS:

No required text. The instructor should provide sample portfolios as a guideline.